ANCIENT MONUMENTS LABORATORY

REPORT

4014

SERIES/No CONTRACTOR

AUTHOR Peter Murphy

TITLE Magistrates Courts, Whitefriars Street, Norwich. Examination of environmental samples

AMK Rpnt 4014

Site	:	Magistrates Courts, Whitefriars Street, Norwich
County	:	Norfolk
Code	:	450N
Type of Site:		Urban waterfront site
Period	:	Late Saxon-Post-Medieval
Geology	:	Terrace sands and gravels
Director	:	B.S. Ayers
Contents	:	1. Freshwater and land molluscs
		2. Marine molluscs
		3. Parasitic nematode ova
		4. Avian eggshell
		5. Plant macrofossils (excluding wood and mosses)
		6. Wood
		7. Fiche text (with details of sampling and proceesing methods, full tables of identifications etc.)

Whitefriars Street, Norwich (450N): Freshwater and land molluscs

Mollusc shells were recovered by bulk-sieving on site and also by wet-sieving in the laboratory. Most samples from pits and ditches contained only very small numbers of shells and many were devoid of molluscan remains. Whorl fragments and apices of the synanthropic species Helix aspersa Müller were relatively common, and shells of Trichia cf. striolata (Pfeiffer) and Limacidae also occurred. Other terrestrial taxa included Carychium sp., Cochlicopa sp. Pupilla muscorum (Linné), Discus rotundatus (Müller), Zonitidae and Trichia cf. hispida (Linné). Shells of Succinea sp. occurred sporadically. Paired valves of juvenile Sphaeriidae occurred in 1118 (Sample 18G), and 1117 (Bulk Sample 16) produced shells of Anisus vortex (Linné). These very sparse mixed assemblages are of little palaeoecological value, other than indicating wet conditions in the gulley 1117/1118.

The only sample producing a substantial shell assemblage was 414, (sample 7), the fill of an oven of late 14th century or later date. This deposit was a yellowish-red clay loam including part-fired clay apparently weathered from the oven wall. It contained shells of freshwater molluscs, many of which are crushed, deformed by heat and grey in colour, as well as ostracods, fishbone, charophyte oogonia and derived chalk foraminiferans. Molluscs identified are listed in Table . A sample from the oven wall was also examined, but disaggregation of the fired clay was difficult and shells appeared to be rare and still more poorly preserved than in 414. Despite the poor preservation of molluscs in 414 the sample clearly contains a freshwater assemblage, including Valvata cristata Müller, Valvata piscinalis (Müller), Bithynia tentaculata (Linné), Planorbis planorbis (Linné), Gyraulus albus (Müller), Unionidae and Sphaeriidae. These shells are thought to indicate use of river mud in the construction of the oven.

Whitefriars Street, Norwich (450N): Marine molluscs

Bulk-sieved soil samples produced shells and fragments of Ostrea edulis (oyster) Mytilus edulis (mussel), Cerastoderma edule (cockle), Buccinum undatum (whelk), Neptunea antiqua (whelk), Littorina littorea (winkle) and occasional other fragmentary marine bivalves. Specimens identified are listed in Table

The shell assemblages from this site differ from those at 421N (Ayers and Murphy 1983, 34) where dense and extensive layers of crushed shell, mainly of mussel, were observed.

At 450N no mussel shell concentrations were seen: shells were dispersed throughout general refuse layers. Moreover the predominant species at this site is the oyster which comprises 62% of the total minimum number of individual molluscs counted at 450N compared to only 25% at 421N. This is thought to indicate two distinct patterns of shell refuse disposal: the assemblages from 450N seem to represent refuse from domestic consumption, whereas those from 421N may reflect larger scale, possibly commercial, activities. It is known that during the later middle ages shellfish boats landed their catches in the area between Whitefriars and Fye Bridges (Hudson and Tingey 1910, xxxvi) and the shell deposits at 421N may well indicate similar activities on the waterfront at an earlier period. The deposits of waste shell could have been produced either by sale of shellfish for immediate consumption at the quayside or preparation of the catch for later sale as shelled meat.

Hudson, W. and Tingey, J.C., (1910) The Records of the City of Norwich Vol.2

Ayers, B. and Murphy, P., (1983) A Waterfront Excavation at Whitefriars Street Car Park, Norwich 1979. East Anglian Archaeology Report No. 17 1-60. Gressenhall

Parasitic nematode ova

Difficulties and limitations in the study of parasite remains from archaeological deposits have been reviewed by Jones (1982, 68-9). In view of the problem of determining parasite species and hence host species extensive sampling for ova was not undertaken at the present site. However soil samples from four deposits which on archaeological and palaeobotanical grounds appear to have been composed largely of human excreta (1043, 1159, 2003, 3111) were examined. Aqueous suspensions of soil from these waterlogged deposits were prepared. Microscopic examination of these suspensions revealed numerous ova of a roundworm, Trichuris sp., with some ova of Ascaris sp. in all four deposits. Although specific determination of these ova has not been attempted, the contexts of the samples make it probable that human infestation is represented.

Jones, A.K.G. (1982) 'Human parasite remains: prospects for a quantitative approach', in Hall, A.R. and Kenward, H.K. (eds) 'Environmental Archaeology in the urban context'. CBA Research Report No 43, 66-70. London.

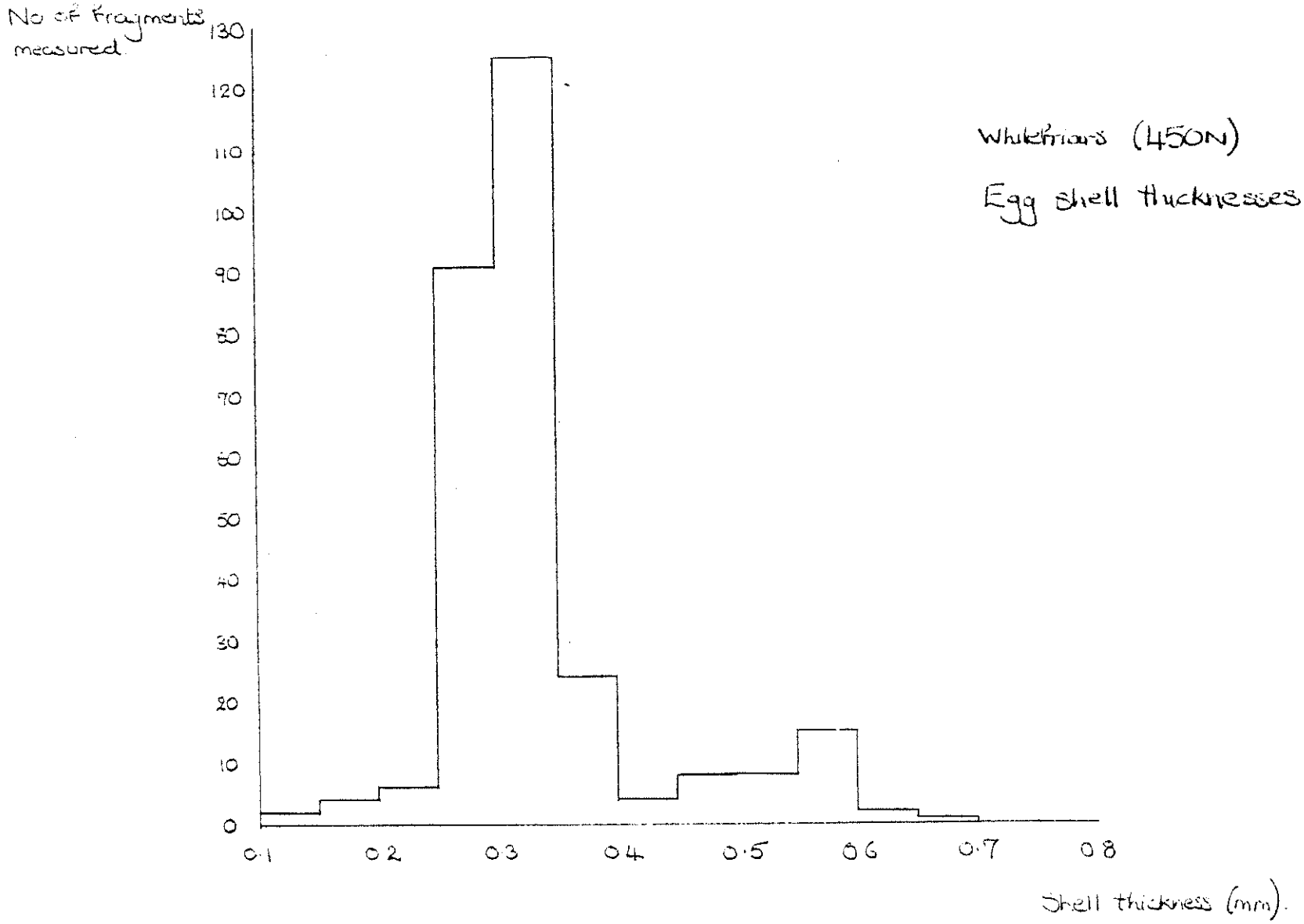
Whitefriars Street, Norwich (450N). Avian eggshell

Eggshell fragments recovered by bulk sieving from seventeen contexts were examined. 1118 produced, in addition, a crushed egg (Plate).

Thicknesses of a maximum of thirty fragments per sample were determined using a flat-jawed micrometer screw gauge. The results are summarised in histogram form (Fig.). Two groups are distinguishable: a large group of fragments generally between 0.25 and 0.35mm thick, and a smaller group of fragments with a modal thickness between 0.55 and 0.6mm. Keepax (1981, 323) reports two comparable thickness groups in material from a number of archaeological sites and notes that the thicker group is comparable with goose, swan or guinea fowl, whilst the distribution of the thinner group corresponds to modern domestic fowl, though some other species cannot be excluded on thickness criteria alone. Most of the thick fragments from Whitefriars came from a single context: 1032, an organic fill of an 11th/12th century gulley. A similar double grouping of thick- and thin-shelled fragments was noted in samples from medieval contexts at Pottergate, Norwich, 149N (Murphy, forthcoming).

The crushed egg from 1118, the organic lining of the same 11th/12th century gully, retained its internal membranes (Plate). Shell fragments from this egg were 0.29-0.34mm thick, matching the abundant thin-shelled fragments from the site.

Keepax, C.A. (1981) 'Avian eggshell from archaeological sites' Journal of Archaeological Science 8, 315-336



Whitehaven (450N)

Egg shell thicknesses.

Plant macrofossils (excluding wood and mosses)

Methods used for the extraction and identification of fruits, seeds, leaves, stem fragments etc. are fully described on microfiche ( ).

Macrofossils extracted from samples in the laboratory are listed in Tables (fiche) and specimens larger than 2mm, recovered by bulk sieving, appear in Table (fiche).

In the final section of the report on plant macrofossils from Whitefriars Street Car Park 421N (Ayers and Murphy, 1983, 44) it was concluded that continued examination of waterfront deposits consisting of a complex mixture of natural fluviatile sediments with tipped layers of refuse would not be profitable, since interpretation of macrofossil assemblages from such heterogeneous deposits poses great difficulties. Further, it was proposed that at the Magistrates Courts site (450N) attention should be concentrated on well-sealed clearly-defined contexts which might be expected to contain assemblages related to a more restricted range of activities. Sampling at 450N was confined largely to such contexts.

It should be emphasised that all assemblages examined from the present site are, to a greater or lesser extent, mixed, in the sense that they include material from more than one source. Three samples (1137, a depression in a foreshore brushwood platform; 1117 (Samples 15 and 32) from the fill of the main gulley bisecting the site) contained an apparently random mixture of macrofossils from crops and wild plants with no one group of plant remains predominant. Functional interpretation of such assemblages is at best tentative and these samples will therefore not be discussed further. The remaining samples, however, are more distinctive in composition, and have been divided into seven types of assemblage, as follows:

1. Carbonised cereal/segetal assemblages.
2. Cereal/segetal assemblages from waterlogged contexts.
3. Ruderal assemblages.
4. Cess assemblages.
5. Grassland/wetland assemblage.
6. Reseda luteola assemblage
7. Aquatic assemblage.

Three other groups of plant macrofossils, whilst never forming the predominant component of any assemblage, are nonetheless of interest.

These are:

8. Heath plants.
9. Fibre crops.
10. Halophyte.

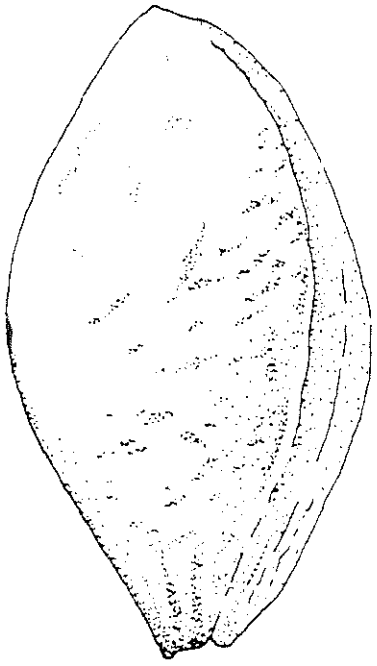
These assemblages and plant macrofossil groups are discussed in turn below.

Fig : Selected crop plant remains from 450N.

Taxa are represented by fruitstones, fruits or seeds unless otherwise indicated.

a. Mespilus germanica (medlar) 1159.
b. Malus sylvestris/domestica (apple) 2003.
c. Vitis vinifera (grape) 2003.
d. Morus nigra (mulberry) 2003.
e. Foeniculum vulgare (fennel) 2003.
f. Coriandrum sativum (coriander) 2003.
g. Vicia faba (bean). Testa fragment with position of hilum (the pigmented tissue of the hilum is missing). 3111.
h. Prunus domestica subsp. domestica (plum). Large cultivated plum fruit-stone. 1159.
i. Hordeum cf. distichum (barley). Carbonised rachis section. 1119.
j. Secale cereale (rye). Carbonised rachis section. 1119.
k. Secale cereale (rye). Uncarbonised rachis node, partly degraded. 1118.
l. Humulus lupulus (hop). Bract fragment (the central part is folded double). 3111.

Scales graduated in mm.



