AML REPORT. 1646

1360

Stauch Meadow, Brandon, Suffolk (BRD 018): Environmental and Economic Studies

In this report (which replaces earlier reports) studies of sediments and macrofossils completed up to April 1985 are described and discussed. Since excavation at the site continues the report will no doubt require subsequent alteration and addition. Work on pollen, mosses, dendrochronology, insects and bone is either incomplete or has not begun. However, an outline of proposed contents of the final report is included.

Brandon, Suffolk: Environmental and Economic Studies

Proposed contents of final report.

1. Introduction.
*2. Sampling and recovery methods.
*3. Valley sediments and associated archaeological deposits.
*4. The occupation layer: general description and interpretation.
5. Pollen analysis. (by Dr Rob Scaife)
*6. Plant macrofossils (excluding mosses and wood).
7. Mosses (by Robin Stevenson).
*8. Wood.
9. Dendrochronology (by Dr Jennifer Hillam).
10. Insects (by Dr Maureen Girling)?
*11. Molluscs.
12. Fish-bone (by Alison Locker)?
13. Other faunal remains (by Roger Jones)?
14. General discussion.

Sections marked with an asterisk and included in this report. Study of other categories of biological remains is either incomplete or has not yet begun.

2. Sampling and recovery methods

Five groups of samples were collected, each group being designed to examine particular aspects of the environment and economy of the site. These groups were as follows:

1) Four column samples from sections through the valley floor peats and associated archaeological deposits, to investigate the stratigraphic sequence and to provide data on local habitat change. Additional samples were taken for radiocarbon dating. Plant macrofossils from all four columns were identified, and separate sub-samples for insect analysis were retained from column 4, which came from the deepest peat section exposed. A parallel series of pollen samples was collected by Dr R. Scaife at 2cm. intervals next to column 4.

2) A grid of samples from the area of the Middle Saxon 'occupation layer' excavated in 1983/4. These were taken to examine the spatial distribution of plant and animal macrofossils across this area of the site.

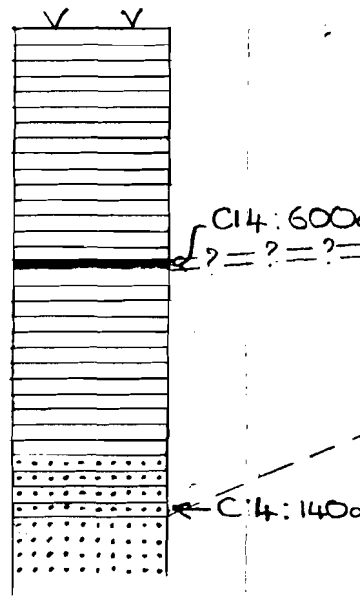
3) Bulk samples from a group of eleven Middle Saxon features (0045, 0055, 0062, 0074, 0078, 0110, 0147, 0201, 0215, 0254, 0298) excavated in 1980. These were collected primarily for the recovery of carbonised seeds, fishbone, and mollusc shell. 35cm.^{2} columns sub-divided at 10cm. intervals were removed from these features.

4) Samples from five Iron Age contexts (1080, 1354, 1362, 1372, 1373) excavated in 1981. These were taken mainly to provide information on Iron Age crop production and processing at the site.

5) Samples from the waterfront and adjacent areas. Here artificial sand and clay mounds or 'islands' had been laid on the peat surface, and these appeared to be related to some industrial process. The main reason for sampling was to establish the nature of this process.

The methods of Kenward et al (1980) were used to extract macrofossils from peats and waterlogged archaeological deposits from low-lying areas of the site. Bulk samples from the dry sandy fills of Middle Saxon features excavated in 1980 were processed using a flotation/wet sieving tank based on the model described by Williams (1973), with 0.5mm. meshes. Smaller samples from other dry archaeological deposits were processed in the laboratory, by manual water flotation and wet-sieving, again with 0.5mm. meshes. Further details of recovery and preparation methods are given below where necessary.

Column 1.



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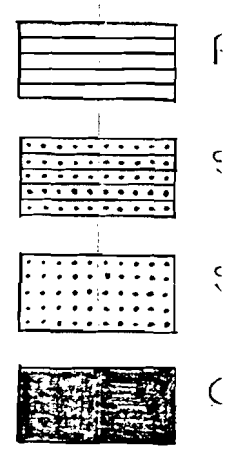
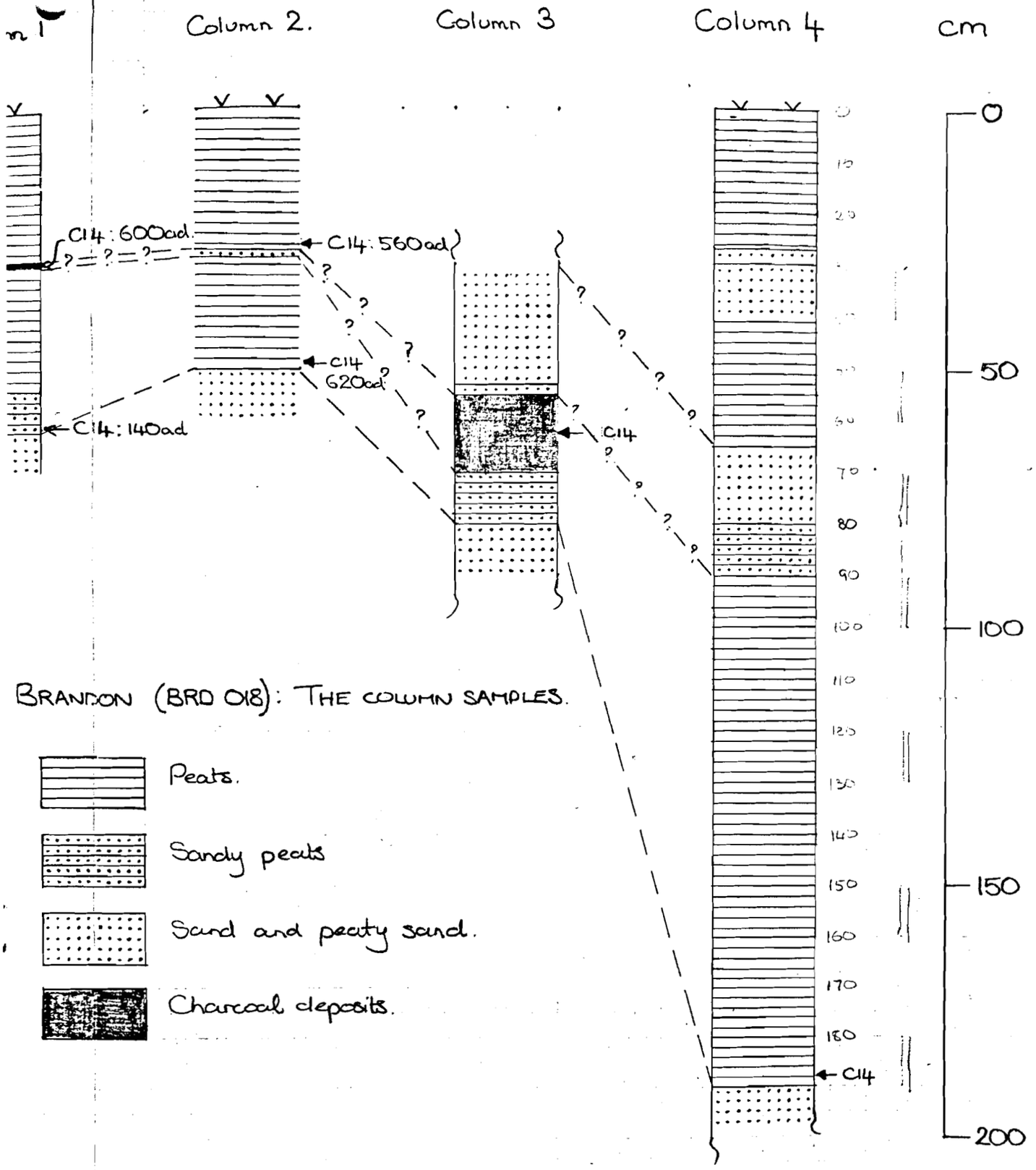



Column 2.
Column 3
Column 4
cm
C14: 600ad
C14: 560ad
C14
620ad
C14: 140ad
C14
C14
0
50
100
150
200
BRANDON (BRD 018): THE COLUMN SAMPLES.
Peats.
Sandy peats
Sand and peaty sand.
Charcoal deposits.

3. Valley sediments and associated archaeological deposits

Four column samples have been examined. These were located at the margins of the sand hummock on which the settlement is sited where archaeological deposits (charcoal or sand layers predominantly) are inter-leaved in the peaty valley floor sediments. The stratigraphy and dating of the deposits will be outlined here and plant macrofossils directly relevant to the interpretation of the sections will be listed and discussed. Other plant and animal remains giving more general information on the environment and economy of the site are considered separately below.

Column sample 1

During the 1980 season a section showing just over 50cm. of peat was exposed in the northern part of the excavation, adjacent to the river. A sample column, subdivided at 5cm. intervals within layers was removed from the lowest 33cm. of the section: deposits above this were humified and contained live earthworms. Samples were also collected for pollen analysis and radiocarbon dating. 1kg. sub-samples were examined for macrofossils. The samples were disaggregated by soaking and manual agitation in hot water and then washed out over a 250 micron mesh sieve. Material retained was graded in a sieve bank (2mm. - 250 micron meshes) and the sieved fractions were sorted wet under a binocular microscope at low power, except for the charcoal-rich sample at 20-21cm, which was dried before sorting.

Plant macrofossils identified are listed in Table .

(a) Stratigraphy

At this point the existing ground surface was at +3.55m. OD., although the upper 10cm. of the A_0 horizon had previously been stripped off.

0-20cm.	Black well-humified sandy peat; some charcoal fragments; earthworms common.
20-21cm.	Layer of charcoal; some fired clay fragments. (Elsewhere in section up to 5cm. thick).
21-45cm.	Dark reddish brown (5 YR 2.5/2) sandy peat; humified at top 5cm., fibrous plant remains below; very rare small flints up to 10mm.; rare earthworms in top 5cm.
45-53cm.	Dark reddish brown to black very sandy peat with fibrous plant remains; discrete patches of variable grey to greyish brown humose sand; slightly stony with flints up to 23mm.

53cm.+ Greyish-brown slightly humose sand with rare small flints up to 12mm.

(b) Dating

A sample from the lowest 5cm. of peat gave a date of 1810 ± 80 b.p. or a.d. 140 (HAR-4087), and a date of 1350 ± 70 b.p. or a.d. 600 (HAR-4086) was obtained for charcoal at 20cm. depth.

Column sample 2

During the 1981 season a trial pit was dug to the south-east of the excavated area to examine peats to the south of the sand hummock. The section was 26.50m. from grid peg 950490 and 22.85m. from grid peg 950480. A sample column was collected for macrofossil analysis and samples were also taken for pollen analysis and radiocarbon dating. The macrofossils were extracted as described above. Identifications are given in Table .

(a) Stratigraphy

The ground surface was at +3.83m. OD.

0-27cm.	Dark reddish-brown to black homogeneous slightly sandy humified peat; charcoal flecks and rare small fragments of fired clay; modern roots and some earthworm burrows throughout.
27-27.5cm.	Thin impersistent band of white sand. Maximum thickness 0.5cm.
27.5-51cm.	Very dark greyish-brown sandy peat.
51-60+cm.	Grey slightly humic sand with rare small flints.

(b) Dating

Peat samples from depths 25-27cm. and 49-51cm. were submitted for C14 dating. The sample at 49-51cm. gave date of 1330 ± 80 b.p. or 620 a.d. (HAR-5071); that at 25-27cm. gave date of 1390 ± 80 b.p. or 560 a.d. (HAR-5072).

Column sample 3

The section sampled was exposed during the 1983/4 season. A column sample was taken 2.5m. to the west of grid peg 91/62. Unlike the first two column samples this column was taken mainly through archaeological deposits overlying very thin partly humified peats at the very edge of the former river marsh. 1kg. samples were examined for macrofossils from this peat, 2kg. samples from the

overlying charcoal layer and 5kg. samples from the 'occupation layer'. A sample for radiocarbon dating was taken from the charcoal layer. Macrofossils were extracted from peat samples as described above with some pre-soaking in NaOH solution to disaggregate the samples where necessary. From the dry archaeological deposits carbonised plant remains were extracted by manual water flotation, collecting the flot in a 500 micron mesh sieve. The residues were wet sieved in a 1mm. mesh. Both flots and residues were dried before sorting. Macrofossils identified are listed in Table .

(a) Stratigraphy

The modern topsoil had been stripped off before sampling.

0-23cm.	(Middle Saxon occupation layer). Grey sand with prominent reddish-brown mottles and patches of light yellowish-brown sand particularly below 15cm. depth; rare small flints; bone fragments and charcoal flecks; fine fibrous roots; sharp, regular boundary.
23-25cm.	Yellowish-brown sand with rare charcoal flecks; thickness variable; sharp regular boundary.
25-40cm.	Layer of charcoal with some burnt bone fragments; sharp boundary, undulating over 5cm.
40-50cm.	Dark brown humified very sandy peat; very thin layer of white heat-shattered flint chips on top surface; sharp, slightly undulating boundary.
50-55cm.	Greyish-brown sand; very rare small flints. Merging boundary.
55cm.+	Light greyish-brown sand; rounded and subangular flints.

Plough-marks scored into the sand surface at 50-55cm. were visible in adjacent areas.

(b) Dating

A charcoal sample from 25-40cm. gave a date of

Column sample 4

This column sample was taken from the deepest section exposed at the northern edge of the 1983/4 trench, which showed almost 2m. of peats and other deposits. The column was sub-divided at 5 and 10cm. intervals depending upon the homogeneity of the sediments. Pollen samples were collected at 2cm. intervals by Dr R. Scaife and a peat sample for radiocarbon dating was taken from the base

Depth (cm)	20-21	21-30	30-40	40-45	45-50	50-53
Ranunculus acris/repens.	-	-	1	6	4	3
Ranunculus flammula L.	-	12	3	99	113	9
Ranunculus sceleratus L.	-	161	16	27	4	11
Ranunculus sp.	-	-	-	-	1	4
Reseda sp.	-	-	-	1	-	-
Hypericum sp.	-	1	-	3	-	-
Lychnis flos-cuculi L.	-	2	10	36	1	1
c.f. Cerastium sp.	-	9	13	18	-	-
Caryophyllaceae indet.	-	1	1	-	3	-
Montia fontana L. subsp. chondrosperma	-	-	-	-	-	2
Chenopodium album L.	-	1	-	c.f.1	-	-
Chenopodiaceae indet.	-	1	-	-	-	-
Potentilla sp.	-	6	-	27	41	26
c.f. Fragaria vesca L. (a)	-	-	1	-	-	-
Cicuta virosa L.	-	-	-	4	1	-
Hydrocotyle vulgaris L.	-	-	1	-	3	2
Berula erecta (Hudson) Colville	-	7	1	1	1	6
Rumex acetosella agg.	-	2	-	3	-	-
Polygonum aviculare agg.	-	-	-	-	1	-
Polygonum c.f. hydropiper	-	-	-	1	-	-
Urtica dioica L.	-	1	-	1	12	1
Calluna vulgaris (L) Hull (b)	+	-	-	-	-	-
Hyoscyamus niger L.	-	1	-	-	-	-
Mentha arvensis/aquatica	-	-	-	-	1	-
Lycopus europaeus L.	-	4	2	6	9	-
Galeopsis tetrahit/speciosa	-	-	-	-	1	-
Scutellaria c.f. galericulata L. (c)	-	-	5	2	1	-
Bidens cernua L.	-	33	19	11	17	1
Cirsium sp.	-	-	-	-	1	-
Sonchus arvensis L.	-	1	-	-	-	-
Sonchus asper (L) Hill	-	-	-	-	1	-
Alismataceae indet.	-	2	1	1	-	-
Juncus spp.	-	+	+	+	+	+
Iris pseudacorus L. (d)	-	-	+	+	+	+
Lemna sp.	-	-	1	2	-	-
Typha sp.	-	2	-	-	-	-
Eleocharis sp.	-	1	-	3	3	-
Carex rostrata Stokes	-	-	1	5	-	-
Carex echinata Murray	-	-	-	-	2	18
Carex sp. (e)	-	-	-	23	36	128

Carex spp.	-	26	36	79	22	20
Isolepis setacea (L.) R.Br.	-	1	-	10	9	18
Gramineae indet.	-	-	-	4	15	-
Phragmites australis (Cav) Steudel (f)	-	-	+	+	+	-
Charcoal fragments	+	-	-	-	+	-
Indet.	-	12	30	26	4	4
Totals	-	287	142	400	307	254

Table .: Plant remains from the Brandon peat column (1kg. samples).
All taxa represented by fruits or seeds unless otherwise indicated.

Notes (a) Form + size appropriate for this species, but pattern of ridges obscure.

(b) Charcoal, charred leaves, capsules + seeds.

(c) Intermediate in size between S. galericulata and S. minor. No reference specimens of the rare Breckland plant Scutellaria hastifolia were available.

(d) Seed fragments showing 'spongy' internal tissue.

(e) All one species. Attempts to identify these nutlets using the key of Nillson + Hjelmquist (1967) were unsuccessful + they could not be matched with available reference specimens.

(f) Culm nodes + fragments.

Depth (cm)	22-27	27.5-36	36-41	41-46	46-51	51-5
Characeae (oogonia)	+	+	+	+	+	+
Ranunculus acris/repens-type	12	4	3	5	8	1
Ranunculus flammula L.	14	13	56	98	124	-
Ranunculus sceleratus L.	24	88	92	93	83	1
Ranunculus subg. Batrachium	-	-	-	1	1	-
cf. Cerastium sp.	-	-	-	-	4	-
Chenopodium sp.	1	-	-	-	-	-
Atriplex patula/hastata	-	1	-	-	-	-
Potentilla sp.	1	-	4	-	5	-
Epilobium cf. hirsutum L.	-	-	-	-	1	-
Hydrocotyle vulgaris L.	-	-	1	-	-	-
Berula erecta/Apium graveolens	-	-	-	-	1	-
Polygonum cf. hydropiper	-	1	2	3	2	-
Rumex acetosella agg.	-	1	-	-	2	-
Polygonaceae indet.	-	-	-	2	2	-
Urtica dioica L.	2	2	1	4	3	-
Manyanthes trifoliata L.	32	3	frag	1	-	-
Euphrasia/Odontites sp.	-	-	-	1	3	-
Mentha arvensis/aquatica	-	-	1	-	1	-
Labiatae indet.	-	-	-	1	-	-
Sambucus nigra L.	1	-	-	2	-	-
Cirsium sp.	-	1	-	-	-	-
cf. Bidens sp. (frag)	-	-	1	-	-	-
Compositae indet.	-	-	-	-	1	-
Alismataceae indet.	1	1	-	1	-	-
Potamogeton sp.	-	-	1	-	1	-
Juncus spp.	+	+	+	+	+	-
Iris pseudacorus L.	frags	frags	frags	frags	3	-
Lemna sp.	1	3	1	1	1	-
← Sparganium sp Eleocharis palustris (L) Roemer + Schultes	7	9	19	21	33	-
Carex rostrata Stokes	3	10	12	8	17	-
Carex c.f. rostrata	31	44	51	59	74	-
Carex spp.	10	2	6	15	13	1
Carex sp. (utricle fragments)	-	+	+	+	+	-
Secale cereale L (charred rachis node)	1	-	-	-	-	-
Cereal indet. (charred caryopsis frag)	1	-	-	-	-	-
Gramineae indet.	-	1	2	-	-	-
Charcoal fragments	+	+	+	+	-	+
Rootlets	-	-	-	-	-	*
Indeterminate	5	5	6	16	19	-

Table : Plant macroffosils from peat section 2

Unless otherwise indicated taxa are represented by fruits or seeds.

Depth (cm)	0-23(o)	23-25	25-30	30-35	35-40	40-45	45-50	50-60
Pteridium-type (a)	-	-	+	?	-	-	-	-
Ranunculus acris/repens/bulbosus	-	-	1	1	1	1	1	-
Ranunculus flammula L	-	-	3	2	-	14	104	3
Ranunculus sceleratus L	-	-	-	-	-	50	26	-
Brassica sp	-	-	-	1	-	-	-	-
Raphanus raphanistrum L (b)	-	-	-	1	-	-	-	-
Lychnis flos-cuculi L	-	-	-	-	-	-	5	-
Agrostemma githago L	-	-	1	-	-	-	-	-
Stellaria media-type	-	-	-	-	1	-	-	-
Spergula arvensis L	-	-	8	4	7	-	-	-
Caryophyllaceae indet	-	-	8	1	1	2	9	-
Montia fontana subsp. chondrosperma	-	-	-	-	-	-	1	-
Chenopodium album L	-	-	13	6	-	-	1	-
Chenopodium sp	-	-	-	-	9	-	-	-
Atriplex sp	-	-	-	1	-	-	-	-
Chenopodiaceae indet	-	1	9	8	-	4	2	-
Medicago/Trifolium sp	-	-	1	-	2	-	-	-
Vicia/Lathyrus sp	-	-	3	-	-	-	-	-
Potentilla sp	-	-	-	1	-	-	-	-
Aphanes arvensis/microcarpa	-	-	-	-	-	-	1	-
Epilobium sp	-	-	-	-	-	1	-	-
Bupleurum/Apium sp	-	-	2	-	-	-	-	-
Umbelliferae indet	-	-	-	-	-	3	7	-
Polygonum aviculare agg	-	-	16	19	18	-	1	-
Polygonum lapathifolium L	-	1	2	1	-	-	-	-
Polygonum convolvulus L	-	-	13	4	2	-	-	-
Polygonum sp	2	-	17	10	12	-	-	-
Rumex acetosella agg	-	-	23	14	27	4	2	-
Rumex sp	-	-	4	5	5	2	5+frags	-
Urtica dioica L	-	-	-	-	1	30	2	-

Corylus avellana L	(c)	+	-	-	-	-	-	-	-
Calluna vulgaris (L) Hull	(d)	1	-	3	5	3	-	-	-
Calluna vulgaris	(e)	+	-	+	+	+	+	cf	-
cf. Menyanthes trifoliata L		-	-	1	-	-	-	-	-
Mentha arvensis/aquatica		-	-	-	6	1	2	18	1
Lycopus europaeus L		-	-	2	-	-	4	1	-
Plantago lanceolata L		-	-	1	-	-	-	-	-
Galium sp		-	-	12	13	10	1	10	-
Sambucus nigra L		1	-	-	1	-	5	-	-
Eupatorium cannabinum L		-	-	1	-	-	-	-	-
Cirsium sp		-	-	-	-	-	2	-	-
Alismataceae indet	(f)	-	-	-	-	-	6	2	-
Potamogetonaceae indet		-	-	-	-	-	-	1	-
Juncus acutiflorus Ehrh. ex Hoffm.	(g)	-	-	+++	++	+	-	-	-
Juncus sp	(h)	-	-	-	-	-	+	+	-
Iris pseudacorus L		-	-	5+frags	6+frags	-	-	-	-
Lemna sp		-	-	-	-	-	2	1	-
Typha sp		-	-	-	-	-	-	1	-
Eleocharis sp		-	-	-	4	-	1	-	-
Isolepis setacea (L) R.Br.		-	-	-	-	-	-	1	-
Carex spp		-	-	34	24	8	5	8	-
Phragmites australis (Cav) Steudel	(n)	+	-	+++	+++	+++	+	-	-
Gramineae indet	(i)	-	-	+	+	+	-	+	-
Gramineae indet		-	-	47	10	10	-	15+frags	-
Secale cereale L	(j)	6	-	3	-	-	-	-	-
Secale cereale L	(k)	-	-	4	1	2	1	-	-
Triticum aestivum s.l.	(j)	-	-	-	1	-	-	-	-
Triticum sp	(l)	-	-	-	1	-	-	-	-
cf. Hordeum sp	(k)	-	-	1	-	-	-	-	-
Cereal indeterminate	(j)	8	1	-	-	-	-	frags	-
cf. Vicia faba L	(m)	1	-	-	-	-	-	-	-

Charcoal (g. >6mm per kg. of soil) (q)	0.45	0.2	←	23.9 (p)	→	+	+	+
Indeterminate seeds etc.	1	-	30	36	31	18	15	-
Indeterminate (stem fragments etc)	-	-	+	+	+	+	+	-
Sample weight (kg)	25	0.5	2	2	2	1	1	2

Table : Column Sample 3; plant macrofossils.

Unless otherwise indicated taxa are represented by fruits or seeds. Macrofossils from samples above 40cm are all carbonised; those from the peat and sand samples below 40cm are mostly uncarbonised apart from charcoal, cereal remains and Phragmites culm fragments.

Notes: (a) Carbonised pinnules and stem fragments; (b) Immature siliqua segment; (c) Carbonised nutshell fragment; (d) Capsules; (e) Stem fragments with leaf bases; (f) Embryos; (g) Inforescences, fragments and capsules with seeds (carbonised). These were kindly identified by Dr Mark Robinson; (h) Uncarbonised seeds; (i) Culm nodes and fragments; (j) Caryopses; (k) Rachis nodes; (l) Top of culm with basal rachis internodes; (m) Abraded cotyledon; (n) Culm nodes (some with ligule hairs) and fragments; (o) 5 x 5kg samples at 5cm vertical intervals were taken; the results are combined here; (p) Based on charcoal from 1kg samples; (q) Charcoal was not identified, apart from pieces in samples from 25-40cm which appeared to be of structural origin. These were twigs and small branches of hazel (Corylus sp), 12-c.40mm in diameter. Almost all are riddled with insect borings and one fragment had been cut to a point before charring. Fragments of charcoal from larger wood, including Fraxinus sp (ash) and Quercus sp (oak) are also present.

Depth (cm)	50-60	70-80	90-100	120-130	150-160	180-190
Ranunculus acris/repens/bulbosus	5	10	-	4	1	3
Ranunculus cf. flammula L	-	-	-	2	-	2
Ranunculus sceleratus L	28	5	19	19	13	36
Ranunculus subg. Batrachium sp	3	7	-	1	-	2
Nuphar lutea (L) Sm.	1	-	-	-	-	-
Papaver argemone L	-	-	-	1	-	-
Brassica sp	-	-	2	7+fr	-	-
Rorippa nasturtium-aquaticum (L) Hayek	-	-	-	-	-	1
Cruciferae indet.	-	-	-	2	-	-
Reseda luteola L	-	2	-	2	-	1
cf. Viola sp	1	-	-	-	-	-
Hypericum sp	-	-	1	-	-	-
Silene sp	1	-	1	-	-	-
Lychnis flos-cuculi L	1	-	1	1	-	-
Agrostemma githago L	-	-	-	fr	-	-
Stellaria media-type	-	4	26	33	1	-
Stellaria palustris/graminea	-	1	3	1	-	-
Spergula arvensis L	-	-	8	-	-	-
Caryophyllaceae indet	2	-	-	-	-	2
Montia fontana L subsp chondrosperma	-	-	-	-	-	1
Chenopodium album L	2	22	23	89	-	-
Chenopodium sp	-	-	1	-	-	-
Atriplex sp	-	-	4	2	-	-
Chenopodiaceae indet	-	1	3	2	-	-
Malva sp	-	-	1	fr	-	-
Linum usitatissimum L seeds	-	-	7	2	-	-
Linum usitatissimum L capsule frags.	-	-	+	+	-	-
Potentilla sp	-	-	-	2	-	1
Aphanes arvensis/microcarpa	-	-	1	-	-	-
Prunus domestica L ssp. insititia	-	-	-	3	-	-
Epilobium sp	-	-	-	5	-	-
Cicuta virosa L	-	-	-	1	4	1
Apium sp	-	-	-	1	-	2
Berula erecta (Hudson) Coville	2	-	cf2	cf2	46	3
Umbelliferae indet	-	-	1	3	-	-
Polygonum aviculare agg	-	1	1	9	-	-
Polygonum cf persicaria L	-	-	23	5	-	-
Polygonum cf lapathifolium L	-	-	6	1	-	-
Polygonum convolvulus L	-	2	fr	4+fr	-	-
Polygonum sp	1	6	1	-	-	-
Rumex acetosella agg	-	-	7	10	-	-
Rumex sp	3	13	25	7	-	6

Urtica urens L	-	4	45	-	-	-
Urtica dioica L	11	22	129	30	3	3
Cannabis sativa L	2fr	1	-	-	-	-
Corylus avellana L	-	+	+	-	-	-
Salix sp (capsules and fragments)	-	-	-	29	-	-
Calluna vulgaris (L) Hull (stems,shoots, lvs, capsules)	-	+	+++	+	-	+
Menyanthes trifoliata L	1	-	-	-	-	-
Hyoscyamus niger L	-	-	1	-	-	-
Atropa belladonna L	-	7	-	-	-	-
Solanum dulcamara L	-	2	-	6	-	-
Solanaceae indet	-	-	1	-	-	-
Mentha arvensis/aquatica	-	3	-	6	-	1
Lycopus europaeus L	-	-	1	-	3	-
Stachys sp	2	-	-	-	-	-
Galeopsis tetrahit/speciosa	1	1	6+fr	-	-	-
Labiatae indet	-	-	-	3	-	-
cf Plantago major L	-	2	-	-	-	-
Sambucus nigra L	5	97	28	114	-	-
Galium sp	-	-	1	-	-	-
Bidens sp	-	-	-	-	-	1
Anthemis cotula L	-	-	-	1	-	-
Cirsium sp	fr	2	1	-	-	-
Lapsana communis L	-	-	2	-	-	-
Sonchus sp	-	-	3	1	-	-
Compositae indet	-	-	2	-	-	-
Alisma plantago-aquatica L	-	-	-	2	-	-
Alismataceae indet (embryo)	1	2	1	-	-	4
Potamogetonaceae	-	2+fr	5	9	1	1
Juncus spp	-	-	+	-	-	-
Sparganium sp	-	1	4	-	-	-
Eleocharis sp	-	2	4	3	-	-
Schoenoplectus sp	16	5	-	1	-	-
Cladium mariscus (L) Pohl	-	1	-	-	-	-
Carex spp	27	31	10	66	91	82
Phragmites australis (Cav) Steudel (culm)	-	+	+	+	+	+
Secale cereale L (caryopsis) c.	-	1	-	-	-	-
Secale cereale L (rachis node) c.	-	-	1	-	-	-
Gramineae indet	4	29	11	4	1	1
Indeterminate	6	8	21	11	6	4

Table : Column Sample 4; plant macrofossils.