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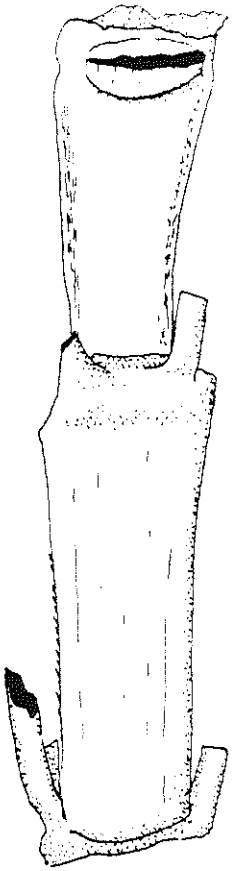

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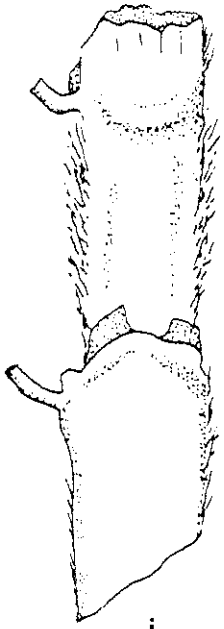

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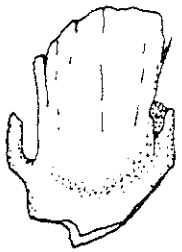

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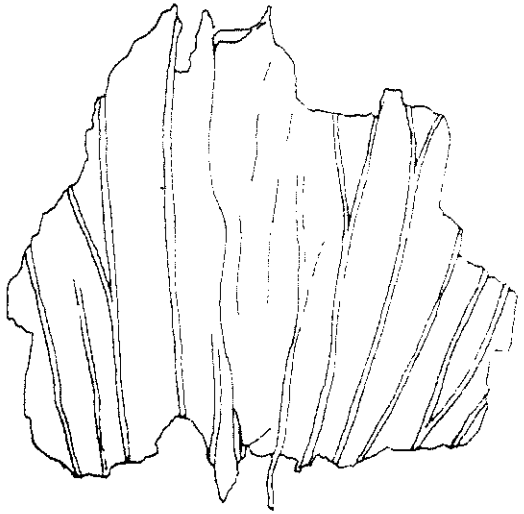

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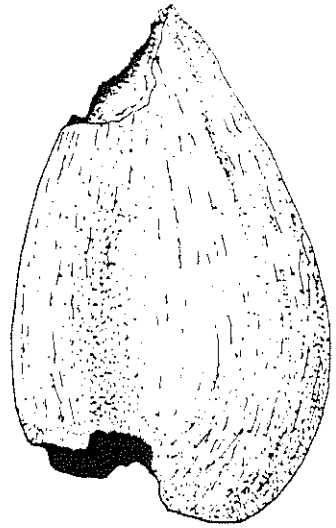

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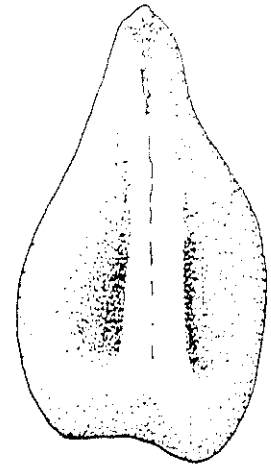

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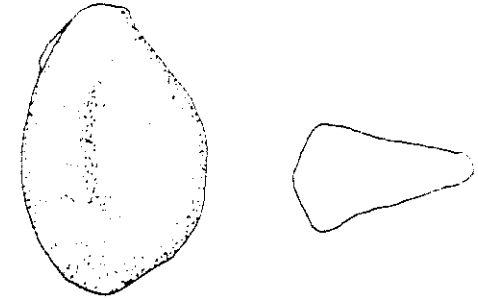

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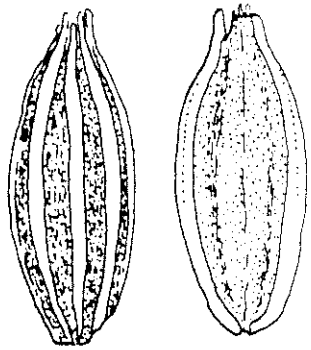

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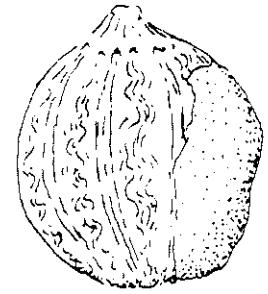

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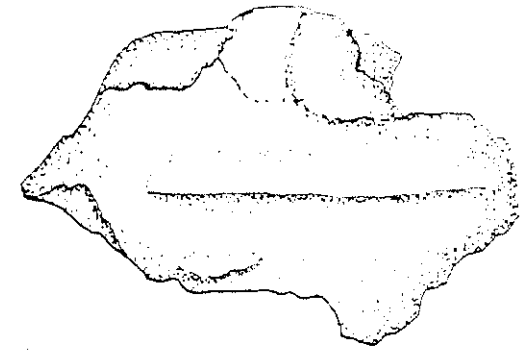

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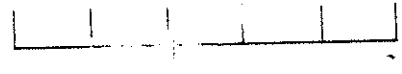


1. Carbonised cereal/segetal assemblages.

Rare charred cereal remains, predominantly grains, occurred in small numbers in the majority of samples. From their contexts these are likely to represent small-scale accidental charring during domestic food preparation. Two much more extensive deposits containing abundant charred cereals and weed seeds came from the large gulley bisecting the site: 1119 from the lowest fill of this gulley and 1122, an ashy deposit occurring at intervals along its length in the upper fill. In samples from these contexts the charred cereals were associated with uncharred macrofossils preserved by waterlogging, but these will not be considered here. Both assemblages include charred cereal grains, rachis nodes, awn and lemma fragments as well as some 'silica skeletons' of awns and inflorescence bracts. In 1122 charred cereal culm nodes and fragments were common, but straw remains were rarer in 1119. 1119, however, contained a higher proportion of charred weed seeds with abundant charred leaves, shoots, capsules and charcoal of Calluna vulgaris and charred pinnules and 'petiole' fragments of Pteridium aquilinum.

The main cereal in 1119 is rye (Secale cereale) with hulled barley, probably two-row (Hordeum cf. distichum) and rare charred remains of wheat, oats, flax and horsebean. The grain : rachis node ratios, calculated from identified grains, are 1.65:1 for barley and 1.44:1 for rye. These figures are, however, misleadingly low, since there was a high proportion of badly deformed indeterminate grains which were not included in the calculation of these ratios. Correcting for this can only be approximate, but grain : rachis node ratios of around 2:1 for barley and 2.3:1 for rye seem realistic estimates. Hulled barley, again probably two-row, is the main cereal in 1122, and in this assemblage the barley grain : rachis node ratio is 1.85:1. This again is somewhat too low a figure because unidentified cereal grains could not be included in the calculation. Compared to the ratios expected for intact cereal ears there is a slight excess of rye grains over rachis nodes (there are normally two fertile flowers per spikelet in rye) and a marked excess of barley grains. This may be explicable in terms of lack of homogeneity within the deposit, relatively poorer preservation of rachis fragments or, in the case of barley, some undetected admixture of six-row barley. Whatever the true ratios it is clear that these samples represent crops at an early stage of processing, which still include significant quantities of rachis fragments, straw and weed

seeds still contained within their fruits: in 1119 there was a fused mass of Spergula arvensis seeds and Vicia seeds with siliqua fragments adhering (cf. Hillman 1981, Fig 6).

The circumstances in which charring occurred cannot be reconstructed with certainty. However, kiln drying of a part-processed or unprocessed bulky crop is not customary and thus accidental charring during kiln drying seems unlikely. A more plausible interpretation is that these deposits are charred residues from rick or barn fires. The occurrence of largely unprocessed crops at the site is a useful indication that primary crop processing activities (threshing, raking, winnowing etc) were taking place nearby and that at this date not all cereals were reaching Norwich as cleaned prime grain. Cultivation at no great distance from the site may be inferred.

The sample from 1119 shows features indicating that the crop was poor. Firstly, the rye grains from the deposit are exceptionally small (Table).

Site	450N	West Stow, Suffolk (WSW 030)	Odoorn Netherlands	Dorestad, Netherlands
Context	1119	026		
min	2.6	3.5	4.0	4.5
mean	4.07	5.07	5.34	5.64
max	5.5	6.5	6.8	7.0

Table : Lengths (mm) of charred rye (Secale cereale) grains

Sources: West Stow (Murphy, forthcoming); Netherlands (Van Zeist 1968).

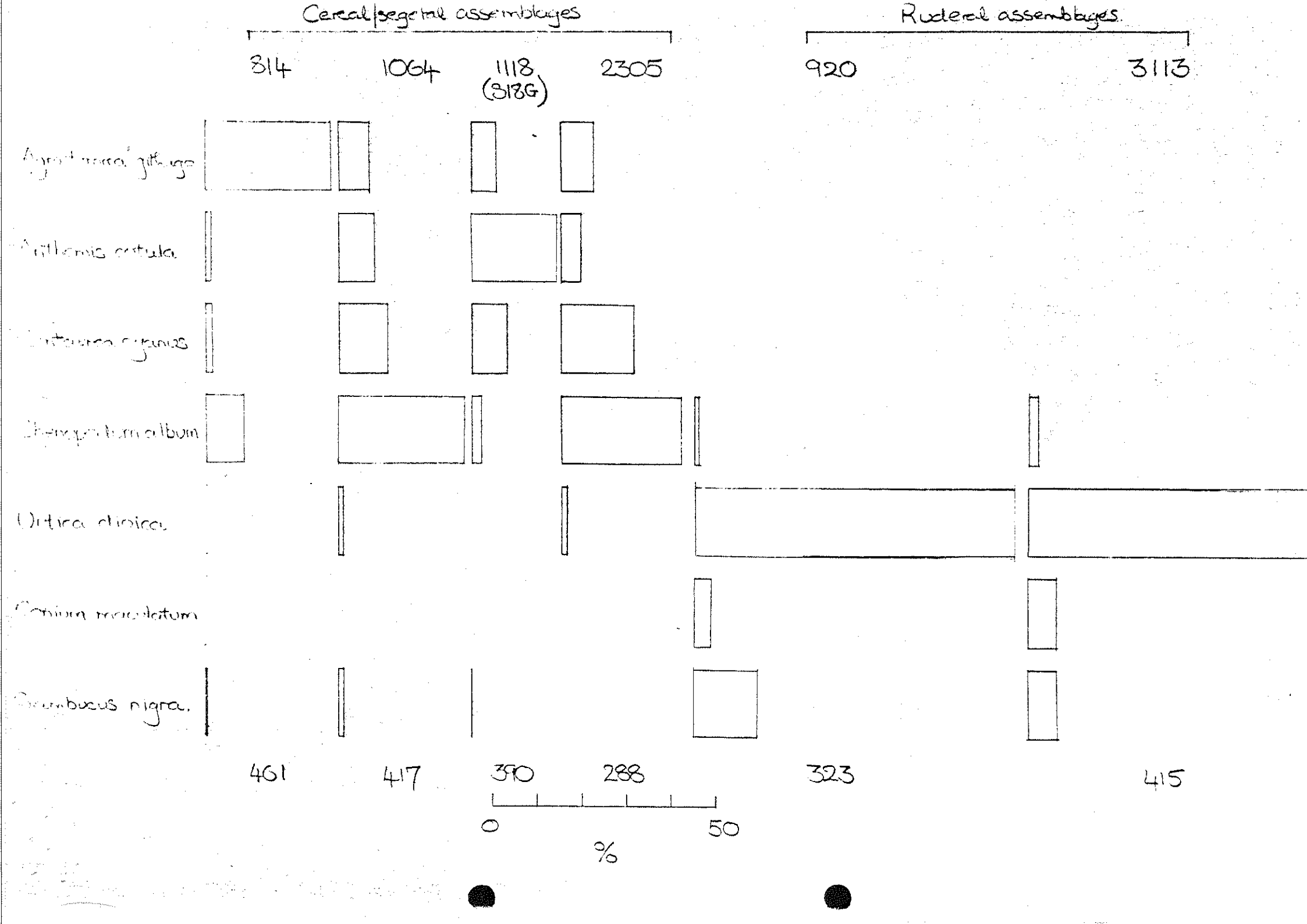
Some allowance must be made for the fact that 1119 is a largely unprocessed crop, whereas the other three samples in Table are of processed prime grain. However, it appears that, even after removal of 'tail grain' from 1119 the mean grain size would have been small. Secondly, of the weed seeds in the sample 52% are of vetches, including Vicia cf. hirsuta. Jones (1978) argues that high frequencies of leguminous weed seeds indicate depletion of soil nitrogen. It would seem from these features that this particular batch of rye had been grown on impoverished soil which was not receiving sufficient manure to maintain soil nitrogen levels. It is worth noting that 1122, and a similar

contemporary sample from Alms Lane, Norwich (302N 925: Murphy, forthcoming), both of which consist predominantly of barley have different, unfortunately very small, weed seed assemblages in which leguminous weeds are not common (Table). This gives some grounds for suggesting that these barley crops may have been cultivated on land which was well manured, whereas rye may have been grown on land more remote from the town, probably on sandy soils given the soil characteristics of the Norwich district, which received less manure. This suggestion cannot be proved on the present evidence, but as a working hypothesis it is capable of being tested by future examination of further cereal/segetal assemblages.

2. Waterlogged cereal/segetal assemblages.

These assemblages are characterised principally by high frequencies of seeds and fruits of segetals, in association with grass or cereal culm fragments and, in most cases, cereal caryopses and cereal rachis nodes (predominantly Secale with rare Hordeum). The most abundant and characteristic segetal species identified are Agrostemma githago, Anthemis cotula and Centaurea cyanus, but a wide range of other segetals is present, including Papaver argemone, P. rhoeas, Raphanus raphanistrum, Silene alba, Spergula arvensis, Scleranthus annuus, Valerianella dentata, Polygonum spp., Lapsana communis, Chrysanthemum segetum and Sonchus spp. amongst others. Many of these plants could also have grown as ruderals on waste ground in the settlement area, but in these particular assemblages seed input from local weed vegetation is not thought to have been significant. This contrasts with ruderal assemblages, as defined below, in which seeds from weed plants growing at the site are thought to form the predominant component. Differences between frequencies of the most abundant species from cereal/segetal assemblages and ruderal assemblages are shown in Fig. . Besides the absence of the three main segetals, the ruderal assemblages are distinguished by very high frequencies of Urtica dioica and fairly high frequencies of Conium maculatum and Sambucus nigra. Chenopodium album occurs in both types of assemblage, but generally at higher frequencies in the cereal/segetal assemblages.

The waterlogged cereal/segetal assemblages are thought to represent crop processing waste with some admixture of macrofossils from other sources. In the case of assemblages with many very large weed seeds (eg. 814 with 27.8%


Cereal/segetal assemblages
Ruderal assemblages
314
1064
1118 (318G)
2305
920
3113
Agrostemma githago
Anthemis cotula
Centaurea cyanus
Chenopodium album
Lithospermum arvense
Papaver rhoeas
Sambucus nigra
461
417
390
288
323
415
0
50
%

Agrostemma githago) this could be waste from hand-sorting of grain before consumption (Hillman 1981, Fig. 7. Stage 14). In other cases waste from sieving may be represented.

3. Ruderal assemblages.

The general characteristics of these assemblages have been discussed above. They are marked by relatively high frequencies of fruits and seeds of Urtica dioica, Conium maculatum and Sambucus nigra with a variety of other ruderal and scrub species. 920, 1090, 3113 and 3114 produced assemblages of this type. In terms of interpreting human activity at the site they are not informative, other than suggesting that the features which produced them were left open for some time, whilst seeds from the local ruderal flora accumulated. Not surprisingly these contexts also produced macrofossils from crop plants, segetals, wetland species and remains of bracken and heather, indicating dispersal of domestic and other refuse of plant origin, but large-scale refuse disposal does not seem to have contributed significantly to the formation of these assemblages.

4. Cess assemblages.

It was clear during excavation that certain deposits, by virtue of their contexts, were likely to include a component of human faeces. 2003, for example, was the organic fill at the base of the garderobe tower attached to the Norman building. Three other deposits (1043, 1159, 3111) were subsequently characterised as cess deposits from the internal characteristics of the deposits themselves and from the plant macrofossil assemblages which they produced. These deposits were all very dark brown and highly organic with large concretions. No chemical analyses have been made of these concretions, but in view of analyses of mineralised plant material from cess pits at other sites (Green 1979) they are thought to include calcium phosphate produced by reaction of phosphates from faeces with dissolved calcium in ground water, or possibly with lime thrown into pits to suppress odours. The concretions commonly contain numerous mineralised fly puparia, plant stem fragments and testa fragments from large weed seeds such as Agrostemma githago. Mineralised arthropods and plant macrofossils were also common in the general matrix of the deposits.

The plant remains present include a high proportion of material which appears to have passed through the human gut. In 1159 and 2003 small fragments of cereal periderm (bran) were very common and these two contexts, as well as 1043 and 3111 also contained many fragmentary fruits and seeds of segetals, notably Brassica sp., Raphanus raphanistrum, Agrostemma githago, Spergula arvensis, Rumex sp., Polygonum convolvulus, Polygonum persicaria/lapathifolium, Lapsana communis and Centaurea cyanus. These macrofossils are thought to represent residues from weed-contaminated wholemeal flour (cf. Dickson & Dickson 1979, Greig 1981) consumed as bread or porridge. Mineralised whole and fragmentary grains of cereals were also present and these could be derived from foods in which whole cereal grains were used (eg. frumenty, stews and soups). Testa and hilum fragments of horsebean (Vicia faba) and perhaps pea (Pisum sativum) were common in 1043 and 3111, reflecting consumption of pulses. 'Pips' from succulent fruits with small seeds and fruitstones, such as Rubus fruticosus, Rubus idaeus, Fragaria vesca, Morus nigra, Ficus carica, Vitis vinifera and Sambucus nigra are also common and sometimes very abundant (eg. 986 fig 'seeds' in a 1kg sample from 2003). These also are presumably derived from faeces. Fruits and seeds of culinary herbs and flavourings (Papaver somniferum, Apium graveolens, Foeniculum vulgare, Coriandrum sativum) are likely to have come from the same source. The remaining fruits and nuts (Prunus spinosa, Prunus domestica, Prunus cf. avium, Malus sylvestris/domestica, Mespilus germanica, Corylus avellana, Juglans regia) are represented by large fruitstones and nutshells, presumably table or kitchen refuse thrown into the cess pits. Most other plant macrofossils from the samples, such as bracken frond fragments, cereal or grass culm fragments, rye rachis nodes and 'seeds' from wetland and ruderal plants are thought to represent floor sweepings similarly disposed of.

The remaining crop plants or potential crop plants, from these deposits call for some further comment. Fruits and bracts of hop (Humulus lupulus) were present in 1043 and 3111. Hop fruits were previously identified at 42IN but only in river foreshore deposits where natural dispersal could not be excluded. The identifications from these cess pits establish with reasonable certainty that hops were being used, though for what purpose and from what source the hops were derived remains uncertain. Evidence for pre-conquest utilisation of hops is given by Wilson (1975). Linseeds (Linum usitatissimum) were identified in 1159 and 3111, and in these particular contexts it seems probable that the

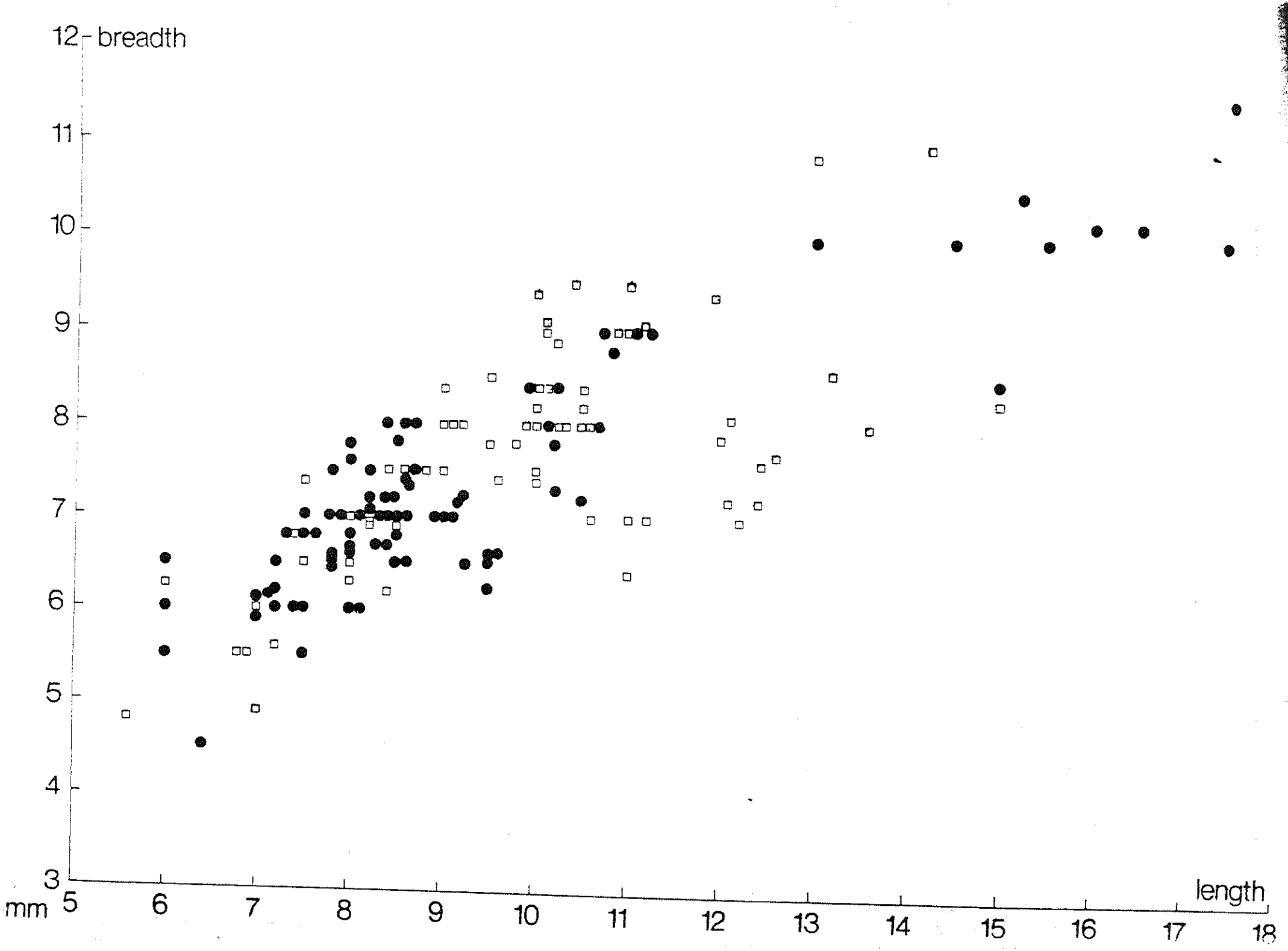
seeds represent human food waste. What use was being made of the hemp fruits (Cannabis sativa) from 1043 is less clear.

The overall distribution of macrofossils from wild and cultivated food plants in bulk samples and laboratory samples of cess deposits is summarised in Table . As might be expected there are differences between the macrofossil assemblages, some of which are no doubt attributable to purely chance factors. However it is possible to rank these assemblages in terms of the relative abundance of macrofossils from wild plant foods and from 'luxury' crops, some of which are likely to have been imported. Assuming that the assemblages are representative of the diets of the cess pit users some tentative assessment of dietary diversity is possible. This, in turn, might be related to social class, though it should be emphasised that the assemblages are not contemporaneous and may, therefore, not be strictly comparable: 1043 is of th century date, 3111 th century, 1159 th century and 2003 th century. Nevertheless 2003 is markedly different from the other three assemblagés. It contained abundant fig 'seeds' (Ficus carica), fruits of fennel and coriander (Foeniculum vulgare, Coriandrum sativum), mulberry fruitstones (Morus nigra) and walnut shell fragments (Juglans regia), crops which were not identified in the other three assemblages. These identifications, together with the context of the sample, at the base of a garderobe tower attached to the stone building, suggest a high social status for the users of the garderobe. 1159 is comparable to 2003 for, although it produced no remains of fig, mulberry or walnut, it did contain a fruitstone of medlar (Mespilus germanica) and large cultivated plum fruitstones (P. domestica subsp. insititia). Dimensions of Prunus fruitstones from 1159 and 2003 are shown in Fig . 1043 is quite different in composition. Bramble fruitstones (Rubus fruticosus) predominate, and remains of large cultivated fruits are absent: the only Prunus fruitstones are of sloe (P. spinosa). 3111 may also be of this type. The dominant plant food waste in this context comprised testa fragments of bean (Vicia faba) and remains of cultivated fruits were very rare. Thus in summary a tentative ranking, possibly interpretable in terms of ascending affluence, would be: 1043, 3111, 1159, 2003.

Cess assemblages of the type described in this section appear to be very characteristic of medieval urban sites. Greig (1981) reports an assemblage from a barrel latrine at Worcester which, though differing in detailed species

Fig : Dimensions of Prunus spinosa and Prunus fruitstones from 1159 (closed circles) and 2003 (open squares).

In 1159 there is a distinct double grouping of dimensions, corresponding to P. spinosa (sloe) and P. domestica subsp. domestica (plum). The spread in 2003 is more even, but with a concentration of fruitstones intermediate in size, representing small P. domestica subsp. domestica and small P. domestica subsp. insititia (damsons and bullaces).


12
breadth
11
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8
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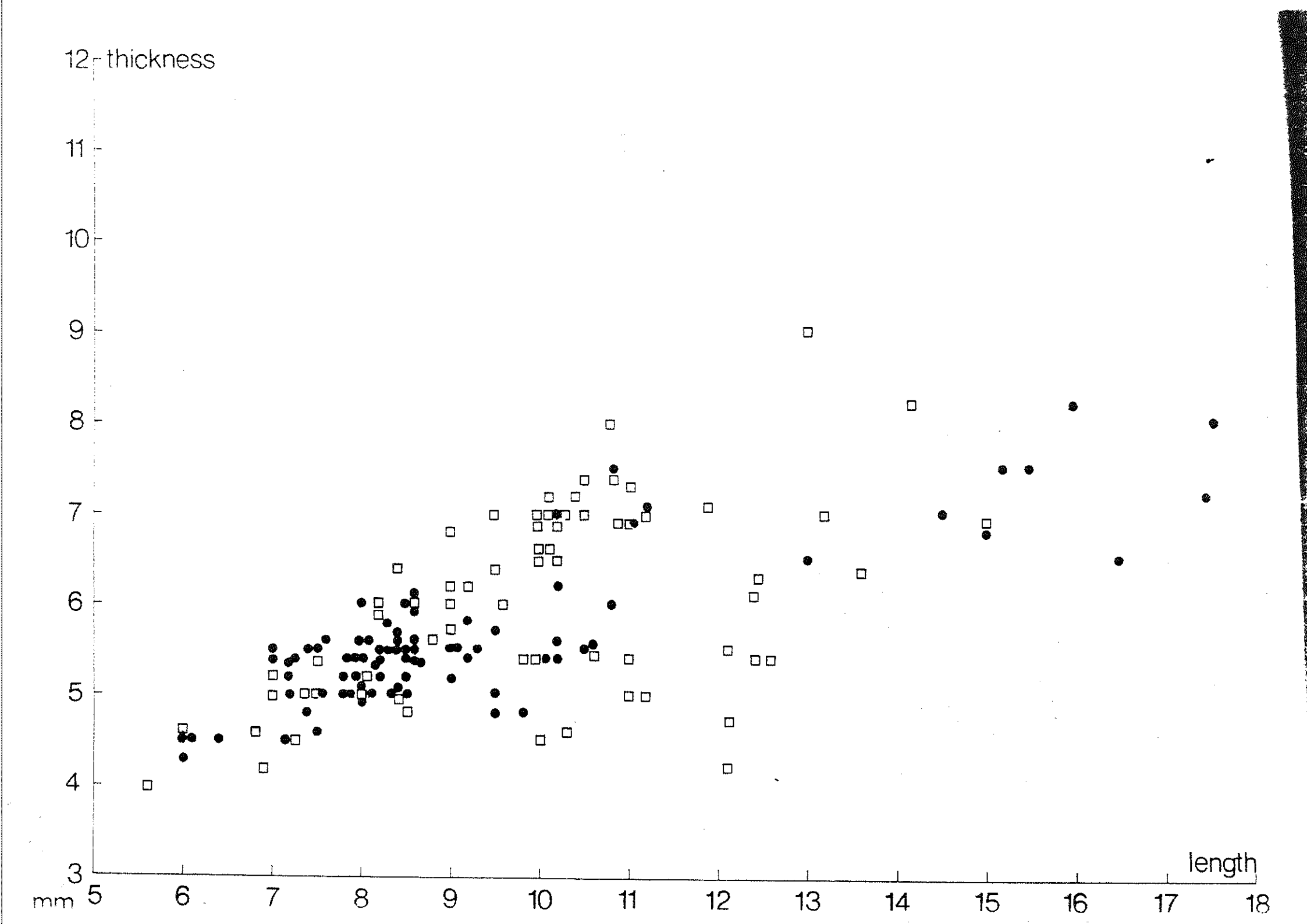
length


thickness
12
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mm
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16
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18
length