Unless otherwise indicated taxa are represented by fruits or seeds.

Abbreviations: c - carbonised; fr - fragments. The Carex spp include a diverse range of nutlet forms of Carex section Carex, Carex lasiocarpa-type and small trigonous forms.

of the section. Macrofossils were extracted from 1kg. sub samples as described above. Identifications are given in Table .

(a) Stratigraphy

Ground surface at 3.07m. OD.

0-27cm.	Brown sandy humified peat. Sharp boundary.
27-30cm.	Yellowish-brown sand with grey sand laminations (thickness variable across section). Sharp boundary.
30-41cm.	Grey sand with rare small angular flint pebbles. Sharp boundary.
41-65cm.	Dark brown peat with monocotyledonous plant remains. Very rare charcoal flecks. Sharp boundary.
65-80cm.	Very coarse light brown sand, with large prominent reddish mottles. Rare angular flints up to 1cm. Peat laminations. Merging boundary.
80-90cm.	Grey sandy peat. Merging boundary.
90-190cm.	Dark brown peat with Phragmites remains. Much wood, some pieces show transverse cuts. Bone fragments common.
190cm.+	Grey sand.

(b) Dating

A peat sample taken at 188-190cm. gave a date of

Interpretation and general discussion

In all four sections examined the lowest deposit was grey or greyish-brown fluviatile sand with a variable but generally low stone content. A phase of lowered ground-water levels in the valley floor, permitting an extension of cultivation onto this surface, is indicated by the presence of plough-marks in the sand in the area of column sample 3. This phase is not directly dated, though the proximity of Iron Age pits containing carbonised remains of cereals (see below), and radiocarbon dates on the overlying peats, suggest that this ploughing was probably of Iron Age date.

In column sample 1, at +3.02m. OD., a radiocarbon date of 1810 ± 80 b.p. (a.d. 140) was obtained for the sand/peat interface, whilst in column 4 at +1.17m. OD. the interface was dated to . Further from the river, and at a higher level (3.32m. OD.) in column sample 2 the base of the peat was dated to 1330 ± 80 b.p. (620 a.d.). This date seems anomalously late in relation to the date obtained from further up this section, and it is possible that some contamination by roots or rhizomes penetrating from above

has occurred. It is, however, clear that the sand hummock on which the Middle Saxon settlement was subsequently sited was progressively isolated and surrounded by valley marsh from about

The most abundant macrofossils in these peats were of Ranunculus flammula, Ranunculus sceleratus, Berula erecta and Carex spp. Culm fragments of reed (Phragmites australis) were present in most samples, and were particularly common in column 4, the column closest to the river. Seeds of calcifuge wetland species including Montia fontana subsp. chondrosperma, Hydrocotyle vulgaris, Carex echinata, together with Isolepis setacea, a plant characteristic of damp, bare sandy ground, were identified in the peat at the base of column 1 but declined in frequency above. Remains of obligate aquatics (e.g. Characeae, Nuphar lutea, Potamogeton sp. and Lemna sp.) were rare, and no remains of Alnus, Salix or other wetland trees and shrubs were observed in the lowest peats. Taken together, the macrofossil assemblages from these peats suggest that wet, fairly acid, conditions were initially maintained largely by an influx of acidic groundwater from the decalcified sandy terrace soils with little river flooding. The frequency of reed culm fragments in column 4, compared to the other columns, suggests that there was a belt of reed-beds fringing the river channel, whilst further from the river open marsh vegetation developed. The complete absence of evidence for colonisation of the marsh by shrubs and trees may imply artificial suppression of scrub development. Some disturbance of sand on the adjacent terrace, indicated by irregular sandy patches in the lowest peat in column 1 and associated with a few seeds of ruderal plants (Urtica dioica, Galeopsis sp., Cirsium sp., Sonchus asper), could be related to grazing or, less probably, tillage.

In column 1, and to a lesser extent column 3, achenes of Ranunculus flammula and Ranunculus sceleratus show complementary variations in frequency, R.sceleratus becoming more abundant towards the top of the peat. In Murphy (1983, 186) this trend was interpreted as indicating more eutrophic conditions in the valley marsh, perhaps related to increased seasonal river flooding. This interpretation is still possible, though Hall et al (1983, 214-5) note the occurrence of R. sceleratus in nitrophilous weed communities in habitats subject to flooding, often associated with organic pollution next to settlement areas. Increasing abundance of R. sceleratus achenes could, therefore, be related to the beginnings of Middle Saxon activity in the vicinity.

In column 3 at a depth of 40cm. these lower peats were overlain by a dense deposit of charcoal, 15cm. thick, which was dated to . This layer included a diverse range of charred plant remains. Twigs and small branches of hazel (Corylus sp.), some of which show transverse cuts, mixed with

charcoal from larger wood including Fraxinus sp. (ash) and Quercus sp. (oak) (Plate), were present. Charred culm nodes of reed (Phragmites australis) and inflorescences of rushes (Juncus acutiflorus) were also common, together with some carbonised fruits and seeds of other wetland taxa including Ranunculus flammula, Menyanthes trifoliata, Mentha sp., Lycopus europaeus, Eupatorium cannabinum, Iris pseudacorus, Eleocharis sp. and Carex spp. (Plate). In addition there were some carbonised grains and rachis nodes of rye (Secale cereale), wheat (Triticum aestivum) and barley (Hordeum sp.), an abraded cotyledon probably of the horse-bean (Vicia faba var. minor) and fruits and seeds from a range of arable weeds. Carbonised capsules of heather (Calluna vulgaris) also occurred. Interpretation of this very mixed assemblage is inevitably tentative but it appears to represent charred destruction debris from a timber-framed structure, including wattle panels, which may have been thatched with reed. The remains of rushes, cereals and carbonised weed seeds could be derived from flooring materials, whilst the charred seeds of other wetland species could have come from plants collected incidentally with the reeds and rushes.

In column sample 1 there was a much thinner charcoal layer, up to about 5cm. thick but generally less, at a depth of 20cm. This gave a date of 1350 ± 70 b.p. (a.d. 600). It consisted of charcoal, carbonised leaves, capsules and seeds of heather (Calluna vulgaris). Carbonised remains of this plant and uncarbonised stems, leaves and capsules also occurred in the peat samples from column 4. It seems probable that all these deposits of carbonised material have a common source. It would appear that at least one structure or building close to column 3 was destroyed by fire, and that heath vegetation growing on the sand hummock in the vicinity also caught fire. Subsequently, some of the charred debris from this conflagration was dumped or washed onto the marsh surface, where it was sealed either by renewed peat development (in column 1) or by occupation deposits (in column 3).

In column 2 no charcoal layer was observed, but the thin (0.5cm.) impersistent band of white sand at a depth of 27cm. in this section is thought to indicate a short-lived episode of increased soil erosion on the sand hummock. It seems likely that this was related to the destruction of vegetation cover in the area during the fire. A date of 1390 ± 80 b.p. (560 a.d.) was obtained from peat just above this sand layer.

In column 3 the charcoal layer was covered by the Middle Saxon occupation layer - a grey mottled sand including domestic refuse. Plant and animal remains from this deposit are discussed further below ( ), but in summary they appear to represent a midden composed of material dumped on the edge of the

	Column 1	Column 2	Column 3	Column 4
Renewed peat development.	Humified re-worked topmost peat.	Humified re-worked topmost peat.	Humified re-worked topmost peat.	Humified re-worked topmost peat.
Middle Saxon occupation deposits, and dispersed material in the peats related to Middle Saxon activity.	-	Charcoal, charred cereals, fired clay fragments in peats between 22-27cm.	Sandy occupation layer with charcoal, bone, charred cereals etc.	Charcoal, carbonised cereals, hazel nut-shells, Prunus fruitstones, remains of flax and hemp. Large proportion of ruderals and segetals in macrofossil assemblages from the peat at this level.
Widespread fire. Accumulation of charred debris on peat surface.	Thin band of Calluna charcoal. 1350 ± 70b.p. (a.d. 600).	Thin band of white sand, perhaps related to increased soil erosion on sand hummock. Peat above this dated to 1390 ± 80b.p. (a.d.560).	15cm. thick layer of charcoal, charred reeds, rushes, cereals etc. ?Destruction deposit from building. Dated to	Rare carbonised cereals, charcoal etc.
Peat development under open marsh vegetation, over sand surface. Some soil disturbance,? related to grazing/ tillage.	Base dated to 1810 ± 80b.p. (a.d. 140). Macrofossil assemblage dominated by R.flammula, R.sceleratus, Bidens cernua and Carex spp. Some calcifuge wetland plants. Irregular sandy patches in peat.	Base dated to 1330 ± 80b.p. (a.d. 620). ?Contamination. Macro-fossil assemblage dominated by R.flammula, R.sceleratus, Eleocharis sp, Carex spp.	Very thin peat. Macro-fossil assemblage dominated by R.flammula, R.sceleratus and Urtica dioica.	Deep peat. Macro-fossil assemblages dominated by R.sceleratus and Carex spp. Phragmites common.
Low groundwater levels. Ploughing, probably of Iron Age date on valley floor sands.			Plough-marks scored into sand surface.	
Deposition of fluviatile sands (late Pleistocene/ early Holocene). Stabilisation and soil development.	Greyish-brown sand at base of section.	Grey sand at base of section.	Greyish-brown sand at base of section.	Grey sand at base of section.

Table : Summary of local habitat change.

marsh, subsequently flattened and partly dispersed. The upper levels of the peat in columns 2 and 4 included carbonised grains and rachis nodes of rye (Secale cereale), charcoal and small chips of fired clay related to this phase of domestic activity. In column 4 the peats and dumped sand layers between 50-130cm. produced plant macrofossil assemblages with a high proportion of ruderal and segetal species, particularly Stellaria media-type, Chenopodium album, Polygonum spp., Rumex spp., Urtica urens, Urtica dioica and Sambucus nigra. Wetland plants, notably Ranunculus sceleratus and Carex spp. are also present, and the sample at 120-130cm. included some capsules of Salix sp. Remains of food plants identified include fruitstones of bullace (Prunus domestica subsp. insititia) and nutshell fragments of hazel (Corylus avellana), whilst seeds and capsule fragments of flax (Linum usitatissimum) and fruits of hemp (Cannabis sativa) seem to be related to the processing of fibre crops. Evidence from the site for cultivation and processing of these crops is discussed in more detail below ( ). In summary the macrofossil assemblages from the uppermost peats sampled seem typical of deposits associated with early medieval riverside settlements (cf. Ayers and Murphy 1983), being derived largely from weed vegetation growing in and around the settlement, with a seed input from local wetland vegetation, mixed with domestic and industrial plant wastes.

The topmost layers of peat in all sections were humified and included live earthworms and roots. Only the most durable macrofossils had survived this humification and reworking: in column 2 for example Menyanthes trifoliata was virtually the only species represented by macrofossils in peats above 22cm. depth. Detailed examination of these topmost levels was therefore not undertaken, and no information on habitat change post-dating the Middle Saxon settlement is therefore available.

The sequence of events in the valley floor and adjacent sand hummock established from the examination of these four column samples is summarised in Table .

4. The occupation layer

A sample area of this layer was examined during the 1983/4 season. The matrix of the layer consisted, throughout the area sampled, of a dark greyish-brown sand of variable stone content mixed with domestic refuse. There were local concentrations of chalk fragments and lumps of unfired clay, but the stones were mainly angular and subangular flints up to about 5cm. On higher ground the organic content was very low, but towards the river it increased and the layer merged laterally into structured organic deposits. Macrofossils from these organic layers on the waterfront are discussed below. Between these

extremes, the layer was strongly gleyed. Reddish-brown mottling was prominent and old root channels coated with concretions of iron compounds were common.

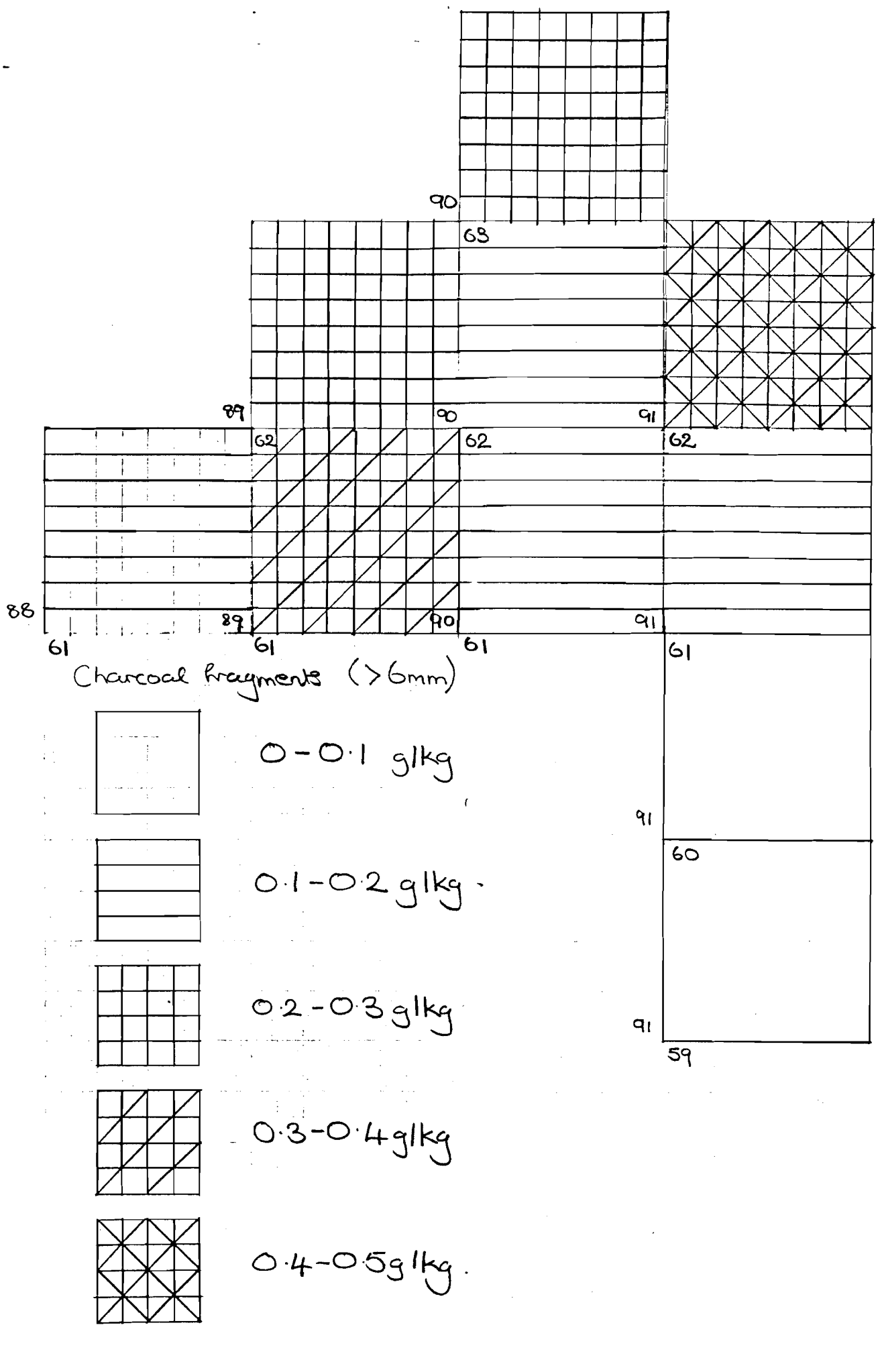
The relationship of the occupation layer to underlying deposits of peats and of charcoal was examined in column sample 3 (see above). In addition, in the northern part of the excavated area samples were taken to assess whether there were any significant patterns to the distribution of biological remains across the site which might be related to activity areas. 5kg. samples were collected from the centre of each 2.5m. grid square, giving 16 samples per 10m. square in most cases. Trial processing of samples from two 10m. squares (88/61 and 89/61) indicated that complete analysis of all samples would be excessively time-consuming and therefore from each remaining 10m. square a maximum of 5 samples were processed, except for squares 91/59 and 91/60 from which only three samples had been taken. The total weight of soil processed was 215.6kg.