	Taxon and plant part
	Cereal pericarp fragments
	Cereal (indeterminate mineralised grains and fragments)
	Hordeum sp. (carbonised grain)
Cereals	*Triticum aestivum* (carbonised + mineralised grain)
	Secale cereale (carbonised + mineralised grain)
	Secale cereale (uncarbonised rachis nodes)
	Avena sativa (mineralised floret)
	Vicia faba (mineralised testa and hilum)
Pulses	cf. *Pisum sativum* (mineralised testa and hilum)
Fibre/Oil	*Linum usitatissimum*
plants	*Cannabis sativa*
	Papaver somniferum
	Apium graveolens
Flavourings	*Foeniculum vulgare*
	Coriandrum sativum (fruit fragments)
	Humulus lupulus (fruits and bracts)
	Rubus fruticosus
	Rubus idaeus
	Prunus spinosa
	Prunus domestica subsp. *insititia*
	Prunus domestica subsp. *domestica*
	Prunus cf. *avium*
Fruits	*Malus sylvestris/domestica*
	Fragaria vesca
	Mespilus germanica
	Morus nigra
	Ficus carica
	Vitis vinifera
	Sambucus nigra
	Corylus avellana
Nuts	*Juglans regia*

Table : Synopsis of the distribution of wild and cultivated food plants in cess deposits. Unless otherwise indicated taxa are represented by fruits or seeds.

Common name	3111 (10th-11thC.)	1043 (11thC.)	1159 (11th/12thC.)	2003 (13th-14thC.)
Cereal bran	-	-	+++	+++
Cereal grains	+	+	-	+
Barley	-	+	+	-
Wheat	-	+	-	+
Rye	-	+	-	-
Rye	-	+	+	-
Oats	-	+	-	+
Horsebean	+++	+	-	-
Pea	+	-	-	-
Linseed/Flax	+	-	+	-
Hemp	-	+	-	-
Opium poppy	-	-	+	-
Celery	+	++	-	-
Fennel	-	-	-	+
Coriander	-	-	-	+
Hop	+	+	-	-
Bramble	++	+++	+	-
Raspberry	+	-	-	-
Sloe	-	+	++	+
Bullace	+	+	+	+
Plum	-	-	+	+
Cherry	+	-	++	+
Apple	-	+	+	++
Strawberry	+	+	+	++
Medlar	-	-	+	-
Mulberry	-	-	-	+
Fig	-	-	-	+++
Grape	+	-	+	+++
Elderberry	+	++	+	-
Hazlenut	+	+	+	+
Walnut	-	-	-	+

composition, is overall remarkably similar to the assemblage from 2003.

5. Wetland/grassland assemblages.

Macrofossils from wetland and grassland plants were identified at low frequencies in most samples from waterlogged contexts. Monocotyledonous taxa are well-represented: Juncus seeds, Eleocharis and Carex nutlets are particularly common, and nutlets of Isolepis setacea and Cladium mariscus occur sporadically. Wetland and grassland herbs include Achillea millefolium, Ajuga reptans, Eupatorium cannabinum, Filipendula ulmaria, Hydrocotyle vulgaris, Lychnis flos-cuculi, Lycopus europaeus, Prunella vulgaris and Ranunculus spp. These fruits and seeds are thought to be derived by natural dispersal from local vegetation and from thatch, litter and hay imported to the site. In only one sample (1118 S18A) do macrofossils from grassland and wetland plants form a substantial part of the assemblage. Fruits of Ranunculus acris/repens/bulbosus alone make up 32.7% of the 'seed' total (Σ = 436) from this sample and other grassland/wetland taxa from the deposit include Ranunculus flammula, Prunella vulgaris, Filipendula ulmaria, Achillea millefolium, Eupatorium cannabinum, Carex sp. and Gramineae. These high frequencies of grassland taxa suggest that Sample 18A includes a high proportion of hay, derived perhaps from flooring material in houses, stables or byres. The floristic diversity of hay cut in meadows managed by traditional methods has been noted by Greig (1981, 1982, 62-3), who concludes that fruits and seeds from grassland herbs are potentially a useful indicator of the presence of hay in archaeological deposits.

6. Reseda assemblage.

Reseda luteola, (dyers rocket) is considered to have been intentionally introduced as a dye-plant to the British Isles (Godwin 1975, 136) but it is now naturalised and grows as a weed. The plant gives a brilliant fast yellow dye (Grigson 1958, 68). Rare seeds of this species were identified in several samples, where they need represent no more than seeds dispersed from the local weed flora. In 1118 (S18C), however, seeds of R. luteola are extremely common, accounting for 84% of the total assemblage (Σ = 350). Given this extremely high frequency it seems reasonable to suggest that the deposit includes remains of plants which had been utilised for dye production or were intended for this purpose. This clearly fits with the suggested archaeological evidence for

dyeing at the site (p.).

7. Aquatic assemblage.

A thin dark reddish-brown organic silty clay (2081) sealed between two crushed chalk floor surfaces within the Norman building was sampled. It was initially thought that this represented the remains of flooring materials, and the sample was analysed in order to determine which plants were used to cover the floor. However, by far the most abundant macrofossils in this deposit were charophyte oogonia, and these were associated with cladoceran ephippia. It therefore appears that this deposit represents not flooring material but sediment deposited during an episode of flooding. Analogous events were indicated by sediments and biological remains in a medieval stone building in Queen St., King's Lynn: here successive floors of mortar and crushed chalk were separated by deposits including laminated flood silts and fine sands with foraminifera (Murphy 1982). Flooding at King's Lynn was by salt-water, and at the Magistrates Courts site by freshwater, but in both cases the location of major buildings at low elevations close to rivers clearly caused problems with periodic flooding and presumably this prompted re-flooring of buildings to higher levels.

8. Heath plants.

Calluna vulgaris (heather) is represented in most samples by varying quantities of charred and uncharred twigs, leaves, shoots and capsules, and bracken (Pteridium aquilinum) by frond fragments comprising charred and uncharred pinnules and fragmentary petioles. Heather and bracken were evidently imported to the site, presumably for use as flooring, bedding etc.

9. Fibre crops.

Fruits of hemp (Cannabis sativa) were identified in six of the 21 samples, bulk-sieved in a 2mm mesh. Flax seeds were not observed in the coarse sievings from these bulk samples, but of the samples examined in the laboratory seven produced flax seeds (of which two also contained capsule fragments) and only one contained fragmentary hemp fruits. In addition very small quantities of plant fibres were present as fibre bundles in several samples. These fibres

have not been identified, since they are clearly only a very minor part of the macrofossil assemblages examined.

At 42lN it was suggested that remains of fibre crops from Period 1 contexts might indicate some local processing - perhaps retting in the river. (Ayers and Murphy 1983, 40). The sparse remains of fibre crops from the present site could also be tentatively interpreted in this way, but no assemblages consisting principally of fibre crop remains were encountered at these two sites and the evidence for fibre production in the immediate vicinity is thus not strong.

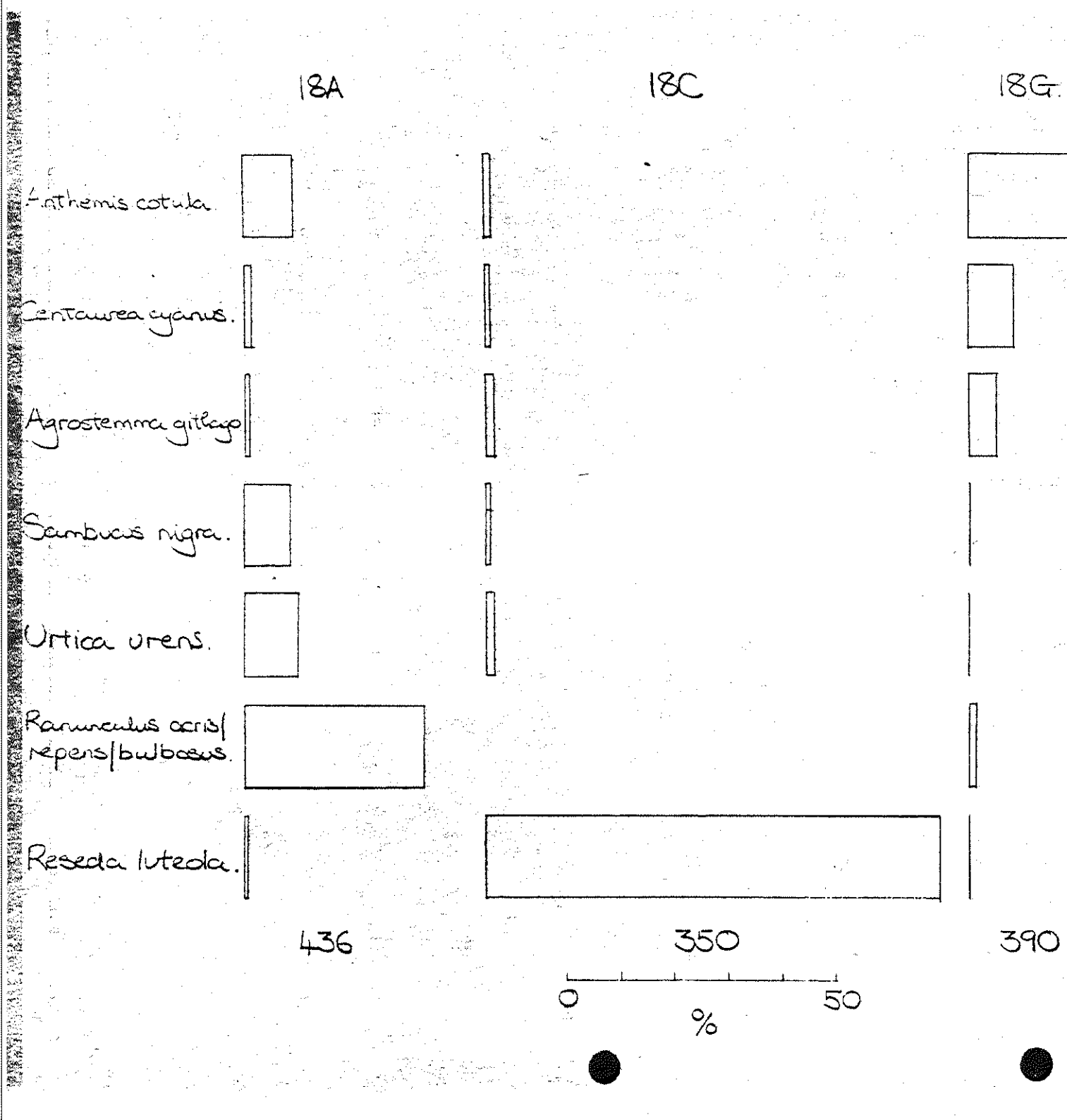
10. Halophyte.

The presence of fruits of Triglochin maritima in 1118 and 1064 is worth noting. A wider range of halophytes was present in samples from 42lN (Ayers and Murphy 1983, 43) and it was suggested that the fruits and seeds of these plants may have reached the site on the hooves or in the guts of animals which had been pastured on salt marsh or sea meadow before shipment to Norwich.

A note on context 1118.

1118 was a highly organic, extremely compacted deposit forming a lining to the main gulley bisecting the site. From the section drawings ( ) it is quite clear that 1118 did not form in situ in this gulley but appears to have been emplaced artificially, presumably to reduce erosion of the gulley sides by flowing water. It appears to have originated as a midden heap, the lowest layers of which would have been sufficiently compacted and cohesive to be cut into blocks, in much the same manner as in peat-cutting, for use as a rather unconventional structural material.