Biological remains present comprised charcoal, carbonised seeds and cereal remains, bones of fish, mammals and birds, coprolites and very rare mollusc shell fragments. In the more organic 'facies' of the layer close to the river there was partial preservation of uncarbonised macrofossils: fruits and seeds of Sambucus nigra, Chenopodiaceae, Hyoscyamus niger, Solanum nigrum etc. were present in some samples. These, however, seem to represent only the more durable remnants of a more diverse flora: seasonal fluctuations in the water table have resulted in destruction of most plant and animal macrofossils. The samples from the occupation layer were therefore treated as aerobic deposits. Charred plant remains were extracted by manual water flotation with a 0.5mm. collecting mesh. The residues were wet-sieved in a 1mm. mesh. Flots and residues were dried before sorting. Macrofossils recovered are listed in Table .

Identifications of macrofossils recovered will be discussed in detail below. Here the overall distribution of plant and animal remains in the area of the occupation layer sampled will be briefly considered. The distribution of charcoal, carbonised cereals and mammal/bird bone fragments is summarised in Figs. - . Concentrations of these three categories of material are highest in the central block of grid squares, at the edge of the former river marsh. This seems to indicate dumping of material mainly in this area. The plant remains present appear to be derived from domestic hearths used for heating and cooking. The cereal remains present consist almost entirely of grains with no crop processing waste. Charcoal concentrations are highest in grid squares 89/61 and 91/62 and these two squares also produced most of the shoots, leaves and capsules of Calluna vulgaris (heather), implying that heather was used as fuel or kindling. The bone fragments probably represent cooking

and table waste: burnt bone fragments are present in most samples. Preservation conditions for shell were less than ideal, but badly pitted small fragments of oyster shell came from squares 90/61 and 91/61. Coprolites were recovered from squares 90/61 and 91/61. These include fragments of bone and are most likely to have been dropped by scavenging dogs.

In summary the results indicate the presence of a partly-dispersed midden composed mainly of domestic food refuse at the edge of the marsh.



Charcoal fragments (>6mm)

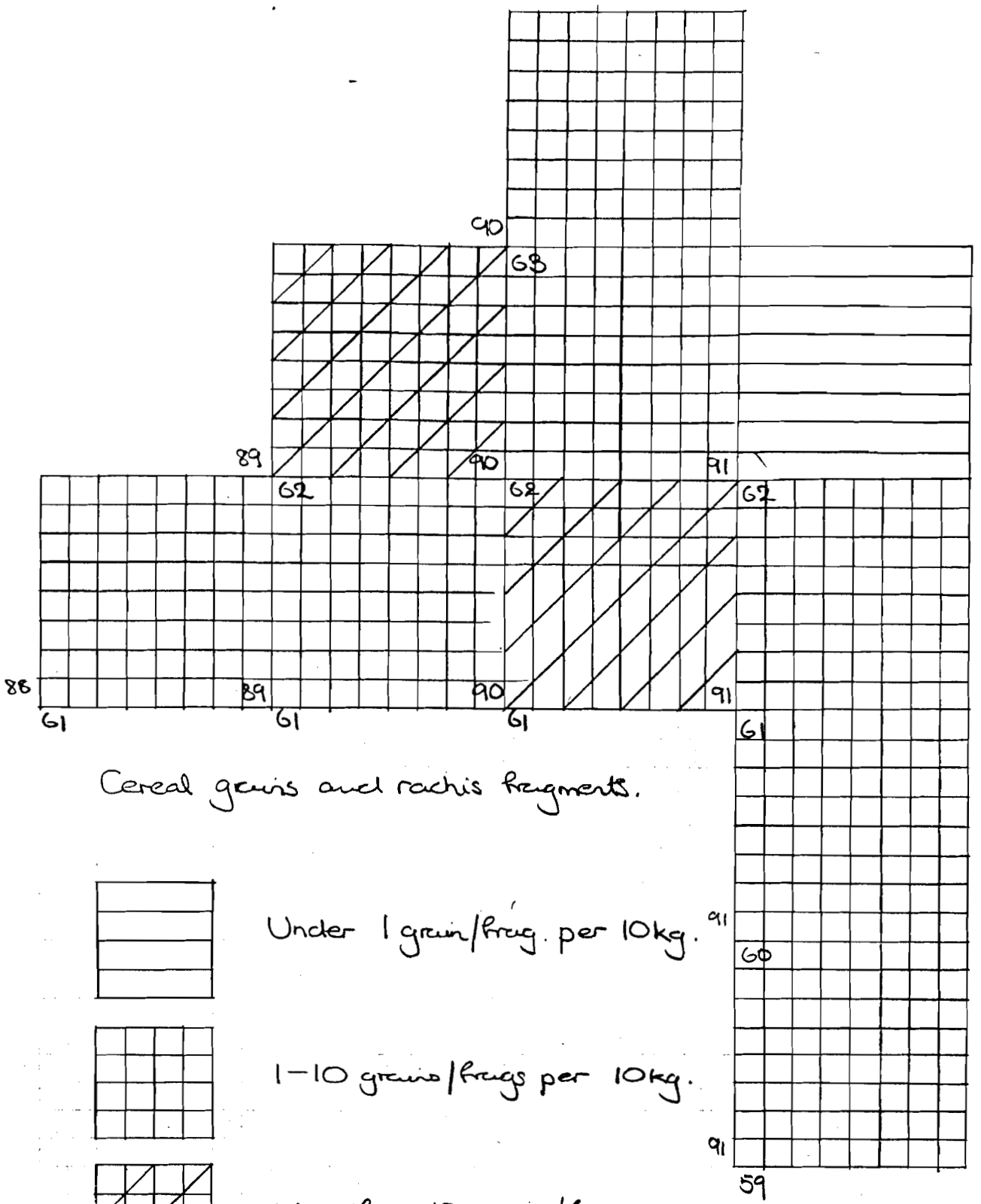
0-0·1 g/kg

0·1-0·2 g/kg

0·2-0·3 g/kg

0·3-0·4 g/kg

0·4-0·5 g/kg

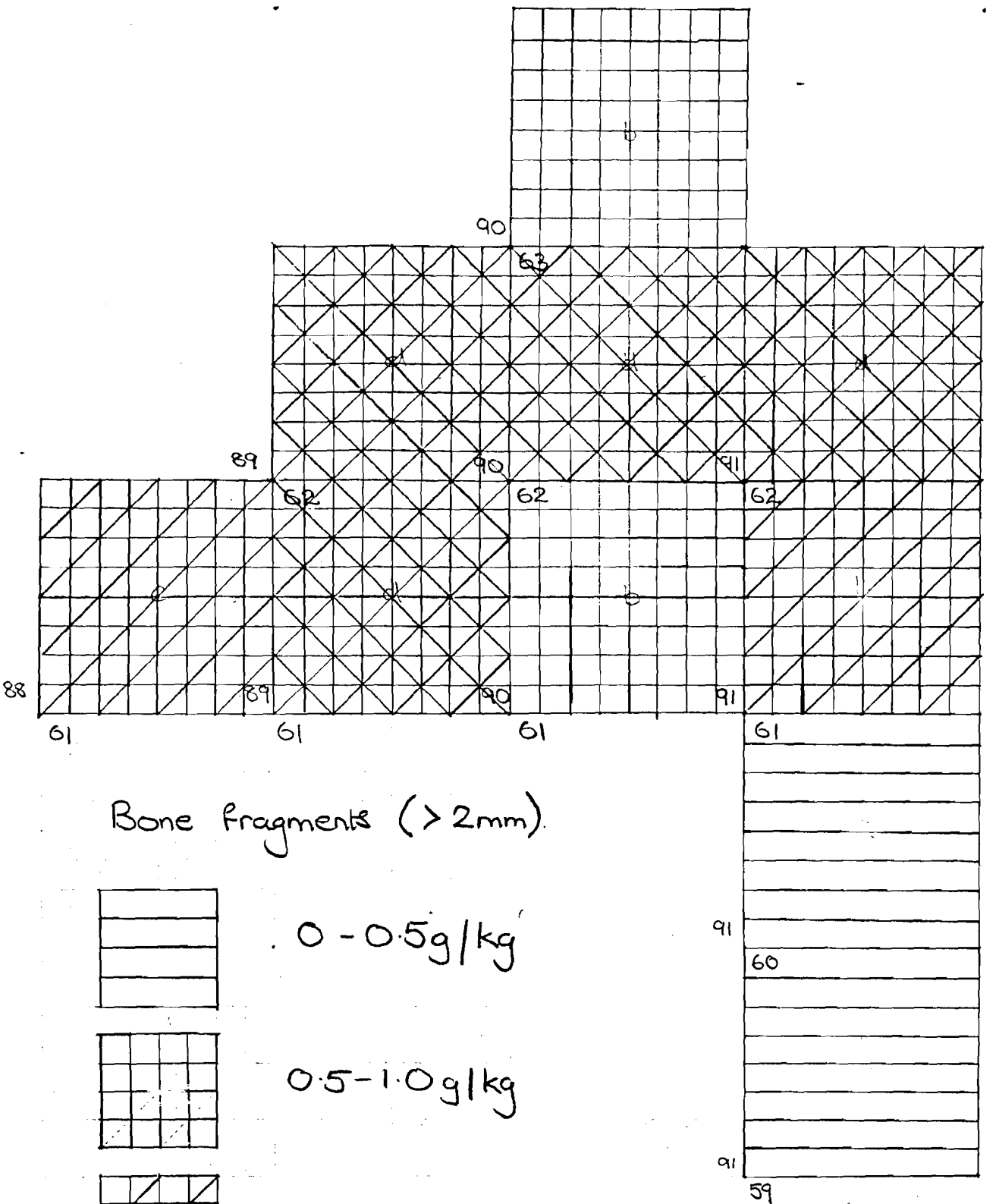


Cereal grains and rachis fragments.

Under 1 grain/frag. per 10kg.

1–10 grains/frags per 10kg.

More than 10 grains/frags per 10kg.



Bone Fragments (>2mm).

0 - 0.5g/kg

0.5 - 1.0g/kg

1.0 - 2.0g/kg

2.0 - 3.0g/kg

10m grid square	2.5m grid square	Sample weight (kg)	Bone frags >2mm (g)	Carbonised cereals	Calluna capsules & leaves	Mollusc shell	Fishbone and other small vertebrates	Charcoal frags >2mm (g)	Other material
	4293	4.5	0.3	+		-	-	0.4	
91/59	4297	4	0.2	+	-	-	-	0.4	
	4301	2.5	0.4	+	-	-	-	0	
	4332	4.6	1.5	+	-	-	+	0.1	
	4337	5	0.1	-	-	-	-	0.2	
91/60									
	4345	5	0.1	+	-	-	-	0.1	
	4680	5	7.6	-	-	-	+	0.5	
	4681	5	4.2	+	-	-	+	0.1	
91/61	4683	5	16.0	+	-	-	+	2.4	Coprolite. Wee
	4684	5	1.8	+	+	-	+	0.1	seeds.
	4685	5	6.9	-	-	+	+	0.9	
	4996	5	1.8	+	-	-	+	0.1	
	4967	5	5.5	+	-	-	+	0.6	?Phragmites cu
90/61	4969	5	4.0	+	-	-	+	0.9	
	4970	5	5.3	+	+	+	+	1.4	Chalk fragments
	4972	5	6.4	-	-	-	+	0.7	common. Weed
	5059	5	25.2	+	-	-	+	1.3	
	5062	5	2.8	+	+	-	+	0.7	
89/61	5063	5	6.4	+	+	-	+	2.0	
	5064	5	13.8	+	+	-	+	4.4	Weed seeds.
	5065	5	23.4	+	+	-	+	1.4	
	5224	5	0.4	+	-	-	+	0.3	?Phragmites cul
)	5231	5	4.3	+	-	-	+	0.5	

88/61	5232	5	12.4	-	-	-	+	1.2	
	5233	5	6.8	+	-	-	+	2.3	Weed seeds.
	5234	5	14.1	+	-	-	+	0.6	Weed seeds.
	5356	5	16.3	+	-	-	+	0.2	
	5358	5	11.0	+	-	-	+	1.0	Weed seeds.
89/62	5362	5	16.5	+	-	-	+	1.2	
	5364	5	6.3	+	+	-	+	4.9	Corylus nutsh
	5365	5	1.2	+	-	-	+	0.1	
	5447	5	17.0	+	-	-	+	0.6	
	5375	5	19.7	+	-	-	+	1.9	Weed seeds.
90/62	5377	5	5.3	-	-	-	+	0.2	
	5379	5	1.4	-	-	-	-	0.5	
	5382	5	20.5	+	-	-	+	0.4	
	5044	5	16.6	-	+	-	+	3.0	
	5045	5	17.2	+	+	-	+	5.0	Weed seeds.
91/62	5046	5	15.6	-	+	-	+	2.5	Weed seeds.
	5048	5	5.2	-	-	-	+	0.2	
	5050	5	3.8	+	-	-	+	1.8	
	5784	5	3.3	+	-	-	+	2.0	Weed seeds.
90/63	5787	5	1.1	-	-	-	+	0.8	Unfired clay.
	5788	5	6.8	-	-	-	+	0.7	Weed seeds.

Table : Macrofossils from the occupation layer

6. Plant macrofossils (excluding mosses and wood)

Macrofossils from the column samples, which provide information primarily on local vegetation and habitat change, have been discussed above. In this section attention will be concentrated on macrofossils of crop plants and on the other plant remains related to economic activities.

(a) Plant macrofossils from the waterfront area

The main features in the area of the waterfront excavated in 1984 were three artificial mounds or 'islands' constructed by dumping sand on the peat surface. On these were several phases of clay features with charcoal layers. Underlying the 'islands' and in adjacent areas were patches of laid brushwood and twigs, patches of charcoal and discrete areas of other organic materials. Samples were taken from five contexts associated with the western 'island', from thirty in and around the central island, and from thirty-one contexts in and around the eastern 'island', and another concentration of clay features in grid square 88/61. Previously, during the 1980 season, samples from a waterlogged pit (0045), had been examined.

Full quantitative analysis of all these samples was clearly not possible. Instead 0.5kg. sub-samples were rapidly examined in outline, noting their main constituents, in order to identify samples which could provide specific information on the activities taking place in this area. Potentially informative samples were then studied in more detail. The samples fall into four main groups.

(1) Concentrations of charred plant remains

Thirty four samples from charcoal-rich organic deposits in the waterfront area and from charcoal spreads, oven fills and other features in adjacent areas were examined superficially to give some idea of their main constituents (Table). The samples are of several types:

(i) Samples including very large charcoal fragments usually of oak (Quercus sp.) and ash (Fraxinus sp.) with twigs of hazel or alder (Corylus/Alnus sp.) and fragments of other diffuse porous charcoals. Carbonised reed stem fragments (Phragmites australis), seeds of weeds, wetland plants and rare carbonised cereal remains are usually present. Carbonised remains of heather (Calluna vulgaris) occur in some of these samples but only in small quantities. Samples from contexts 5116, 5206, 5215, 5583, 5589, 6174 and 6363 are of this type. These samples seem broadly similar in

	5038	5742	6232	6457(m)
Pteridium aquilinum (L) Kuhn (a)	+	+	-	+
Pteridium aquilinum (L) Kuhn (b)	-	-	-	+
Ranunculus acris/repens/bulbosus	1	-	-	-
Ranunculus cf. flammula L	1	-	-	-
Raphanus raphanistrum L	1	-	-	-
Reseda luteola L	2	-	-	-
Lychnis flos-cuculi L	1	-	-	-
Stellaria media-type	5	-	-	-
Stellaria graminea/palustris	1	-	-	-
Spergula arvensis L	1	-	-	-
Scleranthus cf. annuus L	1	-	-	-
Chenopodium cf. album L (c)	19	-	-	-
Atriplex sp	1	-	-	-
Chenopodiaceae indet	7	2	-	-
Malva sylvestris-type	12	-	-	-
Linum usitatissimum L (d)	1	-	-	-
Pisum sativum L var. arvense	-	3+fr	-	-
cf. Medicago/Trifolium-type (e)	13	-	-	-
Vicia spp	2	-	2	-
Polygonum aviculare agg	9	-	-	-
Polygonum persicaria/lapathifolium	4	-	-	-
Polygonum convolvulus L	18	-	-	-
Polygonum sp	3	-	-	-
Rumex acetosella agg	21	-	-	1
Rumex sp	4	-	-	-
Polygonaceae indet	1	-	-	-
Calluna vulgaris (L) Hull (f)	+	+++	+++	+
Plantago lanceolata L	3	-	-	-
Galium aparine L	-	4+fr	-	-
Galium sp	2	-	-	-
Sambucus nigra L	3	-	2	-
Juncus sp (g)	21	-	-	-
Eleocharis sp	2	-	-	-
Carex spp	45	-	-	-
Phragmites australis (Cav) Steudel (h)	+++	+	+	++
Cereal indet	23	1+fr	14	3
Secale cereale L	552	-	7	6
Secale cereale L (i)	-	-	-	1
Hordeum vulgare L emend Lam	-	-	84	-
Hordeum sp	2	-	-	2
Avena sp	4	-	9	-
Avena sp (j)	1	-	-	-

Avena fatua-type (j)	-	-	1	-
Gramineae indet	14	1	-	3
Gramineae (?cereal) indet (k)	+	-	-	-
Mosses	-	+	+	-
Buds	+	-	-	-
Indeterminate	38	2	6	3
Sample weight (kg)	5	3.7(l)	4	3

Table : Carbonised plant macrofossils in four samples from charcoal concentrations on the peat surface

Taxa are represented by fruits or seeds except where indicated.
Notes (a) Stem fragments; (b) Pinnules; (c) Testas blistered; (d) Seed fragment; (e) Distorted; (f) Charcoal, shoots, leaves, capsules and seeds; (g) Capsules containing seeds; (h) Culm fragments; (i) Rachis internodes; (j) Floret base; (k) Culm fragments; (l) Only 50% sorted; (m) This sample also included much silica ash consisting of skeletal tissue fragments apparently mainly of Gramineae. These samples also contained a small proportion of uncarbonised plant remains, which were not identified.

	Calluna (a)	Phragmites (b)	Other charcoals (c)	Other constituents
038 (see Table)	+	common	large frags	Clay. Bone frags (some burnt). Cereals common.
5116		+	large frags	Carbonised seeds. Clay.
5206		+	large frags	Carbonised seeds.
5215		+	includes large frags	Cereals. Bone frags
5244	+		+	Clay.
5406	+		+	Cereals. Bone. Clay. Chalk.
5408	+	+	+	Rare cereal frags. Bone (some burnt).
5412	+		+	Rare cereal frags. Clay. Bone (some burnt).
5421	+		+	Bone.
5426	+		+	Clay.
5443	+		+	Clay. Bone.
5559	+	?	+	Clay. Bone.
5583			large frags	Bone.
5585			+	Bone.
5589		+	includes large frags.	Bone. Clay. Carbonised seeds.
5706			+	Chalk. Cereals and weed seeds.
5717			+	Chalk. Clay.
5727			+	Clay. Chalk.
5742 (see Table)	common	+	+	Cereals and carbonised seeds. Clay. Bone (some burnt).
5743	+		+	Bone. Clay.
5744	+		+	Bone.
5745	+		+	Bone common.
5914	+		+	Clay.
6045	+		+	Clay.
6047	abundant		+	Bone (some burnt).
6099	common			

6104			+	Cereals. Bone.
6120	+		+	Bone. Clay.
'5	+		+	Cereals. Bone. Clay.
6174	+	+	large frags	Carbonised seeds. Clay.
6215	common			Clay. Burnt bone.
6232 (see Table)	common	+	+	Clay. Bone. Cereals common.
6363		abundant	large frags	Bone.
6457 (see Table)	+	+	+	Clay. Burnt bone. Ash. Chalk.

Table : Notes on charcoal-rich samples from the waterfront and adjacent areas.

These notes are based on a rapid and partial examination of 0.5kg sub-samples. Larger samples from contexts 5038, 5742, 6232 and 6457 were examined in detail. (See Table).

(a) Carbonised shoots, leaves, capsules or stems.

(b) Carbonised culm nodes.

(c) These were not usually identified, apart from a few large and conspicuous fragments.

(d) The charcoal samples from peaty deposits included uncharred plant and animal macrofossils, notably insects and Sambucus seeds. These are not noted here.

composition to the 'destruction layer', which was examined in detail in column sample 3 (see above). They may have a common source.

(ii) Samples containing a generally lower density of charcoal in smaller fragments. Carbonised stems, shoots, leaves and capsules of Calluna vulgaris are usually present and in some samples (eg. 6047, 6099, 6215, 6232) are the most common carbonised plant macrofossils present. Other carbonised plant remains include reed stem, rare cereal remains and seeds. Samples of this type, which make up the majority of those examined, are probably derived from a variety of sources, representing charred residues from fuel used for various domestic and industrial activities.

(iii) Samples including concentrations of cereal remains (contexts 5038, 6232). These deposits seemed to be related to identifiable activities and larger samples were therefore examined in more detail. In addition a sample from context 5742 (a sub-sample of which produced the only seeds of pea (Pisum sativum) from the site), was fully examined to recover further seeds and associated plant remains: and a sample from 6457 which included a high proportion of ash largely of plant origin was studied to determine the origin of this material.

(2) Concentrations of elder seeds

In several places discrete patches of elder seeds (Sambucus nigra) were noted in the peat during excavation (Plate). Samples from seven of these patches were examined (contexts 6004, 6022, 6122, 6124, 6353, 6390, 6391): these seed concentrations were limited in extent and in most cases it was possible to collect the entire deposit. The density of Sambucus seeds varied between these deposits but in most samples the seeds formed a significant proportion of the matrix giving the deposit a loose and gritty texture. In 6122, for example, there were about 150 seeds per cm^3 and after washing the sample in a 500 micron mesh little was retained but Sambucus seeds. In contexts 6004 and 6022 the seed density was lower but Sambucus seeds were quite clearly visible in the field. Sub-samples were examined to see whether any other identifiable macrofossils were present. Only a restricted range of taxa (mainly weeds and wetland species) represented by few specimens, was noted (fruits and seeds of Papaver sp., Ranunculus sceleratus, Chenopodium murale, Atriplex sp., Reseda luteola, Polygonum spp., Rumex sp., Urtica dioica, Juncu spp., Carex spp. and Gramineae with Corylus nutshell fragments, shoots of Calluna vulgaris and culm fragments of Phragmites). It was not thought that full quantitative analysis of these samples would yield any further useful information.

	6113	6358	6385	6387
Pteridium aquilinum (L) Kuhn (a)	-	-	-	+cf
Ranunculus acris/repens/bulbosus	-	4	-	-
Ranunculus flammula L	-	-	-	1
Ranunculus sceleratus L	17	-	1	- 4
Ranunculus sp	-	2	-	-
Papaver argemone L	1	-	1	-
Papaver somniferum L	-	1	5	1
Papaver sp	-	-	1	-
Brassica sp (b)	2	-	6	-
Reseda luteola L	2	27	4	2
Silene sp	-	-	1	-
Lychnis flos-cuculi L	-	2	-	-
Agrostemma githago L	-	-	1+fr	-
Stellaria media-type	-	4	-	21
Scleranthus annuus L	-	1	-	-
Caryophyllaceae indet	1	5	-	-
Chenopodium album L	18	3	-	14
Chenopodium murale L	1	-	-	-
Atriplex sp	-	-	-	5
Chenopodiaceae indet	6	1	-	16
Linum catharticum L	-	-	-	1
Linum usitatissimum L (c)	-	1	3	-
Linum usitatissimum L (d)	-	+	+	+
Linum usitatissimum L (e)	-	-	+++	-
Pisum-type (f)	-	1	-	-
Potentilla sp	1	-	-	-
Malus sylvestris/domestica (g)	-	5	-	-
Apium/Berula-type (h)	42	23	-	2
Oenanthe sp	-	1	-	-
Umbelliferae indet	-	-	-	1
Polygonum aviculare agg	-	-	1	1
Polygonum convolvulus L	1	-	-	-
Polygonum sp	2	5	-	1
Rumex acetosella agg	7	-	-	8
Rumex sp	5	2	1	9
Urtica dioica L	70	4	2	26
Juglans regia L (i)	-	+	-	-
Corylus avellana L	-	+	-	-
cf. Salix sp (j)	-	2	-	-
Calluna vulgaris (L) Hull (k)	+++	+++	+	+
Primulaceae indet	-	-	3	-
Boraginaceae indet	-	1	-	-

Hyoscyamus niger L	11	-	-	1
Mentha arvensis/aquatica	1	3	-	3
Lycopus europaeus L	-	-	-	2
Prunella vulgaris L	-	1	-	-
Lamium sp	2	6	-	-
Sambucus nigra L	9	12	7+fr	15
Bidens sp	-	6	-	-
Anthemis cotula L	-	1	-	-
Cirsium sp	-	-	2	-
Alismataceae indet	-	1	-	-
Juncus spp	-	+	+	-
Typha sp	-	1	-	8
Eleocharis sp	-	2	1	2
Carex spp (l)	10	123	1	9
Phragmites australis (Cav) Steudel (m)	+	+	-	+++
Phragmites australis (n)	-	25	-	83
Gramineae indet	6	80	4	29
Indeterminate	8	28	5	16
Charcoal (unidentified)	+	+++	+	+
Sample weight (kg)	3	1	0.2	1

Table : Plant macrofossils from organic deposits in the waterfront area

Unless otherwise indicated taxa are represented by fruits or seeds.
Notes (a) Stem and pinnule fragments; (b) Fragments also present; (c) Seeds; (d) Capsule fragments; (e) Stem, fibre and epidermis fragments; (f) Carbonised cotyledon; (g) Fibrous endocarp tissue also present; (h) Crushed and partly degraded; (i) Small endocarp fragments; (j) Capsules; (k) Shoots, leaves, capsules, seeds, stems; (l) Various bi- and tri-facial forms including C. cf. elata and C. cf. paniculata; (m) Culm fragments; (n) Caryopses.

	70-80cm	37-50cm
c.f. Pteridium aquilinum (L) Kuhn (a)	+	-
Ranunculus acris/repens	1	-
Ranunculus sceleratus L.	3	3
Papaver rhoeas L.	1	-
Brassica sp.	1	-
c.f. Capsella bursa-pastoris (L) Medicus	2	-
Reseda sp.	3	-
Silene c.f. alba (Miller) Krause	2	-
Stellaria media (L) Vill	2	-
Stellaria graminea L.	1	-
Chenopodium album L.	12	14
Atriplex patula/hastata	4	1
Chenopodiaceae indet.	3	10
Prunus domestica L. ssp domestica	-	1
Umbelliferae indet.	3	-
Polygonum aviculare agg.	2	-
Polygonum persicaria/lapathifolium	2	1
Rumex acetosella agg.	1	-
Rumex sp.	8	10
Polygonaceae indet	6	3
Corylus/Alnus sp. (d)	-	+
Quercus sp. (d)	-	+
Urtica dioica L.	208	149
Calluna vulgaris (L) Hull (b)	+	+
Fraxinus sp. (d)	-	+
Solanum c.f. dulcamara L.	3	-
Solanum c.f. nigrum L.	2	-
Euphrasia sp.	4	2
Sambucus nigra L.	36	94
Juncus sp.	+	+
Typha sp.	-	1
Eleocharis sp.	-	1
Gramineae indet.	4	1
Indet. (c)	+	-
Indet.	7	5

Table : Plant remains from 0045

Notes: (a) Charred stem frags
(b) Charcoal, charred shoot tips, capsules; uncharred wood + shoot tips
(c) V. small twigs
(d) Charcoal

(3) Flax stem waste

Samples were collected from two small discrete patches of reddish fibrous material in the peat (6385, 6386). These samples proved to consist of degraded stem fragments with scraps of epidermis and occasional plant fibres (Plate). Most of the stem fragments lack epidermis, cortical parenchyma and fibres, and consist only of short lengths of featureless woody tissue. From the characteristic stomata on the epidermis fragments Dr Phillippa Thomlinson was able to identify this material as the remains of flax stems (Linum usitatissimum).

The samples represent waste residue from flax processing, after almost all the fibres had been removed, leaving only traces adhering to the xylem. Half the sample from 6385 (200g. of deposit) was examined to see whether any other macrofossils were present (Table).

(4) Other organic deposits

The remaining samples from the waterfront area consisted mainly of peats, sandy peats and organic sands similar to those already examined in the column samples (see above). Of greater interest were deposits including brushwood, reed and heather which appeared to represent materials laid on the peat surface to give a firm footing. Samples from three contexts were examined (6358, 6387, 6113) to detect any macrofossils trapped in the interstices of the deposits, which might be related to industrial activities in the area (Table).

(b) Carbonised plant remains from dry archaeological deposits

Carbonised macrofossils recovered by machine flotation from contexts 45, 55, 62, 74, 78, 110, 147, 201, 215, 254 and 298 are listed in Table , and specimens from the area of the occupation layer sampled in 1984 in Table .

(c) The Middle Saxon Crop Plants: Descriptions

Barley (Hordeum sp.)

Apart from a deformed and tentatively identified rachis node from column sample 3, barley is represented only by grains. In most samples distortion makes it impossible to determine whether a two- or six-row form is represented, but all grains appear to be hulled. The large sample of well-preserved grains from 6232 is of six-row hulled barley (Hordeum vulgare L emend. Lam.). Asymmetrical grains from lateral spikelets are common in this sample, and several specimens retain rachillas and bevelled lemma bases (Plate).