The deposit was sampled as intact blocks and by splitting these along natural planes of cleavage it proved possible to isolate some exceptionally well-preserved organic material, including articulated fish skeletons, crushed avian eggshells, masses of fly puparia and plant macrofossils. Plates and show holly leaves (Ilex aquifolium), bracken frond fragments (Pteridium aquilinum) and a mass of compacted plant material including a fruiting head of Centaurea cyanus and a concentration of nutlets of Lithospermum arvense as exposed on split surfaces. Having split these block samples so far as was


18A
18C
18G
Anthemis cotula.
Centaurea cyanus.
Agrostemma githago
Sambucus nigra.
Urtica urens.
Ranunculus acris/ repens/ bulbosus.
Reseda lutea.
436
350
390
0
50
%

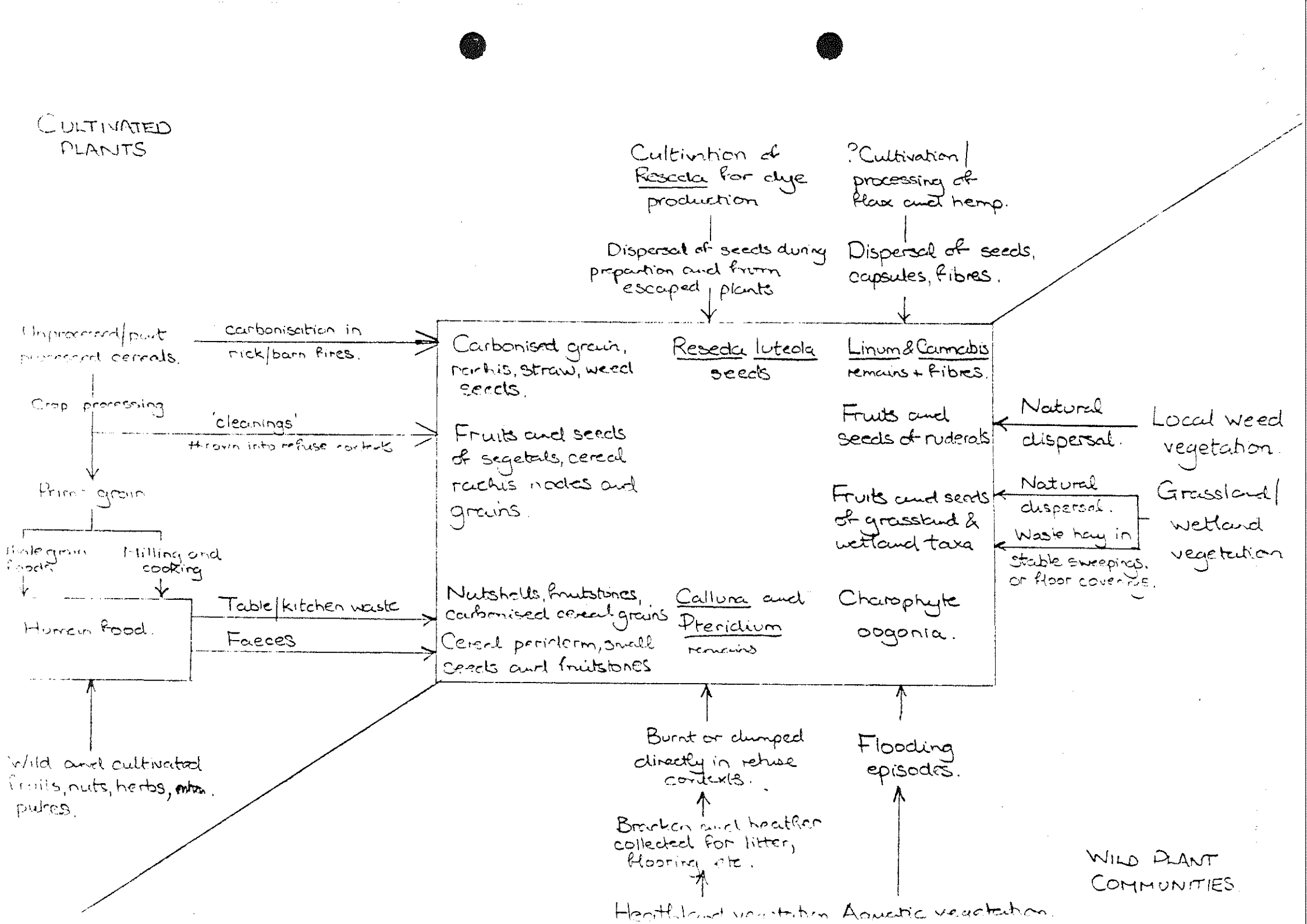
practical, macrofossils were extracted from the partly disaggregated material remaining in the usual manner. The numerical composition of 'seed' assemblages from three samples from 1118 (Samples 18A, C and G) is summarised in Fig. : to simplify the diagram only the frequencies of some of the more abundant taxa are shown. Fig. emphasises the heterogeneity of 1118: although there is clearly some overlap in species composition samples 18A, C and G are quite different in composition. 18A has been described above as a grassland/wetland assemblage, which is thought to include a significant component of hay. It does, however, also contain quite high frequencies of macrofossils from segetals and ruderals. 18C is less diverse in numerical composition, with 84% Reseda seeds. 18G was included above in the cereal/segetal group of assemblages.

It is evident that the midden deposit from which 1118 was derived included inputs from several sources - cereal cleaning waste, domestic food refuse, bracken and heather from floor sweepings, hay and seeds from dye plants, besides a seed input from local weed vegetation. These results emphasise the need for multiple sampling of extensive deposits, even though they appear at first sight to be of uniform composition.

Conclusions

The range of plant taxa identified at 450N, the Magistrates' Courts site is extremely similar to that from 421N, the Whitefriars Car Park site. With the exception of certain cultivated plants of minor importance, such as the identifications of fennel (Foeniculum vulgare, coriander (Coriandrum sativum), medlar (Mespilus germinica), mulberry (Morus nigra) and fig (Ficus carica) from 450N, and of pot marigold (Calendula officinalis) from 421N the two sites produced an identical range of crops. Moreover a similar range of wild plant communities is represented at these sites including aquatic, wetland, grassland, weed, scrub and coastal vegetation.

The significant difference between these two sites has been in the types of contexts available for sampling. By concentrating attention on closed contexts' containing plant macrofossil assemblages produced by specific activities it has been possible to propose a functional interpretation of plant remains from 450N. The results are summarised in Fig. . In this diagram plant remains identified are contained in a central 'box' and the activities and natural processes which


CULTIVATED PLANTS
Cultivation of Reseda for dye production
?Cultivation/ processing of flax and hemp.
Dispersal of seeds during preparation and from escaped plants
Dispersal of seeds, capsules, fibres.
Unprocessed/part processed cereals.
carbonisation in rick/barn fires.
Crop processing
'cleanings' thrown into refuse contexts
Prime grain
Whole grain foods
Milling and cooking
Human food.
Table/kitchen waste
Faeces
Wild and cultivated fruits, nuts, herbs, roots, pulses.
Carbonised grain, rachis, straw, weed seeds.
Reseda luteola seeds
Linum & Cannabis remains + fibres.
Fruits and seeds of segetals, cereal rachis nodes and grains.
Fruits and seeds of ruderals
Natural dispersal.
Local weed vegetation.
Fruits and seeds of grassland & wetland taxa
Natural dispersal.
Waste hay in stable sweepings, or floor coverings.
Grassland/ wetland vegetation
Nutshells, fruitstones, carbonised cereal grains
Callura and Pteridium remains
Charophyte oogonia.
Cereal periderm, small seeds and fruitstones
Burnt or dumped directly in refuse contexts.
Flooding episodes.
Bracken and heather collected for litter, flooring etc.
Heathland vegetation
Aquatic vegetation
WILD PLANT COMMUNITIES

resulted in their accumulation are shown at the periphery. The basis of this report has, then, been taphonomy, and it seems probable that this will prove to be the most fruitful approach to adopt when studying complex urban assemblages.

Acknowledgement

Celia Tordoff undertook most of the sampling and on-site bulk sieving and subsequently sorted the 'flots' and 'residues' from bulk sieving. I am most grateful for her meticulous work.

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Wood

Pieces of oak wood suitable for dendrochronology were extracted from the wood samples collected during excavation. These pieces, including radial boards and large posts and stakes, were submitted to the Sheffield Dendrochronology Laboratory for tree ring studies. This report is concerned with the remaining wood, which includes items of oak which, because of their size or growth rate, include few rings and also wood samples of other species. Identifications and descriptions of the wood examined are given in Table (fiche) and scale drawings of cross-sections in Fig (fiche).

The waterlogged deposits in the northern part of the site provided ideal conditions for wood preservation, and in general the larger pieces of wood are very well preserved. Difficulties were, however, experienced in identifying some of the smaller wood (twigs and small branches) as a result of compression and mineralisation. In several contexts (notably 1189) the weight of overlying deposits had strongly compressed the wood samples. In such material the lumina of the vessels were almost closed, and features necessary for identification (eg. perforation plates, secondary thickening) were difficult or impossible to discern. Mineralised wood also presented problems. In the wattle lining of cess pit 1164 in particular the smaller rods were wholly or partly mineralised by impregnation with calcium phosphate. Clear sections could not be obtained from these mineralised rods; consequently only the larger vertical stakes, which were only superficially mineralised, were identified from this context.

Contexts and structures

Isolated posts, ill-defined structures and scatters of worked wood fragments will not be discussed here, though these items are listed in Table . Some of the better preserved structures, however, require more detailed description.

1. 1079; a late 16th century barrel well.

Nineteen staves of oak (*Quercus* sp) were examined from this well, together with an off-cut from the exterior of a forked branch or trunk of oak, showing sapwood. The staves were made of wood from immature trees (150+mm in stem diameter) with very wide growth rings (up to almost 12mm). These staves are strikingly different

from the oak boards with very narrow rings from early medieval contexts at 450N. All the staves from 1079 were split or sawn tangentially, right across the trunk. Two examples from the exterior of a trunk show some sapwood.

2. 1164: a wicker-lined cess pit.

As noted above, the rods from this pit-lining were not identified due to problems of mineralisation. Vertical stakes and/or posts from this lining had only an outer crust of mineralised woody tissue, and the wood beneath this was soft and could be sectioned for identification. Sixteen posts and/or stakes were examined: nine were of Alnus sp (alder), three of Quercus sp (oak), one each of Populus sp (poplar), Corylus sp (hazel) and Fraxinus sp (ash) and one was not identified.

Alder may have been deliberately selected for use in this pit, but the range of woods present in the structure may merely reflect what was available in the vicinity: alder, ash and poplar (presumably here P. nigra) are common and characteristic valley-floor trees. Insect exit-holes in 1164A (T43) and 1164H (T52) suggest that some re-used or stockpiled wood was employed, since clearly insect attack would not have occurred after submergence in the cess pit. The posts and stakes from the structure are made from whole, halved and quartered stems, between about 60-160mm in original diameter. Some are definite stakes with sharpened tips, all four-facetted; other examples (listed as posts/stakes in Table) are incomplete, due to difficulties of extraction on site, and may or may not have been sharpened at their tips.

3. 1136: 11th century wicker-work fence

The wood from this structure was well-preserved and proved to consist entirely of hazel (Corylus sp). The vertical elements consist of untrimmed hazel stems with bark showing between 18 and 23 years growth. Due to compression only estimates of original stem diameters are possible, but these appear to have been about 20-27mm. The horizontal rods are similar in size and may even have had a slightly larger mean size (about 20-40mm), but consist of younger stems, showing about 14-19 years growth. Both the verticals and the rods consist predominantly of straight stem sections, though two of the verticals were forked. The uniform species composition and relatively narrow age/size range of the wood used suggests that it may have come from a single stand of hazel.

4. 1139, 1189, 1187 (11th-12th century fences)

1139 differed markedly from 1136 in the range of woods used, despite its generally similar construction. It included untrimmed, generally straight stems of holly (Ilex sp), hazel (Corylus sp), oak (Quercus sp) and probably the Crataegus group (hawthorn etc). Stem diameters show a wider range than in 1136 (13-42mm). These features may indicate that the wood in 1139 came from a variety of sources, in contrast to 1136. The wood from 1189 was badly compressed and deformed, and has not been identified.

1187 was a more substantial fence, consisting of oak (Quercus sp). Most of the wood has been submitted for tree ring analysis, but one oak post has been included in the present study. It consists of an untrimmed stem with sapwood and bark, about 90mm in diameter.

Wood utilisation: summary

The principle timber used at the site for boards and the more massive posts and stakes was oak. Some smaller oak stems were used as stakes and posts in the fences and cess-pit linings, but in general diffuse porous woods were preferred. The two predominant diffuse porous species were hazel and alder: hazel stems between 10-40mm diameter were used in the wicker fences, and more substantial alder stems (90-160cm) were used whole or split as stakes and posts (see Fig.). Young stems of holly and the hawthorn group, under 40mm diameter were also used in the fences, and there were two more substantial stakes of poplar and Prunus sp. Detailed studies of growth patterns have not been undertaken at this site (cf. Morgan 1982, 34-5) since the sample is too small for firm conclusions about woodland management to be drawn, but it seems likely that groups of stems of fairly uniform size and of a single species (eg. the hazel stems from 1136) came from managed stands.

Reference

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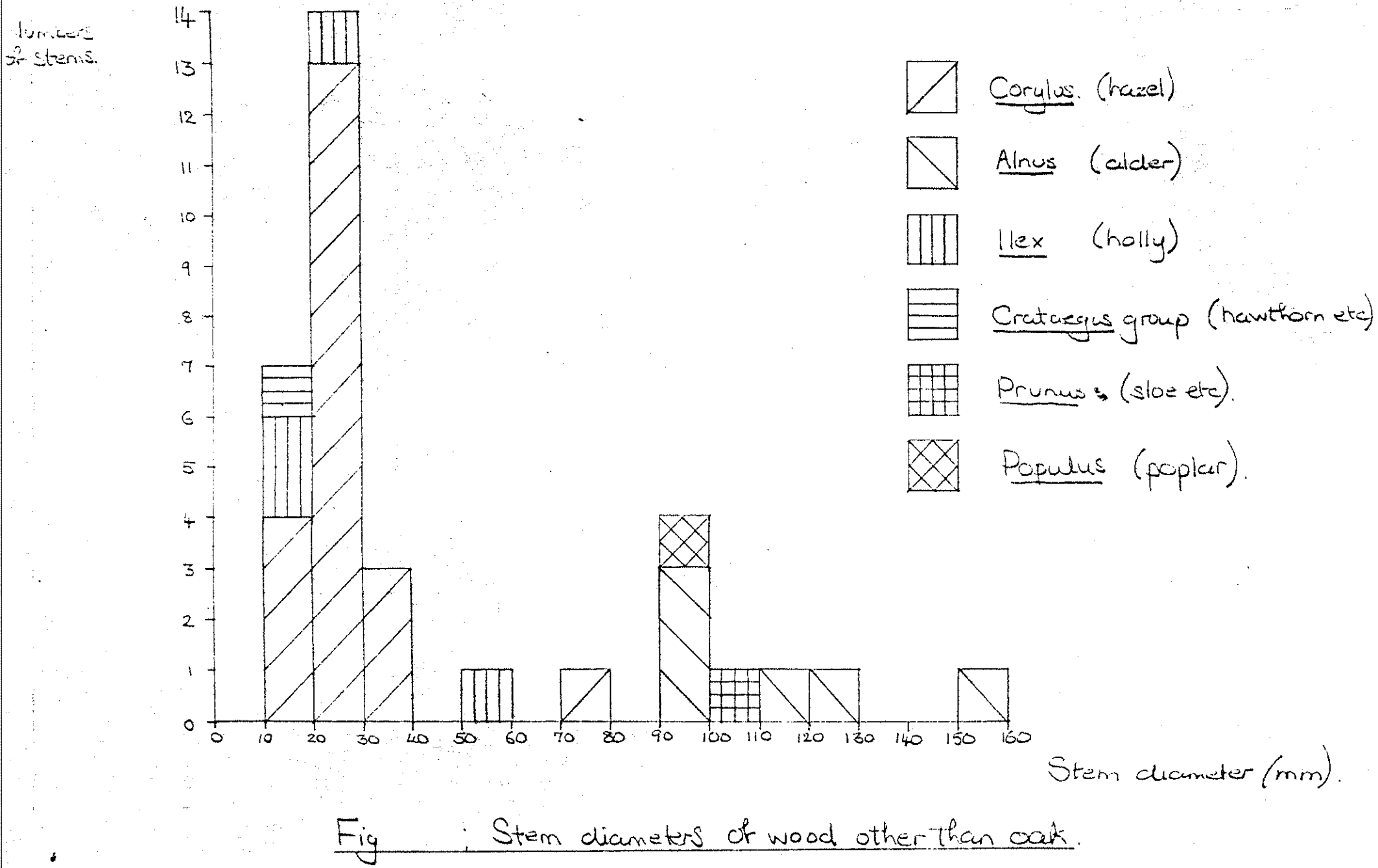


Fig : Stem diameters of wood other than oak.