Context No.		4293	4297	4301	4332	4345	4681	4683	4684	4966	4967	4969	4970	5059	5062	5063	5064
10m grid square			91/59		91/60			91/61				90/61				89/61	
Cereal indet	frags	+	+	-	-	-	-	-	-	+	-	+	+	-	+	+	+
Cereal indet	ca.	-	2	1	1	-	2	1	3	2	2	2	4	1	-	-	2
Hordeum sp	ca.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Triticum aestivum s.l.	ca.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Secale cereale L	ca.	1	4	-	-	-	-	-	2	1	21	1	-	-	1	-	-
Secale cereale L	rf.	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-
Pisum-type	co.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leguminosae indet	co fr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculus acris/repens/bulbosus		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae indet		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia/Lathyrus sp		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum convolvulus L		-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Calluna vulgaris (L) Hull	c.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
Calluna vulgaris (L) Hull	st + lf.	-	-	-	-	-	-	-	+	-	-	-	+	-	+	+	+
Corylus avellana L	fr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine L		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium sp		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Sambucus nigra L		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1+fr
Carex sp		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cf. Phragmites	cn + fr	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Gramineae indet		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Indet		-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-

Table : Carbonised plant remains (excluding charcoal) from the occupation layer.

Abbreviations: c. capsule fr. fragments st. stem
ca. caryopsis lf. leaves
cn. culm node rf. rachis fragment

Taxa are represented by fruits or seeds except where indicated.

65	5224	5231	5233	5234	5356	5358	5362	5364	5365	5447	5375	5382	5044	5045	5046	5050	5784	5787
		88/61					89/62				90/62			91/62			90/63	
-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-
2	-	-	-	3	1	8	2	3	2	4	1	1	-	1	-	1	-	-
-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	-	-	1	1	-	7	1	1	1	-	-	-	-	-	-	-	2	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
+	-	-	-	-	-	-	-	+	-	-	-	-	+	+	+	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
-	-	-	-	-	-	-	-	-	-	-	1fr	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-
-	1	-	1	-	2	-	-	1	-	1	-	-	-	-	-	-	-	-

Context No.		1080	1354	1362	1372	1373
Sample wt (kg)		4	9.5	9.2	6	6
Cereal indet.	ca	1fr	7	3	2fr	5fr
	cn	-	2	-	-	-
Triticum sp.	ca	-	13	11	-	-
	bri	-	8	6	-	-
	gb(a)	-	18	8	1	3
	spb	-	7	4	-	-
Triticum spelta L.	gb	2	27	10	1	10
	spf	-	1	1	-	1
Triticum c.f. dicoccum Schubl.	gb	-	1	-	-	-
Hordeum sp. (hulled)	ca	-	7	10	-	-
	ri	-	7	1	-	-
Avena sp.	afr	-	-	+	-	-
Pteridium aquilinum (L) Kuhn	pi	-	+	+	-	-
Silene cf. alba (Miller) Krause		-	-	1	-	1fr
Scleranthus c.f. annuus L.		-	-	3	-	1
Chenopodium album L.		-	109	125	1	4
Atripliex patula/hastata		-	-	7	-	2
Chenopodiaceae indet. (b)		-	33	65	10	183
Malva sp. (b)		-	8	7	1	1
Trifolium/Medicago sp.		-	330	286	66	63
Vicia sp.		-	-	1+1co	-	-
Leguminosae indet.		-	1	-	3	-
Prunus spinosa L.		-	-	1	-	-
Polygonum aviculare agg.		-	36	31	24	30
Polygonum persicaria/lapathifolium		-	3	4	-	-
Polygonum convolvulus L.		-	19	9	-	63
Rumex acetosella agg.		-	5	13	-	3
Rumex sp. (crispus-type)		-	28	9	1	24
Polygonaceae indet. (b)		-	14	7	-	20
Calluna vulgaris (L) Hill	c	-	18	27	-	10
	st+lf	-	+	+	-	+
Plantago lanceolata L.		-	-	2	-	2
Tripleurospermum maritimum (L) Koch		-	1	-	-	-
Carex sp.		-	-	1	-	-
Eleocharis sp.		-	3	1	-	-
Bromus mollis/secalinus		-	35	12	1	4
Gramineae indet.		-	3	1	33	-
Indeterminate (c)		1	40	48	27	36

Table : BRD 018, Iron Age plant remains

Notes : (a) Fragmentary

(b) Testas or fruit coats missing or obscured by encrustations.

(c) These samples include relatively large numbers of poorly-preserved weed seeds: 'puffed' and weathered specimens, seeds with 'blistered' testas or testas missing entirely and seeds obscured by mineral encrustations. Specimens in the final stages of degradation are impossible to distinguish from abraded fragments of cereal grains or charcoal.

Abbreviations: a-awn; bri-brittle-rachis wheat internodes; c-capsules; ca-caryopses; cn-culm nodes; co-cotyledon; fr-fragments; gb-glume bases; lf-leaves; pl-pinnules; ri-rachis internodes; spb;spikelet bases; st-stems.

Context No.		45	45	45	45	45	45
Depth (cm)		0-10	10-20	20-30	30-40	40-50	50-60
Cereal indet.	ca	2	5	1	3	-	1
Triticum aestivum s.l.	ca	1	-	-	-	-	1
Triticum sp.	ca	-	-	-	-	-	-
Hordeum sp.	ca	1	3	-	3	-	2
Secale cereale L.	ca	1	2	-	2	1	1
	rf	-	-	-	-	-	-
Avena sp.	ca	-	-	-	-	-	-
Vicia faba L. var minor		-	-	-	-	-	-
Linum usitatissimum L.		-	cf.1	-	-	-	cf.1
Ranunculus sp.		-	-	-	-	-	-
Raphanus raphanistrum L.		-	1fr	-	-	-	-
Scleranthus sp.		-	-	-	2	-	-
Chenopodium album L.		-	-	-	5	-	-
Chenopodium sp.		-	-	5	-	-	-
Atriplex patula/hastata		-	-	1	3	-	-
Chenopodiaceae indet.		-	1	7	-	-	-
Malva sp.		-	-	-	1	-	-
Leguminosae indet.		3	-	-	-	-	-
c.f. Prunus sp.	end.fr	-	-	-	-	-	-
Polygonum aviculare agg.		1	4	14	1	-	-
Polygonum persicaria/lapathifolium		-	1	1	-	-	-
Polygonum convolvulus L.		-	5+fr	8+fr	8	-	-
Polygonum sp.		1	-	-	2	-	-
Rumex acetosella agg.		1	-	1	-	-	-
Rumex sp.		-	1	3	-	-	-
Polygonaceae indet.		-	-	-	-	-	-
Calluna vulgaris (L) Hull	c	6	21	19	14	1	14
	st+lf	+	+	+	+	-	+
Veronica hederifolia L.		-	-	-	-	-	-
Plantago lanceolata L.		-	-	3	-	-	-
Galium aparine L.		cf.1	-	-	-	-	-
Sambucus nigra L.		-	4	8	3	-	-
Eleocharis sp.		-	-	1	-	-	-
Carex spp.		-	4	2	4	-	-
Cyperaceae indet.		-	-	1	-	-	-
Bromus mollis/secalinus		1	-	-	-	-	-
c.f. Phragmites	cn+fr	+	+	+	+	-	-
Gramineae indet.		-	1	-	-	-	-

55	62	62	62	62	62	74	74	74	74	78	7
-	0-10	10-20	20-30	30-40	40-50	0-10	20-30	40-50	50-60	0-10	10-
41	4	5	2	3	2	1	5	3	-	20	29
3	-	-	-	-	-	-	-	1	-	2	7
-	-	-	-	-	-	-	-	-	-	-	-
10	-	1	-	-	-	-	-	1	-	7	5
24	2	3	cf.2	-	-	-	2	1	cf.1	14	13
1	-	-	-	-	-	-	-	-	-	-	-
2	-	cf.1	-	-	-	-	-	-	-	1	1
2	-	-	-	-	-	-	-	-	-	-	1
8	-	1	-	-	-	-	-	-	-	-	-
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78	78	110	147	147	147	201	201	215	254	298	298
0-30	30-40	20-30	0-10	10-20	20-30	20-30	30-40	0-10	0-10	0-10	10-20
37	23	1	4	5	5	5	3	-	1	12	6
4	1	-	-	2	-	1	1	-	-	-	-
-	-	1	-	-	-	-	-	-	-	-	-
5	2	1	-	-	-	1	4	-	-	1	1
19	17	-	-	1	-	2	-	1	-	3	3
1	1	-	-	-	-	-	-	-	-	-	-
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	cf.1	-	-	-	-	-	-	-	-	-	-
	+	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	2	-	-	-	-	-	-

Indeterminate	s	-	1	8	7	-	-
	b	-	-	2	-	-	-
	st.fr	+	-	-	-	-	+
	ch	-	-	-	-	-	-

Table 2 : BRD 018. Charred plant remains from Middle Saxon contexts

Only cereal fragments including the embryo or comprising most of the grain have bee counted. Unless otherwise indicated taxa are represented by fruits and seeds.

Abbreviations:

b	bud	ch	charred 'cokey' material	lf	leaves
bu	bulbil	cn	culm node	rf	rachis fragment
c	capsule	end	endocarp	s	seed
ca	caryopsis	fr	fragments	st	stem

N.B. Samples from 0045 also included uncharred seeds, but these are not listed in this Table (see Table 3)

-5	-	2	1	-	-	-	-	-	-	-	2	1	
-	-	-	-	-	-	-	-	-	-	-	-	-	
+	-	-	-	-	-	-	-	+	-	-	-	-	
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-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	±	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	-	3	2	-	-	1	3

Wheat (Triticum sp.)

The wheat grains are generally short and broad and are identified as Triticum aestivum s.l.: free-threshing, hexaploid bread or club wheat. A grain from 110 is more elongate with a maximum width towards the apex and with a flat ventral surface. This could possibly be of a glume wheat, though definite identification of a single grain in the absence of spikelet fragments is not possible. The only wheat rachis fragment came from Column Sample 3 (30-35cm.). It consists of the two lowest internodes, elongate and quadrilateral in cross-section, attached to the top of the culm.

Rye (Secale cereale)

Grains and rachis fragments were recovered. The grains show the typical variability of this species, though most are more or less elongate, pointed towards the embryo and keeled dorsally (Plate). Some rather abraded rachis internodes, came from contexts 55, 78 and 6457, from the occupation layer and from peat samples in columns 2 and 4, but the best-preserved rachis sections, consisting of several internodes with marginal pubescence were from column 3 (25-45cm.).

Oats (Avena sp.)

A few oat caryopses were identified, but the only floret base came from 6232. This was of Avena fatua-type.

Pea (Pisum sativum)

Three seeds, 4.7-5.1mm. in length with some cotyledon fragments came from 5742. One seed retains a short oval hilum approximately 1.1 x 0.6mm. An isolated cotyledon from 5045 is described as Pisum-type.

Horse-bean (Vicia faba var. minor)

The seed from 78 is 7.3mm. in length, 6.0mm. across the cotyledons. Damaged seeds and cotyledons were recovered from 55 and the occupation layer in column sample 3.

Hemp (Cannabis sativa)

Three fragmentary fruits were recovered from column sample 4, 50-60 and 70-80cm. (Fig).

Flax (Linum usitatissimum)

Carbonised seeds were recovered from contexts 45, 55, 62, 147 and 5038. Seven well-preserved specimens from 55 had the following dimensions:

	Length (mm)	Breadth (mm)
minimum	3.1	1.8
mean	3.66	2.0
maximum	4.2	2.1

Seeds and capsule fragments were also recovered from organic deposits: contexts 6358, 6385, 6387 and colum sample 4, 90-100cm. and 120-130cm. Some examples are illustrated in Fig . Two deposits of flax stem waste (6385, 6386) have been described above. A portion of the sample from 6385 is shown in Plate .

Bullace (Prunus domestica subsp. insititia)

Prunus fruitstones were recovered from context 45 and from column sample 4 at 120-130cm. Their dimensions were as follows:

	Length (mm)	Breadth (mm)	Thickness (mm)
45	11.2	9.0	c. 7.0
column 4	14.4	8.7	6.0
	10.8	8.0	6.7
	10.5	8.0	7.0

Apple (Malus sylvestris/domestica)

Five seeds of apple came from 6358. Two of these were adpressed and attached to fibrous endocarp tissue.

Walnut (Juglans regia)

6358 produced several small fragments of walnut endocarp, showing the characteristic irregular branched and sinuous grooving.

Hazel-nut (Corylus avellana)

Nutshell fragments were fairly common in 6358 and also occurred in column sample 4 (70-80cm.; 90-100cm.). Carbonised fragments came from column sample 3 (0-23cm.) and the occupation layer (5784).

(d) The Plant Economy: General Discussion

In this section the significance of the remains of crops and other utilised plants will be considered. Besides indicating the range of species exploited the composition of the assemblages provides evidence on the types of crop-processing activities which were taking place at the site. Cereals are considered first, followed by fibre crops, dye-plants, pulses, fruits and nuts.

Only five samples of carbonised cereals and weed seeds were examined from Iron Age contexts, but these seem in every respect to be typical of Iron Age sites in Southern Britain. The assemblages consist largely of spelt (Triticum spelta) with some remains of hulled barley (Hordeum sp.), traces of emmer (Triticum dicoccum) and oats (Avena sp.) and abundant weed seeds. The predominance of glume bases, spikelet forks, rachis internodes and weed seeds indicates that these assemblages are largely composed of fine sievings from grain cleaning (Hillman 1984, Table 1), though the presence of carbonised remains of bracken (Pteridium aquilinum), heather (Calluna vulgaris) and a carbonised fruitstone of sloe (Prunus spinosa) shows that there was some admixture of plant material from other sources. The range of arable weed species is characteristic of Iron Age assemblages, the predominant weeds being Chenopodium album, Trifolium/Medicago, Polygonum spp., Rumex spp. and Bromus mollis/secalinus. The occurrence of wetland taxa (Carex spp., Eleocharis spp.) at low frequencies is consistent with the evidence from plough-marks beneath the peat in column sample 3 for an extension of cultivation onto low-lying ground on the river flood-plain.

The cereal assemblages from Middle Saxon contexts differ from those of the Iron Age both in overall composition and in the range of species present. Crops identified are bread wheat (Triticum aestivum), six-row hulled barley (Hordeum vulgare), rye (Secale cereale) and wild or cultivated oats (Avena sp.). The relative abundance of these crops is summarised in Table . Despite marked variations in the density of plant remains in the soil, the composition of these Middle Saxon assemblages is fairly consistent. Grains, mainly of rye and barley, predominate; rachis fragments, mostly of rye, are uncommon; and weed seeds are generally rare. These samples are thought to represent cleaned prime grain either carbonised during the final stages of preparation for consumption or storage, by accidents during grain drying or cooking, or alternatively carbonised during accidental granary fires. There are no deposits of waste from grain cleaning and this implies that cereals arrived at the site in a cleaned or part-cleaned state. The composition of these samples is very similar to those from Middle Saxon contexts at Ipswich, which again represent prime

	Contexts 45,55, 62,74,78,110, 147,201,215,254, 298	Occupation layer (1984 season)	Context 5038	Context 6232	Context 6457	Peat column 2	Peat column 3	Peat column 4
Secale cereale (rye: grains)	115	46	552	7	6	-	9	1
Secale cereale (rye: rachis)	3	3	-	-	1	1	8	1
Hordeum sp (barley: grains)	48	3	2	84	2	-	-	-
Hordeum sp (barley: rachis)	-	-	-	-	-	-	1	-
Triticum aestivum (wheat: grains)	25	3	-	-	-	-	1	-
Triticum aestivum (wheat: rachis)	-	-	-	-	-	-	1	-
Avena sp (oats: grains)	7	-	4	9	-	-	-	-

Table : Summary of carbonised cereal remains identified from Middle Saxon contexts (numbers of grains/rachis fragments).

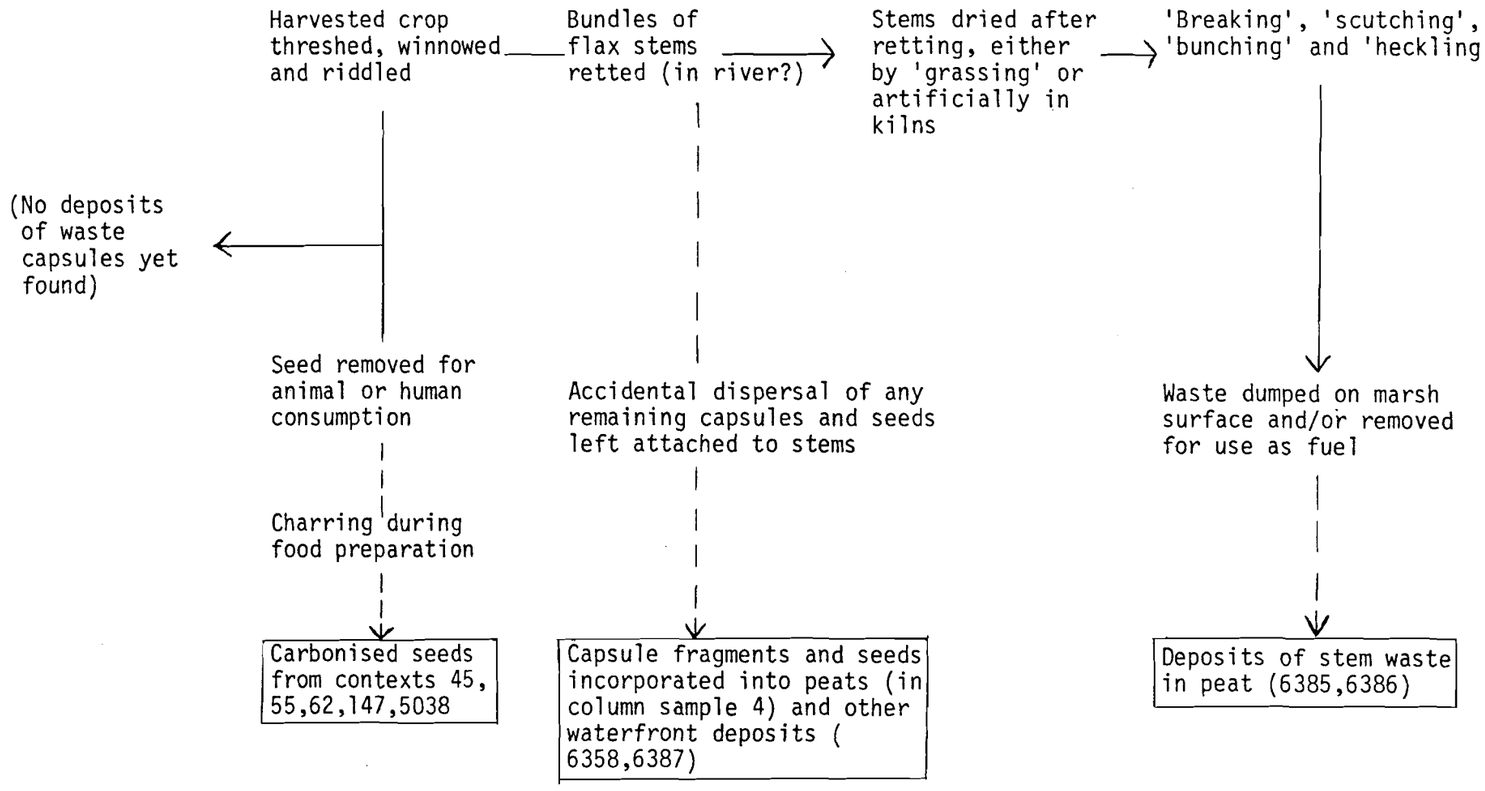

Fig : Evidence for flax processing from the site

peat surface clearly indicate that elderberries were being used in quantity for some purpose. There are two main possibilities: either the juice was being expressed for production of wine or other beverages, or it was being used as a dye. Elderberry juice yields a greyish-blue dyestuff and is known to have been used for dyeing in medieval Germany (Brunello 1973, 154). In view of the evidence for textile production in this area of the site, interpretation of these elder seed deposits as waste residues from dyeing seems plausible. The relative abundance of seeds of Reseda luteola (Dyer's Rocket) in context 6358, and their presence in several other samples from the waterfront area also suggest dyeing at the site. This plant gives a brilliant fast yellow dye (Grigson 1958, 68).

Other crop plants identified in samples from Middle Saxon contexts include pulses, fruits and nuts. Carbonised seeds and cotyledons of horsebean (Vicia faba var. minor) occurred in samples from contexts 55, 78 and the occupation layer in column sample 3. Well-preserved seeds of pea (Pisum sativum) came from 5742, and a pea-type cotyledon from 5045. The Prunus fruitstones from context 45 and column sample 4 (120-130cm.) seem to represent small cultivated bullaces (P. domestica subsp. insititia). Context 6358 produced seeds of apple (Malus sylvestris/domestica) with fibrous endocarp tissue. Nutshells of hazel (Corylus avellana) were identified, but of greater interest are the small fragments of walnut endocarp (Juglans regia) from 6358. At present these give the earliest post-Roman record of this crop from East Anglia.

Finally, the abundance of macrofossils of reed (Phragmites australis) and heather (Calluna vulgaris), is worth noting. These two plants, represented by carbonised and uncarbonised macrofossils, occur in the majority of samples. It is quite clear that large quantities of reed and heather were brought to the site for use as thatch, litter and flooring materials.

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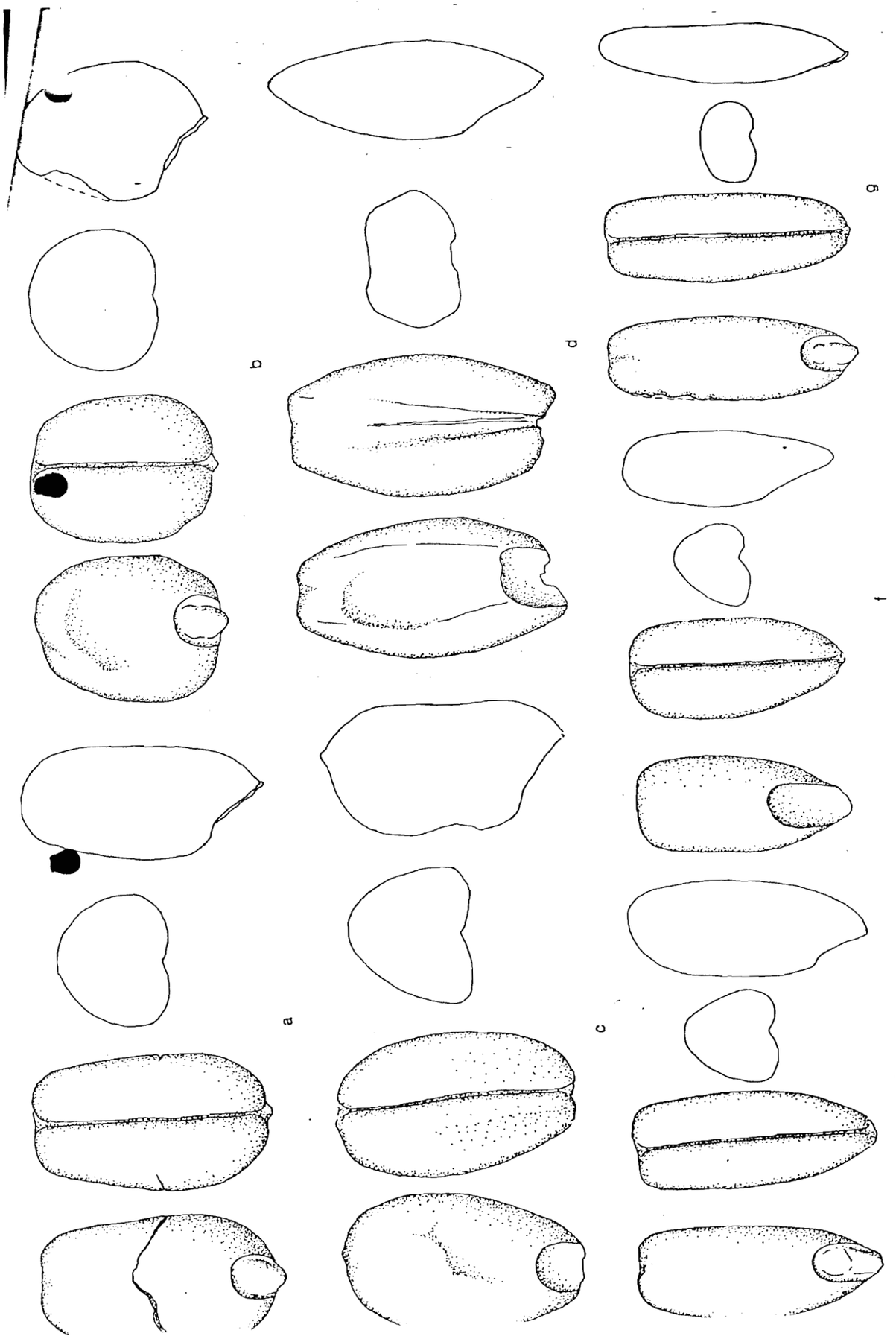
Fig : BRD 018, Charred crop plant remains

a,b Triticum aesticum/compactum Caryopses (0074 and 0055)
c. Triticum cf. spelta. Caryopsis (110)
d. Hordeum sp. (hulled) Caryopses (0055)
e,f Secale cereale. Caryopses (0055 and 0078)
g. Avena sp. Caryopsis (0055)
h. Vicia faba var minor. Seed (0078)
i. Linum usitatissimum. Seeds (0055)
j,k Secale cereale Rachis fragments (0078)

Scales graduated in mm.


a
b
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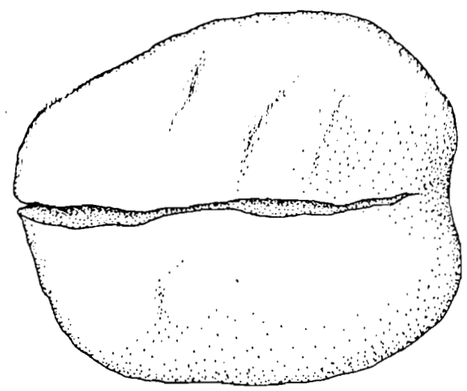

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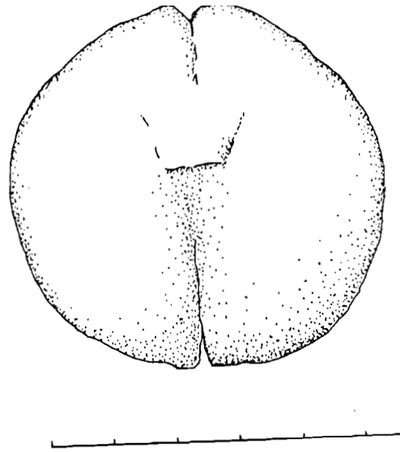

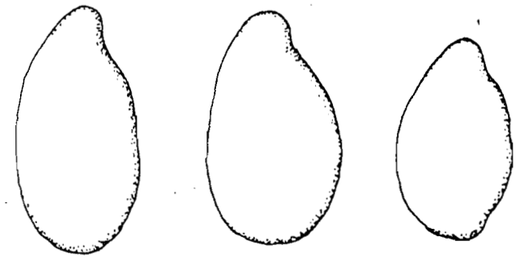

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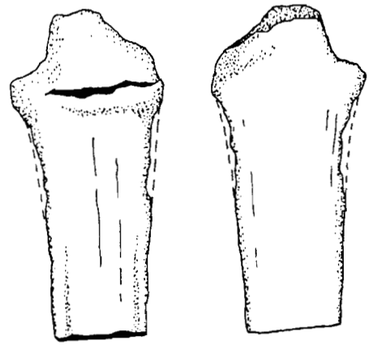


j

k

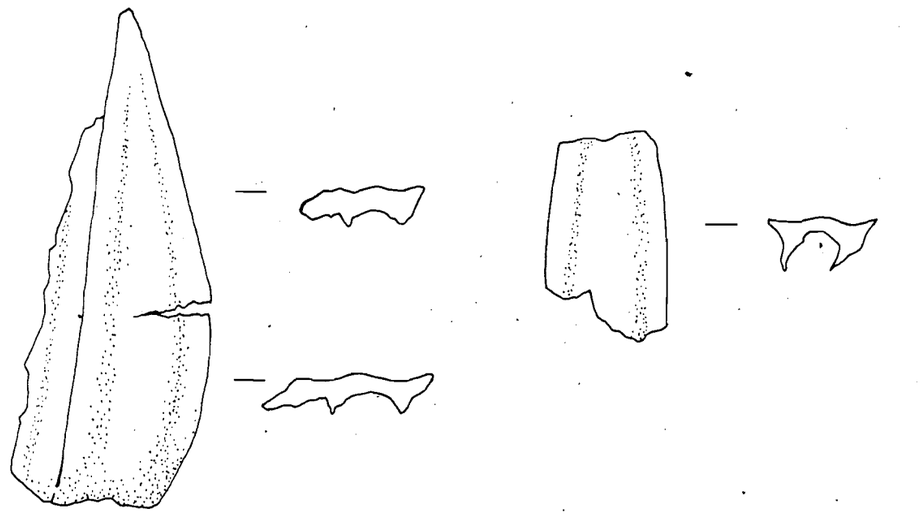
Fig. : Remains of fibre crops from Column Sample 4

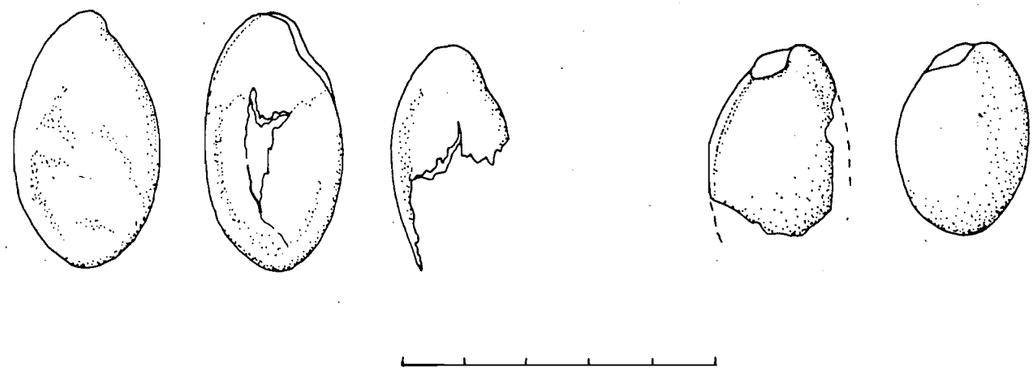
a,b. Linum usitatissimum, flax. Capsule fragments (90-100 and 120-130cm.)

c,d,e. Linum usitatissimum, flax. Seeds. (90-100cm.)

f,g. Cannabis sativa, hemp. Fragmentary fruits. (50-60 and 70-80cm.)