Magistrates' Courts Site, Whitefriars St., Norwich (450N): Fiche text.

Methods: macrofossils (sampling and extraction).

As at 421N, the methods used for extraction of macrofossils were those of Kenward et al (1980). Two sample series were taken: a series of large samples for bulk sieving on site and a series of smaller samples for laboratory analysis.

Samples were taken almost entirely from well-sealed clearly defined contexts (pits, gulleys, post-holes, ovens and floor-levels) although a few 'control' samples were taken from open contexts similar to those encountered at 421N, for the sake of comparison (eg. 1137 (Sample 34), a depression in the foreshore brushwood platform). Most of these samples were intended for biological analysis, but samples 1 (1001), 2 (66), 3 (26), 4 (237), 5 (12), 7 (414), 15 (1117), 21 (1117), 29 (736) and 30 (722) were taken for chemical analysis of patches of reddish staining thought possibly to be related to dyeing and of other apparent chemical precipitates.

The sizes of the bulk samples were recorded as numbers of buckets of soil:

BS1 (390)	3 buckets	BS8	(1095)	2 buckets	BS15	(1120)	2 buckets
BS2 (1043)	2 "	BS9	(1117)	2 "	BS16	(1117)	2 "
BS3 (1043)	1 "	BS10	(531A)	3 "	BS17	(1122)	1 "
BS4 (1043)	1 "	BS11	(1117)	3 "	BS18	(1032)	1 "
BS5 (503)	1 "	BS12	(719)	2 "	BS19	(2003)	3 "
BS6 (1064)	3 "	BS13	(531A)	1 "	BS20	(1159)	1 "
BS7 (1093)	2 "	BS14	(531B)	3 "	BS21	(814)	1.5 "

These were processed in a bulk-sieving tank, using a 0.5mm mesh to collect the flot and a 1mm mesh to retain the residue. Flots and residues were dried before sorting in the laboratory. Only the fractions >2mm of the flots were examined, but the entire flots have been retained for any future examination. The residues, sieved to 1mm were completely sorted. Mollusca, mineralised arthropods (mainly fly puparia), avian eggshell, bone and mineralised plant macrofossils were recovered mainly from the residues, most other plant remains from the flots.

The samples processed in the laboratory were disaggregated by soaking in hot water or, for the more compacted organic deposits, by prolonged soaking in NaOH solution. Following Kenward et al (ibid) the organic fractions of samples were separated from the mineral residues by wash-over. Organic material was then graded in a sieve-bank using a minimum mesh of 250 microns and sorted wet under a binocular microscope at low power. The residues were wet-sieved in a 500 micron mesh, and dried before sorting.

Samples from 1118 required special treatment before disaggregation. This deposit was a highly compacted almost purely organic layer and was sampled as intact blocks. By splitting these blocks along natural planes of cleavage it proved possible to isolate some unusually intact macrofossils including articulated fish skeletons, crushed avian eggs, masses of fly puparia, leaves, stems and capsules. Specimens exposed were photographed and a few examples were conserved, but for purposes of identification most specimens had to be removed from the matrix.

Methods: plant macrofossils (details of extraction and identification)

As noted above only specimens larger than 2mm were extracted from the flots from bulk sieving. The finer fractions of these flots contained enormous numbers of smaller seeds, but it was thought to be preferable to obtain assemblages of such smaller macrofossils under more controlled conditions in the laboratory. The organic fractions of the laboratory samples were graded to 2mm, 0.5mm and 0.25mm following washover. Seeds were most abundant in the 2-0.5mm fraction. In some samples the fine fraction (0.5-0.25mm) was not totally sorted, but only partly scanned over: generally this fraction contained only a very restricted range of seeds (predominantly Juncus spp. with rare Papaveraceae, underdeveloped Chenopodiaceae etc.). Sorting of sample 13 (1093) was abandoned since plant macrofossils were exceedingly rare. From samples 26 (1119) and 38 (1122) only charred plant remains (mainly cereals) were extracted and in the case of these two samples both the flot/washover fractions and the residues were air-dried before sorting.

Identifications were made initially using standard reference works, but all identifications were verified by comparison with modern reference material. Identification of certain categories of macrofossils and certain taxa has not

been attempted since it was not thought that the necessary expenditure of time would yield an adequate return in terms of increased information. Thus Gramineae caryopses and Carex nutlets have not been specifically determined, and plant fibres and indeterminate crushed culm and stem fragments have not been examined in any detail.

Macrofossils from bulk-sieving are listed in Table (fiche) and those from laboratory samples are listed in Tables - (fiche).

Methods: mollusca, avian eggshell (extraction, identification)

Marine mollusc shell and avian eggshell fragments and rare shells of terrestrial and freshwater molluscs were present in the residues from bulk sieving to 1mm, and further material was extracted from the residues of laboratory samples, wet-sieved to 0.5mm. Mollusca were identified using Kerney and Cameron (1979), Macan (1969), McMillan (1968) and Tebble (1976). Mollusc identifications are listed in Tables and (fiche). From each sample of avian eggshell fragments a maximum of thirty thickness measurements were obtained using a flat-jawed micrometer screw gauge. The measurements are listed in Table (fiche).

Valvata cristata Müller	7
Valvata piscinalis (Müller)	7
Valvata sp	6
Bithynia tentaculata (Linné)	3
Bithynia sp	6
Bithynia sp (opercula)	69
Lymnaea sp	8
Planorbis planorbis (Linné)	2
Gyraulus albus (Müller)	1
Planorbis sp	5
Vallonia sp	1
Indeterminate gastropods (crushed etc)	15
Unionidae (valve fragments)	+
Sphaeriidae (valves)	20

Table : Land and freshwater mollusca from 414.

Many specimens in this sample are crushed or deformed by heat.

Sample No.	1	2	3	4	5	6	7	8	9	10	11
Context No.	390	1043	1043	1043	503	1064	1093	1095	1117	531A	1117
Ostrea edulis L. uv	1	1	1	1	-	5	1	+	+	3	5
lv	-	-	-	-	+	5	1	+	-	5	1
Mytilus edulis L.	+	2	2	+	+	+	1	+	-	+	+
Cerastoderma edule (L)	+	-	-	-	-	+	-	+	-	-	-
Buccinum undatum L.	-	-	-	-	-	+	-	-	-	-	+
Neptunea antiqua (L)	+	-	-	-	-	-	-	-	-	-	-
Littorina littorea (L)	-	+	-	-	-	-	-	-	-	+	-
Indet bivalve	+	-	-	+	-	+	-	-	-	-	-
Indet gastropod	-	-	-	-	-	-	+	-	-	-	-

Table : Marine mollusc shell from 450N.

Abbreviations: uv - upper (right) valve.
lv - lower (left) valve.
+ - non-hinge or non-apical fragments only.

12	13	14	15	16	17	18	19	20	21
719	531A	531B	1120	1117	1122	1032	2003	1159	814
1	-	1	1	-	+	1	-	+	+
4	+	1	1	2	+	3	1	+	+
+	-	1	-	+	+	-	-	-	-
+	-	-	-	-	-	-	-	+	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	1	+	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Table: (fiche)

450N: Avian Eggshell thicknesses (mm)

BS 1.	0.31	0.31	0.31	0.29	0.32	0.29					
2.	0.46	0.26									
3.	0.12*	0.30	0.28		*?not eggshell						
4.											
5.	0.34	0.25	0.29	0.29	0.30	0.33	0.49	0.34	0.28	0.29	0.65
6.	0.30	0.34	0.32	0.32	0.35	0.33	0.34	0.36	0.34	0.27	
	0.33	0.34	0.33	0.35	0.31	0.35	0.33	0.29	0.45	0.37	
	0.32	0.31	0.32	0.30	0.33	0.29	0.34	0.30	0.32	0.30	
7.	0.32										
8.	0.45 encrusted										
9.	0.29	0.24	0.33	0.31	0.31	0.31	0.30	0.24	0.29	0.31	
	0.31	0.38	0.26	0.30	0.27	0.31	0.33	0.35	0.30	0.34	
	0.62	0.32	0.29	0.30	0.29	0.33	0.35	0.32	0.38	0.37	
10.											
11.	0.57	0.58	0.30	0.34	0.57	0.28	0.29	0.33	0.28	0.60	
	0.27	0.31	0.60	0.60	0.29	0.31	0.27	0.30	0.32	0.36	
	0.30	0.26	0.33	0.33	0.34	0.32	0.26	0.30	0.30	0.35	
12.	0.32	0.29	0.31	0.31	0.30	0.32	0.28	0.48	0.33	0.31	
	0.28	0.29	0.30	0.29	0.28	0.36	0.31	0.28	0.32	0.33	
	0.31	0.33	0.37	0.27	0.31	0.34	0.32	0.27	0.32	0.29	
13,14.											
15.	0.33	0.36	0.32	0.28	0.31	0.33	0.36	0.33	0.37	0.35	
	0.35	0.38	0.39	0.33	0.30	0.36	0.33	0.33	0.37	0.36	
	0.31	0.32	0.32	0.32	0.30	0.35	0.38	0.39	0.27	0.34	
16.	0.28	0.27	0.28	0.31	0.29	0.38	0.39	0.28	0.35	0.30	
	0.35	0.25	0.66	0.33	0.31	0.36	0.28	0.32	0.31	0.32	
	0.33	0.26	0.29	0.28	0.29	0.30	0.33	0.30	0.27	0.28	
17.	0.27	0.30									
18.	0.54	0.53	0.53	0.50	0.50	0.56	0.58	0.59	0.59	0.50	
	0.58	0.58	0.25	0.48	0.60	0.32	0.58	0.43	0.48	0.31	
	0.55	0.32	0.35	0.51	0.55	0.31	0.60	0.53	0.55	0.25	
19.	0.30	0.29	0.28	0.36	0.30	0.29	0.31	0.30	0.28	0.28	
	0.35	0.31	0.27	0.38	0.32	0.30	0.42	0.31	0.31	0.30	
	0.31	0.28	0.31	0.31	0.33	0.28	0.28	0.31	0.31	0.30	
20.	0.16	0.30	0.33	0.31	0.33	0.10	0.32	0.28	0.18	0.17	
	0.28	0.22	includes apparently abraded fragments								

BS 21.	0.35	0.33	0.36	0.34	0.33	0.33	0.31	0.33	0.31	0.26
	0.34	0.33	0.35	0.30						
Intact egg from 1118.				0.29	0.29	0.34				

Bulk Sample No.			1	2	3	4	5	6
Context No.			390	1043	1043	1043	503	1064
No. of buckets processed			3	2	1	1	1	3
	Cereal indet.	ca	1(c)	2(m)	-	-	-	15(c)/1(m)
	Hordeum sp (hulled)	ca	2(c)	1(c)	-	1(c)	-	22(c)
Cereals	Triticum aestivum L	ca	-	1(c)	2(c)	-	1(c)	-
	Secale cereale L	ca	-	-	2(c)/2(m)	-	-	-
	Avena sativa L	ca + flo	-	-	-	-	-	2(c)
	Avena sp	ca	-	-	-	-	-	-
Bean	Vicia faba L	t	-	-	1	-	-	-
Coriander	Coriandrum sativum L	f	-	-	-	-	-	-
	Rubus fruticosus agg	fs	-	7	5	-	-	-
	Prunus spinosa L	fs	-	7	10	-	-	1
	Prunus domestica L subsp insititia	fs	-	3	8	-	-	-
	Prunus domestica L subsp domestica	fs	-	-	-	-	-	1fr
Fruits	Prunus avium-type	fs	-	-	-	-	-	-
	Prunus sp	fs	-	-	2	-	-	-
	Malus sylvestris/domestica	s	-	6	5	-	-	1
	Mespilus germanica L	fs	-	-	-	-	-	-
	Morus nigra L	s	-	-	-	-	-	-
	Vitis vinifera L	s	-	-	-	-	-	-
	Sambucus nigra L	s	-	-	-	-	2	-
Nuts	Corylus avellana L	nu fr	-	+	-	+	+	+
	Juglans regia L	nu fr	-	-	-	-	-	+
Hemp	Cannabis sativa L	f	-	6	2	-	-	1
Wetland plants	Menyanthes trifoliata L	s	-	-	-	-	-	-
	Carex sp	nu	-	-	-	-	-	-
	Brassica sp	s	-	-	-	-	-	-
	Raphanus raphanistrum L		-	2si	2si	-	-	5si
	Agrostemma githago L	s	-	1	-	-	-	9
	Vicia sp	s	-	-	-	-	-	-
	Umbelliferae indet	f	-	-	-	-	-	-
	Polygonum persicaria/lapathifolium	n	-	-	-	-	-	-
Segetals	Polygonum convolvulus L	n	-	1	-	-	-	-
	Lithospermum arvense L	n	-	-	-	-	-	-
	Galeopsis sp	n	-	-	-	-	-	1
	Galium aparine L	f	-	-	-	-	-	1(c)
	Centaurea cyanus L	f	-	-	-	-	-	-
	Bromus mollis/secalinus	ca	-	-	-	-	-	1(c)
	Lolium temulentum-type	ca	-	-	-	-	-	-
	Gramineae indet	ca	-	-	-	-	-	-