Scale graduated in mm.





Some Linum + Camelina remains from Brandon, Suffolk

8 Brandon (BRD 018) : Wood

Most of the structural wood from the site (planks from the building and piles from the causeway) consisted of oak. Pieces suitable for dendrochronology have been submitted to the Sheffield Dendrochronology Laboratory. All oak wood from the site (apart from very small fragments) has been examined by Richard Darrah with a view to gaining information on production and woodworking techniques. The remaining material is listed here.

Context No.	Description	Taxon
1016 (Building 1094)	Large irregular stake. Approx. ¼ of branch/trunk c. 16cm diameter. No bark	Willow (Salix sp.)
1036 (Building 1094)	Decayed wood, fragments.	Ash (Fraxinus sp.)
1049 (Building 1094)	Decayed wood fragments	Oak (Quercus sp.)
1056 (Building 1094)	Centrally-split branch c. 14cm diameter. No bark. Length c. 29cm.	Ash (Fraxinus sp.)
1814 (Building 1986)	Badly decayed small frags.	Oak (Quercus sp.)
1980 (Stakehole line (4) 1582)	Decayed fragments of stake	? Hazel/alder ?(Corylus/Alnus sp.)
1981 (Stakehole line (7) 1582)	Stake with no bark. Trimmed to irregular 5-facetted point. Max diameter 6cm, length c. 30cm.	? Hazel/alder ?(Corylus/Alnus sp.)
1954 (Stakehole line 1583)	Broken stake fragments, no bark. Comprises ½ section of branch c. 5cm diameter. Trimmed to irregular 4-facetted point.	Hazel (Corylus sp.)
1955 (Stakehole line 1583)	Stake with bark. Part-trimmed to point. Max. diam. c. 5.5cm, length c. 30cm. Decayed	Hawthorn-group (Crataegus-group)
3028 (1)	Stake with bark. Trimmed to 5-facetted point. Max.diam. c. 5cm.	Hazel (Corylus sp.)
3030 (Stakehole line (3) 1583)	Stake with bark. Trimmed to irregular 5-facetted point. Max. diam. 5.5cm, length c. 36cm. Decayed.	Hazel (Corylus sp.)
3032 (Stakehole line (6) 1583	Stake fragments, no bark. Approx. 5cm, diameter	Hazel/alder (Corylus or Alnus sp.)
3033 (Stakehole line (7) 1583	Tip of stake, 4-facetted. Max. diam. 3.5 + cm. Decayed.	Hazel (Corylus sp.)
3034 (Stakehole line (18) 1583	Stake made from split branch (>½) Max. diam. 5.5cm, length c. 28cm	Hazel/alder (Corylus or Alnus sp.)

1941 (Non-structural)	Decayed wood fragments	Oak (Quercus sp.)
1956 (Non-structural)	Broken and decayed fragments of stake tip.	Oak (Quercus sp.)
1952 (Non-structural)	Part-charred wood fragment	Ash (Fraximus sp.)

The wood identified as hazel or hazel/alder was generally in a very poor state of presentation. Features associated with the vessels (eg. spiral thickening and multiple perforation plates) were often not clearly visible and hence in some cases it was not possible to distinguish between hazel and alder. The cell structure of the remaining material was in a better condition.

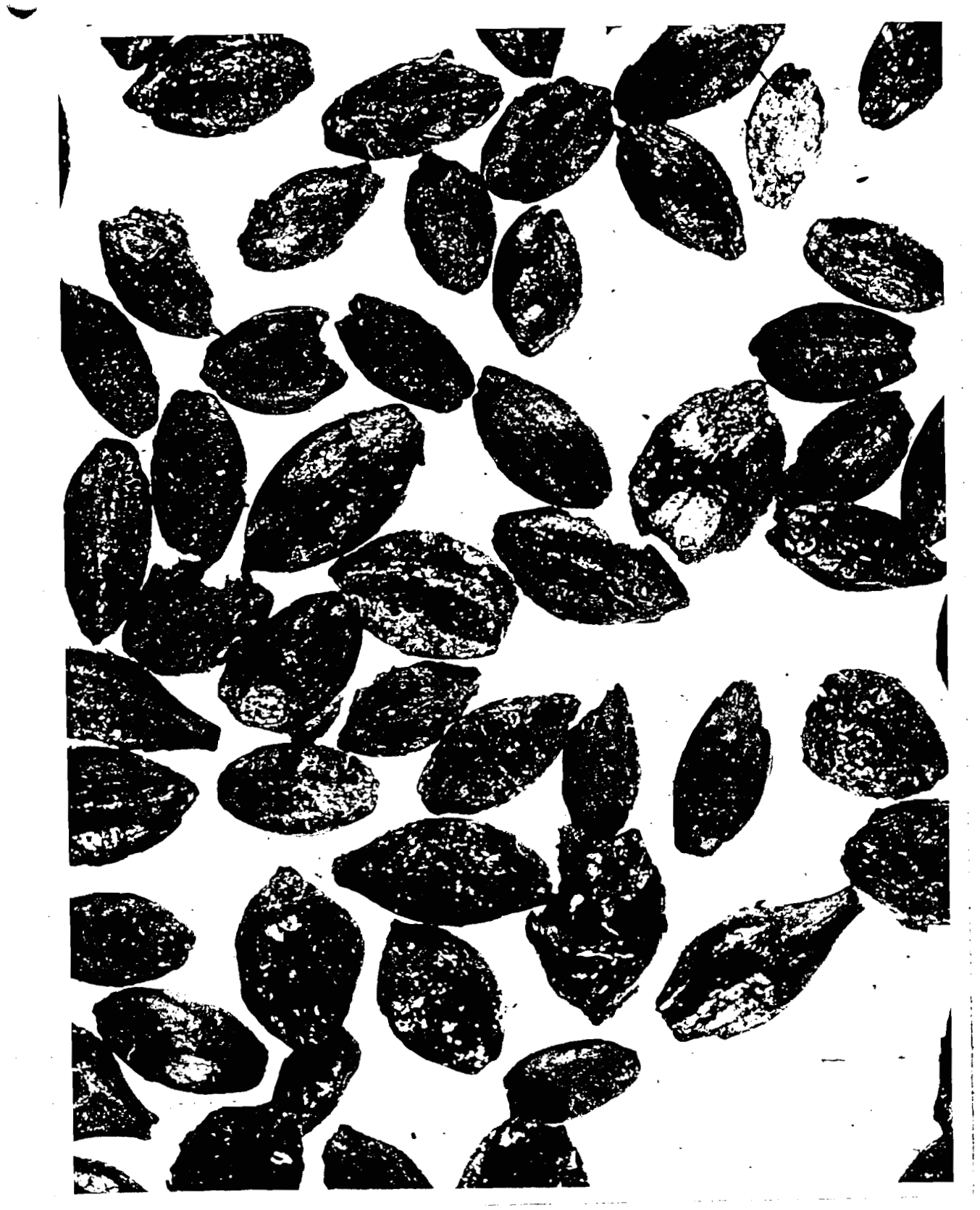
11. Mollusca

Soil conditions at this site were generally too acid for the preservation of mollusc shells (pH 5.2-6.3 in the lower horizons of the modern profile; R. MacPhail, soil report). However 147 produced a few poorly-preserved valves of Ostrea edulis (oyster) (two left and two right valves from 10-20cm; one left valve from 20-30cm) and some very pitted and abraded oyster shell fragments were recovered from the occupation layer (contexts 4685, 4970). Oysters were presumably imported to the site from the Wash via the Great and Little Ouse Rivers. An East coast source seems improbable since this would have involved a longer journey with no continuous river communications.

The presence of these oyster valves and, in some features, of dumped chalky material had produced locally base-rich conditions in which land mollusc shells had survived. Unfortunately some of these shells are evidently recent contaminants, since they retain periostraca, though others, with badly pitted surfaces, are more likely to be contemporary with the archaeological deposits. In view of this contamination detailed study was not thought worthwhile but the most abundant snails were Pupilla muscorum and Vallonia spp. with a few shells of Helicella itala, Nesovitrea hammonis, Cochlicopa sp., Carychium sp. and c.f. Lymnaea sp.

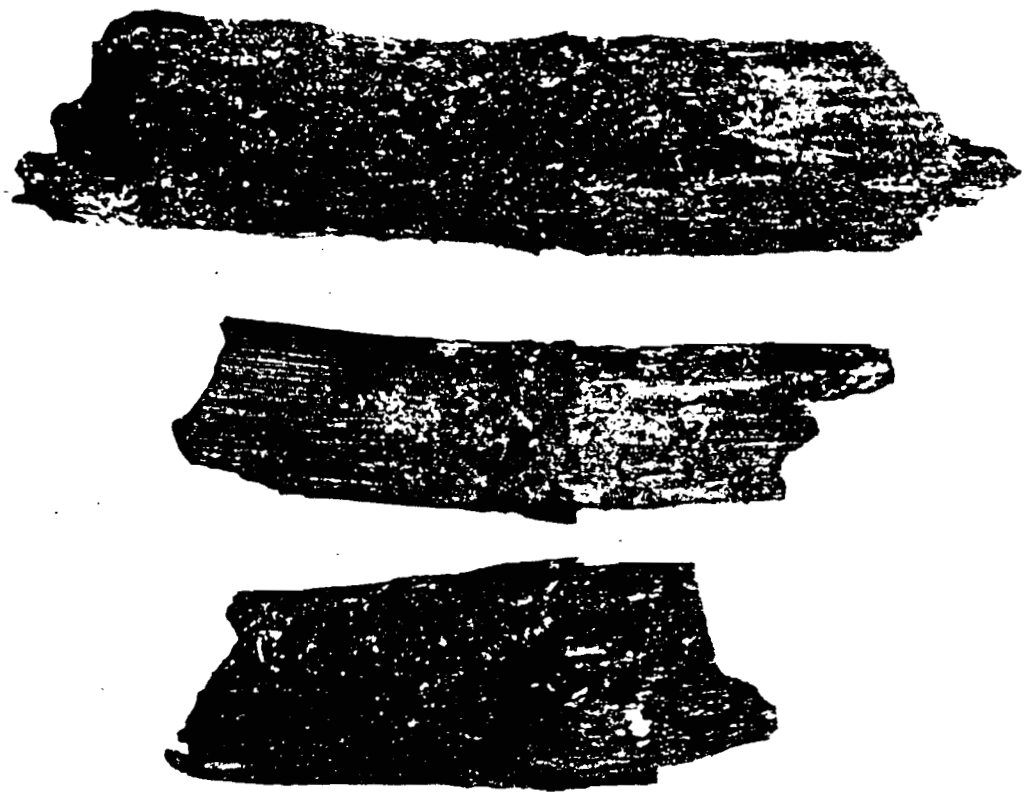
5mm

Plate : Brandon (BRD 018). Grains of rye (Secale cereale) from ⊗ 5038.



5mm.

Plate : Brandon (BRD 018). Grains of six-row hulled barley from 6232.

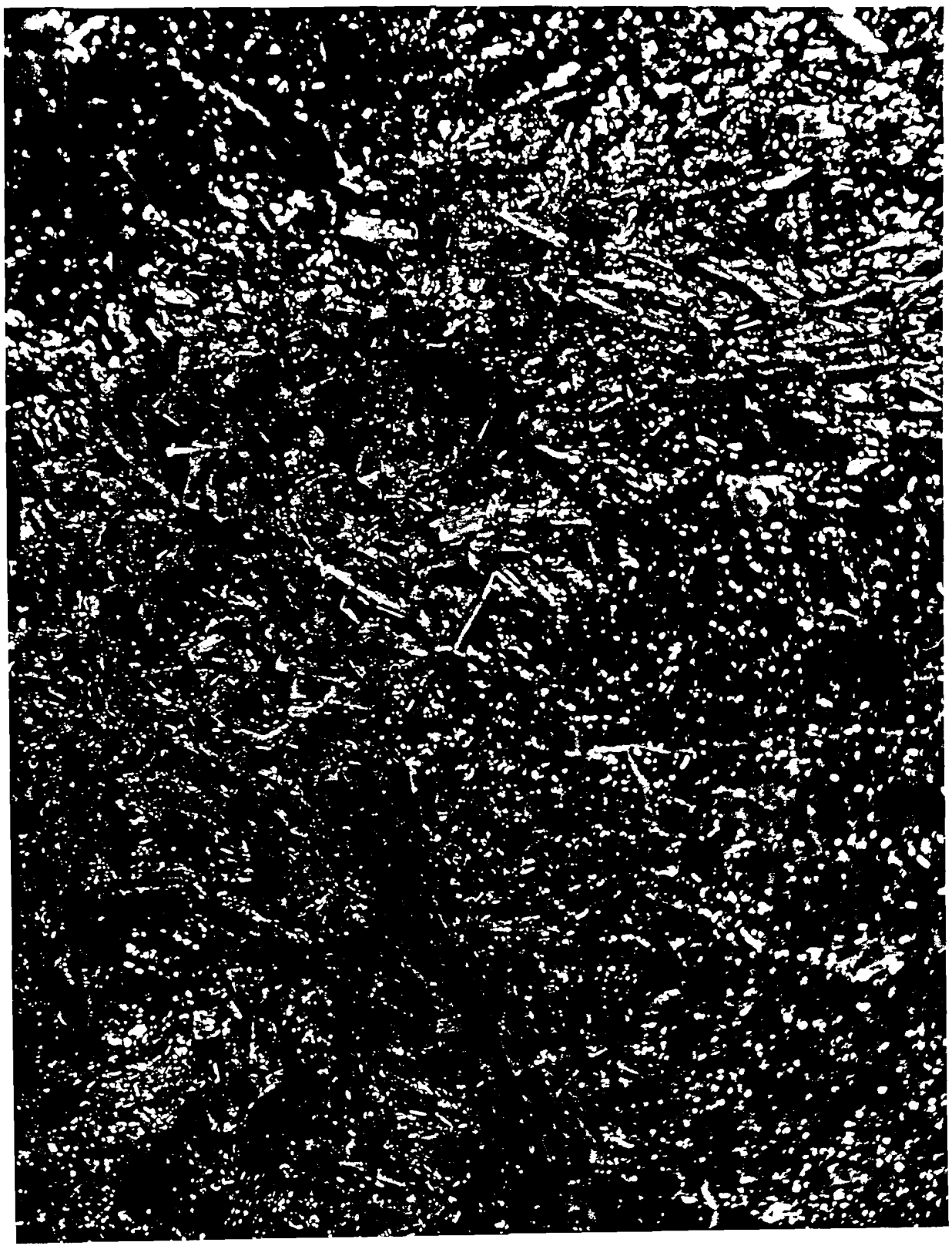


5mm.

Plate : Brandon (BRD 018). Culm nodes of reed (Phragmites australis) with seeds of yellow flag (Iris pseudacorus). from Column 3, 30-35cm.

10mm.

Plate : Brandon (BRD 018) Twigs/small brambles of hazel charco (Corylus sp) from Column Sample 3, 25-40cm. One specimen shows a sharpened tip, insect borings



5mm.

Plate : Brandon (BRD 018). Stem waste ('scutching waste') of flax (Linum usitatissimum) from 6385.

5mm.

Plate : Brandon (BRD 018). Unprocessed portion of sample from 6122, to show the density of seeds of Sambucus nigra (elder)

5mm.

Plate : Brandon (BRD D18). Charcoal of heather (Calluna vulgaris) from context ~~AB~~ 6232.