7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1093	1095	1117	531A	1117	719	531A	531B	1120	1117	1122	1032	2003	1159	814
2	2	2	3	3	2	1	3	2	2	1	1	3	1	1.5
1(c)	2(c)	-	1(c)	4(c)	22(c)/3(m)	1(c)	-	4(c)	-	33(c)	66(c)	14(m)	2(c)	-
-	4(c)	-	3(c)	2(c)	14(c)	-	3(c)	1(c)	2(c)	103(c)	21(c)/2(m)	-	1(c)	-
-	1(c)	-	-	3(c)	-	-	-	1(c)	-	-	1(c)	5(m)	-	-
1(c)	5(c)	2(c)	-	-	2(c?)	-	1(c)	-	2(c)	2(c)	5(c)	3(m)	-	-
-	-	-	-	-	2(c)	-	-	1(c)	-	2(c)	-	-	-	-
-	-	-	-	-	4(c)	-	-	-	1(c)	4(c)	15(c)	1(m)	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	1	1	-	-	-	32	115	-
-	-	-	-	-	-	-	-	-	-	-	1	36	19	-
-	-	-	-	1	-	-	-	-	-	-	-	15	11	-
1fr	-	-	-	1fr	-	-	-	-	2	-	-	1	58	-
-	-	-	-	3	-	-	-	-	3	-	-	25	3	-
-	-	-	-	-	-	-	-	-	-	-	-	101	24	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	6	-	-
-	-	-	-	-	-	-	-	-	-	-	-	250	10	-
2	1	-	-	-	-	-	-	-	-	-	-	-	1	-
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
-	-	-	-	-	-	-	-	+	+	+	-	+	-	-
3	1	-	-	1	-	-	-	-	-	-	-	-	-	-
-	-	1	-	1	2	-	-	-	-	-	3	-	-	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	7	-	1
-	-	3si	1(c)si	1si	-	-	1si	1si	5si	-	8si	2si	3si	10si/5s
-	-	1	-	1	22	-	-	7	-	3	10	2	-	20
-	-	1(c)	-	1(c)	-	-	-	-	-	-	19(c)	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	1	-	-	2	-	-	2	-	-	-	-	-	2
-	-	-	-	-	-	-	-	1	8	-	1	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-	-	-	-	-	1	-
1(c)	-	-	-	-	-	-	-	-	3(c)	-	1(c)	-	-	-
-	-	-	-	-	-	-	-	-	-	-	1(c)	3(m)	-	-
-	1(c)	-	-	-	2(c)/5(m)	-	-	1(m)	-	-	1(c)	-	-	-

	Pteridium aquilinum (L) Kuhn	st	-	-	-	-	-	+
Stems,	*Ilex aquifolium* L	lf + fr	-	-	-	-	-	+
leaves	Cereal culm frags		-	-	-	-	-	+
etc	Stem frags (indet)		-	+	+	-	-	+
	Buds (indet)		-	-	+	-	-	-
	Fibres (indet)		-	-	-	-	-	-
	Indeterminate seeds etc		1	7	-	-	-	8

Table : Plant macrofossils larger than 2mm extracted by bulk-sieving.

Abbreviations: c - carbonised; ca - caryopses; f - fruit; fr - fragments; fs - fruitstones; flo - floret; lf - leaf; m - mineralised; nu - nutshell; n - nutlet; s - seed si - siliqua fragments; st - stem fragments; t - testa fragment with hilum.

-	-	-	-	+	+	-	-	+	+	+	+	+	+	+
-	-	+	-	+	+	-	-	+	-	+	+	-	+	-
-	-	-	-	-	+(c)	-	-	+	-	m+c	-	-	+	-
-	-	-	-	-	-	-	-	-	-	+	-	+	+	-
-	-	-	-	-	-	-	-	+	+	-	-	+	-	-
-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
-	-	1	-	2	9	-	3	3	3	1	1	34	5	-

Sample No.		26	38
Context No.		1119	1122
Hordeum sp		43	37
Secale cereale L		98	2
Triticum aestivum/compactum	ca	8	2
Avena sp		31	9
Cereal indet.		70	20
Hordeum cf. distichum L	rn	25	20
Hordeum sp	brn	1	2
Secale cereale L	rn	68	6
Secale cereale L	lfr	+	-
Secale, Hordeum, Avena	afr	+	+
Avena cf. sativa L	flo	-	4
Avena sp	flo	4	-
Cereal indet.	rn	-	2
Cereal indet.	cn	4	+++ (inc. fr)
Pteridium aquilinum (L) Kuhn	pi	+	-
Brassica sp		-	3
Raphanus raphanistrum L		2+fr	-
Cruciferae indet.		1	-
Agrostemma githago L		10+fr	-
Stellaria media-type		2	-
Spergula arvensis L		11	4
Caryophyllaceae indet.		1	-
Chenopodium album L		2	-
Chenopodiaceae indet.		8	1
Linum usitatissimum L		1	-
Vicia faba L var minor		1	-
Vicia cf. hirsuta (L) S F Gray		10	-
Vicia sp		87	-
Leguminosae indet.		2	4
Rumex sp		4	-
Polygonaceae indet.		-	1
Corylus avellana L	ns,fr	+	-
Calluna vulgaris (L) Hull	c,lf,sh	+	+
Lithospermum arvense L		8	-
Plantago lanceolata L		1	-
Anthemis cotula L		13	-
Compositae indet.		2	-
Carex sp		1	3
Bromus mollis/secalinus		-	3
Gramineae indet.		11	3

Indeterminate	8	11
Sample weight (kg)	1 (50% sorted)	2

Table : Charred cereal/segetal assemblages from 450N

Taxa are represented by fruits or seeds except where indicated.
a - awns; brn - basal rachis nodes; c - capsules; ca - caryopses; cn - culm nodes; flo - florets; fr - fragments; l - lemma; lf - leaf; ns - nutshells; pi - pinnules; rn - rachis nodes; sh - shoots.

Sample No.	11	18G	45	55	16	50	46	47
Context No.	1064	1118	814	2305	1043	3111	1159	2003
Charophyte (oogonia)	-	-	-	-	+	-	-	-
Pteridium aquilinum (L) Kuhn (pinnules etc)	+	++	+	++	-	-	+	+
Ranunculus acris/repens/bulbosus	-	4	1	1	-	3	-	2
Ranunculus cf flammula L	-	1	-	3	-	-	-	-
Papaver rhoeas L	-	-	-	3	-	-	-	1
Papaver cf. hybridum L	-	1	-	-	-	-	-	-
Papaver argemone L	10	6	2	12	1	-	1	-
Papaver somniferum L	-	1	-	-	-	-	11	-
Brassica sp	4	8+fr	19	2	2+fr	2+fr	fr	18
Raphanus raphanistrum L (siliqua frag)	1	5+fr	2	3	fr	-	-	-
Cruciferae indet.	-	3	-	-	-	-	-	-
Thlaspi arvense L	-	-	-	-	-	1	-	-
Reseda luteola L	6	-	-	-	-	-	-	-
Reseda sp	-	1	-	-	1	-	-	20
Hypericum sp	1	-	-	-	-	-	-	-
Silene cf. alba (Miller) Krause	-	-	1	-	1	-	-	-
Silene sp	12	1	-	-	-	-	-	2
Lychnis flos-cuculi L	-	-	2	-	-	1	-	-
Agrostemma githago L	27+fr	20+fr	128	19	2+fr	3+fr	fr	1+fr
Stellaria media-type	5	6	4	-	2	37	-	-
Stellaria graminea L	-	-	1	-	-	-	-	-
Spergula arvensis L	11	9	-	-	-	-	fr	-
Scleranthus cf. annuus L	-	cf1	-	-	-	-	-	-
Caryophyllaceae indet.	-	2	-	-	-	-	-	-
Chenopodium album L	116	7	37	76	37	60	12	8

Chenopodium sp	-	-	-	-	-	-	2	-
Atriplex patula/hastata	9	5	-	6	5	2	-	1
Chenopodiaceae indet.	-	,	11	2	2	-	-	-
Linum usitatissimum L (seeds)	1	2	3	5	-	1fr	9	-
Linum usitatissimum L (capsule frags)	?	-	2	-	-	-	-	-
Ilex aquifolium L (leaves)	+	+	-	-	-	-	-	-
Vicia faba L (testa fragments)	-	-	-	-	-	+++	-	-
Vicia sp (carbonised)	1	-	-	-	-	-	-	-
?Pisum sativum L (testa frags)	-	-	-	-	-	+	-	-
Leguminosae indet.(seeds)	-	11	-	-	fr	-	-	-
Leguminosae indet.(legume frags)	-	1	-	-	-	-	-	-
Filipendula ulmaria (L) Maxim	1	2+fr	-	-	-	-	-	-
Rubus fruticosus agg.	-	-	-	-	346	28	-	-
Rubus idaeus L	-	-	-	-	-	9	-	-
Rubus sp	-	-	-	-	-	1	-	-
Potentilla sp	2	-	-	1	-	-	-	-
Fragaria vesca L	-	-	-	-	10	9	17	20
Aphanes arvensis/microcarpa	3	-	-	-	-	2	-	-
Prunus spinosa L	-	-	-	-	4	-	-	-
Prunus spinosa-type (thorns)	-	-	-	-	-	+	-	-
Prunus domestica L subsp insititia	-	-	-	-	-	3	8	-
Prunus domestica L subsp domestica	-	-	-	-	-	-	-	4
Prunus cf. avium L	-	-	-	-	-	-	4	1+fr
Malus sylvestris/domestica	-	-	-	1	-	5	8	fr
Mespilus germanica L	-	-	-	-	-	-	1	-
Hydrocotyle vulgaris L	1	1	1	1	-	-	-	-
cf. Torilis sp	-	2	-	-	-	-	-	-
Apium graveolens L	-	-	-	-	31	2	-	-
Aethusa cynapium L	-	-	-	-	-	-	-	1
Foeniculum vulgare L	-	-	-	-	-	-	-	2+fr

Coriandrum sativum L	-	-	-	-	-	-	-	2fr
Umbelliferae indet.	-	-	4	-	1	-	-	3
Polygonum aviculare agg.	1	4	4	3	-	5	-	-
Polygonum lapathifolium L (+ perianth)	-	9	3	1	-	-	1	-
Polygonum cf. lapathifolium	1	-	15	-	-	-	-	-
Polygonum convolvulus L	3+fr	1	3	-	fr	2+fr	fr	-
Polygonum sp	-	6	-	-	8+fr	7+fr	fr	-
Rumex crispus L (+ perianth)	-	7	-	-	-	-	-	-
Rumex sp (perianth nodules)	-	6	-	-	-	-	-	-
Rumex sp	-	11	60	3	1	4fr	-	19
Rumex acetosella agg.	31	4	50	14	1	1	-	-
Polygonaceae indet.	-	2	2	-	-	-	-	-
Urtica urens L	10	1	-	1	-	21	-	-
Urtica dioica L	3	-	-	3	11	2	-	-
Humulus lupulus L	-	-	-	-	1	8	-	-
Humulus lupulus L (bract frag)	-	-	-	-	-	+	-	-
Cannabis sativa L	-	-	-	-	fr	-	-	-
Juglans regia L (frags)	+	-	-	-	-	-	-	-
Corylus avellana L (frags)	+	-	+	+	-	+	-	-
Calluna vulgaris (L) Hull (lvs, shoots)	+	+	-	++	-	-	-	-
Calluna vulgaris (L) Hull (capsules)	+	+	-	++	-	-	-	-
cf. Anagallis arvensis L	-	-	1	-	-	-	-	-
Myosotis sp	3	-	-	-	-	-	-	-
Lithospermum arvense L	-	1	-	-	-	-	-	-
Solanum nigrum L	-	-	-	-	1	-	1	-
Euphrasia/Odontites	-	4	-	-	-	-	-	-
Mentha sp	-	-	18	-	1	-	-	-
Prunella vulgaris L	-	3	1	8	-	-	2	-
Stachys sp	-	-	1	-	-	-	-	-
Lamium sp	-	-	-	-	1	-	-	-

Galeopsis tetrahit/speciosa	1	-	1	-	-	-	-	-
cf. Ajuga reptans L	-	-	-	1	-	-	-	-
Labiatae indet.	-	2	3	-	3	-	-	-
Plantago lanceolata L	1	-	-	-	-	-	2	-
Sambucus nigra L	3	1	1	-	25	6	-	-
Valerianella dentata (L) Poll	18	-	1	1	-	-	-	-
Anthemis cotula L	31	73	4	11	2+cf3	-	2	-
Centaurea cyanus L	44+fr	30	5	46	-	-	1+fr	2
Lapsana communis L	9	1	8	-	17	3	fr	1
Sonchus arvensis L	2	1	-	-	-	-	-	-
Sonchus oleraceus L	1	-	-	-	-	-	-	1
Sonchus asper (L) Hill	-	1	-	-	-	-	-	-
cf. Picris sp	-	-	1	-	-	-	-	-
cf. Crepis sp	-	-	1	-	-	-	-	-
Compositae indet.	2	3	1	2	-	-	1	-
Triglochin maritima L	1	1+?1	-	-	-	-	-	-
Juncus spp	+	+	+	+	+	+	-	-
Isolepis setacea (L) R.Br.	-	-	-	-	1	-	-	-
Eleocharis cf. palustris L	2	8	4	10	1	1	-	1
Carex spp	4	4	9	6	1	5	1	1
Cyperaceae indet.	1	-	-	-	-	-	-	-
Hordeum sp (carb)	1	-	-	1	-	-	-	-
Secale cereale L (carb)	1	-	-	-	-	-	-	-
Avena sp (mineralised)	-	-	-	-	1	-	-	-
Secale cereale L (rachis frags)	-	12	-	5	1	-	4	-
Hordeum sp (rachis frags)	-	1	-	-	-	-	-	-
Cereal indet (mineralised grain)	-	-	-	-	-	fr	-	-
Cereal indet (carbonised grain)	1	2	-	-	-	1	-	-
Cereal indet (pericarps)	-	47	-	27	-	-	-	-

Sample No.	51	52	53	48	18C	18A	12	15	32	34
Context No.	3113	3114	920	2081	1118	1118	1090	1117	1117	1137
Charophyte (oogonia)	-	-	-	+++	-	-	-	-	-	-
Pteridium aquilinum (L) Kuhn (pinnules etc)	-	-	-	-	-	+	+	+	+	+
Ranunculus caris/repens/bulbosus	-	7	2	-	-	143	2	4	3	9
Ranunculus cf flammula L	-	1	-	-	1	4	4	1	2	7
Ranunculus subg Batrachium	-	-	-	-	-	-	-	-	-	1
Papaver argemone L	1	-	-	4	-	3	3	-	-	-
Brassica sp	1	-	-	-	1	-	12	2	-	-
Raphanus raphanistrum L (siliqua frags)	-	1	fr	-	-	4	-	-	-	1
Reseda luteola L	-	-	-	-	294	-	-	-	-	-
Reseda sp	-	-	-	5	-	1	-	-	2	1
Silene sp	-	-	-	-	5	-	1	2	-	1
Agrostemma githago L	-	fr	-	-	2	3	1+fr	5+fr	3	1
Stellaria media-type	1	-	-	-	1	7	9	2	2	6
Stellaria cf graminea L	-	-	-	-	-	-	-	-	-	1
Spergula arvensis L	-	-	-	-	3	4	4	3	2	-
Scleranthus cf annuus L	-	-	-	-	-	-	-	2	-	-
Montia fontana L subsp chondrosperma	-	-	-	-	-	-	-	-	-	1
Caryophyllaceae indet	-	-	3	1	-	1	-	-	1	-
Chenopodium album L	6	-	2	2	1	8	26	11	22	28
Chenopodium sp	-	-	-	-	-	-	-	-	1	2
Atriplex patula/hastata	-	2	-	-	-	3	-	-	2	2
Chenopodiaceae indet	-	-	8	-	-	-	1	1	2	-
Malva sylvestris L	-	-	-	-	-	16	-	-	-	-
Linum usitatissimum L	-	-	-	-	-	3	-	-	-	-

Ilex aquifolium L (leaves)	-	-	-	-	-	+	+	-	-	-
Leguminosae indet	-	-	-	-	-	1	-	-	1	-
Filipendula ulmaria (L) Maxim	-	-	-	-	-	2	-	-	-	2
Rubus fruticosus agg	15	-	-	-	-	1	-	1	1	4
Potentilla sp	1	-	-	-	-	-	-	1	-	-
Fragaria vesca L	40	2	-	-	-	-	-	-	-	cf1
Aphanes arvensis/microcarpa	-	-	-	-	-	-	-	1	-	7
Prunus spinosa L	5	2	-	-	-	-	-	-	-	-
Prunus spinosa-type (thorns)	-	-	-	-	-	+	-	-	-	+
Prunus domestica L subsp insititia	-	3	-	-	-	-	-	-	-	-
Prunus cf avium L	-	-	-	-	-	-	1	-	-	-
Prunus sp	4+fr	2+fr	-	-	-	-	-	-	-	fr
Malus sylvestris/domestica	-	4	-	-	-	-	-	-	-	-
Hydrocotyle vulgaris L	-	-	-	-	-	-	1	1	-	-
Conium maculatum L	24	9	11	-	-	-	-	-	1	-
Polygonum aviculare agg	-	-	-	-	-	2	-	15	2	5
Polygonum lapathifolium/persicaria	-	-	-	-	-	-	-	3fr	3	3
Polygonum cf persicaria L	-	-	-	-	-	5	-	-	-	-
Polygonum convolvulus L	-	-	-	-	-	-	-	-	cf1	12+fr
Polygonum sp	-	1	-	-	-	1	4	2	-	-
Rumex acetosella agg	-	-	-	-	1	8	1	2	3	4
Rumex sp	-	4	-	-	-	3	2	2	2	5
Rumex sp (perianth nodules)	-	-	-	-	-	-	-	-	1	-
Polygonaceae indet	2	-	-	-	-	-	-	-	1	-
Urtica urens L	3	3	12	-	2	44	6	3	1	-
Urtica dioica L	264	44	230	-	4	7	15	4	1	7
Humulus lupulus L	-	-	-	-	-	-	-	-	-	8fr
Betula sp (fruit)	-	-	-	-	-	-	-	-	-	5
Betula sp (catkin scale)	-	-	-	-	-	-	-	-	-	1
Corylus avellana L	+	-	-	-	-	+	-	+	+	+

Calluna vulgaris (L) Hull (capsules)	-	-	-	-	-	+	-	-	-	-
Calluna vulgaris (L) Hull (lvs, shoots)	-	-	-	-	+	+	+	-	+	-
cf Anagallis arvensis L	-	-	-	-	-	-	-	-	1	-
Menyanthes trifoliata L	-	-		-	-	-	-	cf1	-	-
Hyoscyamus niger L	-	-	-	-	-	-	1	-	1	1
Solanum nigrum L	1	-	-	-	-	5	1	1	1	-
Euphrasia/Odontites	-	-	-	-	-	1	-	-	-	-
Lycopus europaeus L	-	-	-	-	-	-	-	1	-	-
Prunella vulgaris L	-	3	-	-	-	2+cf1	-	-	-	cf1
Lamium cf album L	-	-	-	-	-	-	2	-	-	-
Galeopsis tetrahit/speciosa	-	-	-	-	-	-	-	2	-	2
Teucrium sp	-	-	-	-	-	-	-	-	-	1
Ajuga reptans L	-	-	-	-	-	-	-	-	-	1
Labiatae indet	-	-	-	-	-	-	-	-	-	1
Sambucus nigra L	25	7	44	1	1	34	20	-	-	1
Valerianella dentata (L) Poll	-	-	-	-	-	1	-	-	1	1
Anthemis cotula !	-	2	-	-	3	39	-	18	4	6
Eupatorium cannabinum L	-	-	-	-	-	1	-	-	-	-
Achillea millefolium L	-	-	-	-	-	2	-	-	-	-
Tripleurospermum maritimum (L) Koch	-	-	1	-	-	-	-	-	-	-
Chrysanthemum segetum L	-	-	-	-	-	-	-	2	-	-
Chrysanthemum-type	-	-	-	-	-	-	-	-	-	1
Arctium sp	-	-	-	-	-	-	-	-	1	-
Cirsium sp	-	-	-	-	-	-	-	-	-	1
Centaurea cyanus L	-	4+fr	-	-	1fr	5	-	6	5	-
Lapsana communis L	-	-	-	-	1	1	-	3	-	1
Sonchus asper (L) Hill	-	-	-	-	-	1	-	-	-	1
Compositae indet	-	1	-	-	-	5	1	1	-	-
Juncus sp	+	+	+	+	-	-	+	+	+	+

Eleocharis cf palustris (L)	6	5	-	-	-	-	5	1	1	2
Isolepis setacea (L) R.Br.	-	-	1	-	-	-	-	-	-	-
Cladium mariscus (L) Pohl	-	-	-	-	-	-	1	-	-	-
Carex sp	7	1	2	-	8	5	1	11	14	7 (+2 utricl
Cyperaceae indet	-	-	-	9	-	-	-	-	-	-
Hordeum sp (carbonised grain)	-	-	-	-	1	-	-	-	-	-
Avena sp (carbonised grain)	-	-	1	-	-	1	1	-	-	-
Secale cereale L (carbonised grain)	-	-	1	-	-	-	-	-	1	-
Cereal indet (carbonised grain)	-	-	-	-	-	-	3	-	-	-
Cereal indet (pericarps)	-	-	-	-	2	15	-	-	-	1
Secale cereale L (rachis frags)	-	-	-	-	-	5	1	2	1	2
Gramineae indet	-	3	1	-	4+1(c)	5	-	2	2	-
Gramineae/cereal (culm frags)	-	-	-	-	+	+	+	-	-	+
Vitis vinifera L	5+fr	-	-	-	-	-	-	-	-	-
Indeterminate buds, budscales	+	-	-	-	-	-	-	+	+	+
Indeterminate inflorescence ?bracts	-	-	-	-	-	+	-	-	-	-
Indeterminate seeds etc	4	15	4	2	13	34	5	5	7	12
Sample weight (kg)	2	2	2	1	0.5	0.5	1	0.5	0.5	1

Table : Macrofossils from ruderal, aquatic, Reseda, grassland/wetland and mixed assemblages. Taxa are represented by fruits or seeds except where indicated.

Context No.	Context description		Taxon	Stem diameter (mm)	Wood description
1079	Barrel well	B	Quercus sp		
		E	"	130+	
		G	"	150+	
		H	"	-	
		I	"	-	Oak staves. Split or sawn tangentially.
		K	"	140+	Sapwood generally removed, apart from
		L	"	-	traces of sapwood on two staves. Very
		M	"	-	wide growth rings: e.g. 1079E with 15
		O	"	-	rings in 68mm growth; 1079G with 13 rings
		P	"	-	in 75mm growth. Widest rings up to 12mm
		S	"	140+	in 1079K.
		T	"	-	
		U	"	-	
		V	"	130+	
		X	"	-	
		-	"	-	
		-	"	-	
		-	"	-	
		-	"	-	
		J	"	-	Exterior part of branch/trunk with fork and much sapwood.
1069	Wood-lined pit outside	A	Quercus sp	-	Oak board, radially split or sawn.
	cess pit arch.	F	"	140	Post made from quartered branch or small trunk.

Context No.	Context description		Taxon	Stem diameter (mm)	Wood description
1125	Group of unassociated wood ?driftwood.		Quercus sp	c.160	Quartered branch or small trunk of oak with bark.
1136 (T72)	Wicker-work fence.	A	?Corylus sp	31x24	Flattened untrimmed branches with bark. B shows oblique transverse cut. A-D are straight stem sections, E-F forked.
		B	Corylus sp	24x21	
		C	Corylus sp	25x15	
		D	?Corylus sp	26x20	
		E	Corylus sp	30x18	
		F	Corylus sp	30x19	
1136 (Withies)	Wicker-work fence.	A	Corylus sp	30x32	
		B	Corylus sp	30x25	Mostly flattened untrimmed branches with bark. Transverse oblique cuts starting up to 80mm from tip. All sections examined are straight.
		C	Corylus sp	34x32	
		D	Corylus sp	32x25	
		E	Corylus sp	30	
		F	Corylus sp	40	
		G	Corylus sp	35x25	
		H	Corylus sp	30x24	
		J	Corylus sp	c.20mm	
1139 (T71)	Wicker-work fence	A	Corylus/Alnus sp	42	Straight and irregularly formed twigs and small branches with bark, some flattened.
		B	Ilex sp	13	
		C	? Crataegus group	14x10	
		D	Ilex sp	20x11	
		E	Corylus sp	22x24	
		F	Quercus sp	20x12	

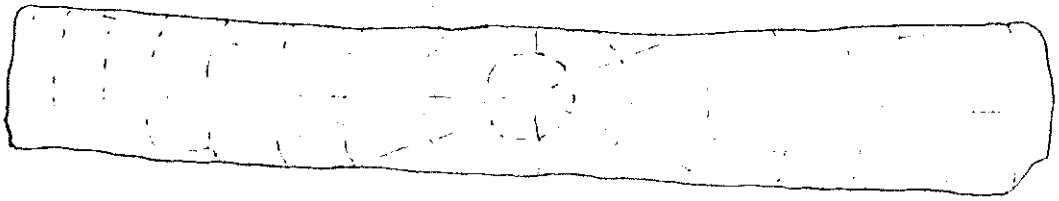
Context No.	Context description		Taxon	Stem diameter (mm)	Wood description
1140	Area of brushwood etc.	A	Quercus sp	?	Fragment of mature wood
		B	? Corylus/Alnus sp	35x21	
		C	? Corylus sp	37x20	Straight small branches with bark,
		D	Corylus sp	37x24	mostly flattened.
		E	Corylus sp	38x22	
		F	Corylus/Alnus sp	34x20	
		G	Indeterminate	31x10	
		H	Ilex sp	26x10	
		I	Corylus sp	21x12	
1140 (T62)	Area of brushwood etc.		Quercus sp	?	Segment of large trunk
1156 (T29)	Scatter of wood over pit 1164		Quercus sp	?	Oak plank. Radially split from large wood
1156 (T30)	Scatter of wood over pit 1164		Quercus sp	?	Trimmed quartered oak branch or small trunk
1164 (T43)	Wicker-lined cess pit	A	Alnus sp	c.130	Stake with 4-facetted tip, cut from halved branch/small trunk. Worm holes
(T68)		B	Alnus sp	?	Post/stake split from large wood
(T47)		C	Quercus sp	60	Curved post/stake made from curving branch, part-trimmed with some bark
(T66)		D	Quercus sp	100	Stake with 4-facetted tip, cut from roughly halved branch/small trunk
(T45)		F	Alnus sp	90	Post/stake made from lightly trimmed branch or small trunk. Dowel-hole. Bark
(T65)		G	? Alnus sp	120+	Post/stake made from quartered branch or small trunk, further trimmed.

Context No.	Context description		Taxon	Stem diameter (mm)	Wood description
1164 (T52)	Wicker-lined cess pit	H	Populus sp	95	Post/stake made from lightly trimmed branch or small trunk. Large (2mm) insect holes
(T55)		K	Quercus sp	80	Post/stake made from quartered branch or small trunk
		L	? Alnus sp	c.100	Post/stake made from roughly squared branch or small trunk
(T59)		M	Alnus sp	c.160	Post/stake made from quartered branch or small trunk, further trimmed. Some bark
(T50)		N	Corylus sp	75	Stake with 4-facetted tip, made from lightly trimmed branch or small trunk. Some bark
(T54)			Indeterminate	90	Post/stake made from quartered branch or small trunk
(T63)			Fraxinus sp	-	Post/stake made from split segment of large wood
(T40)			Alnus sp	-	Stake with 4-facetted tip made from quartered branch or small trunk, further trimmed
(T67)			Alnus sp	-	Fragments of post/stake
(T42)			Alnus sp	c.100	Post/stake made from roughly squared halved branch or small trunk
1165 (T56)			Prunus sp	c.110	Stake with 5-facetted tip cut from trimmed small trunk or branch
1166 (T69)	Isolated stake		Quercus sp	-	Stake with 3-facetted tip cut from segment of branch or trunk

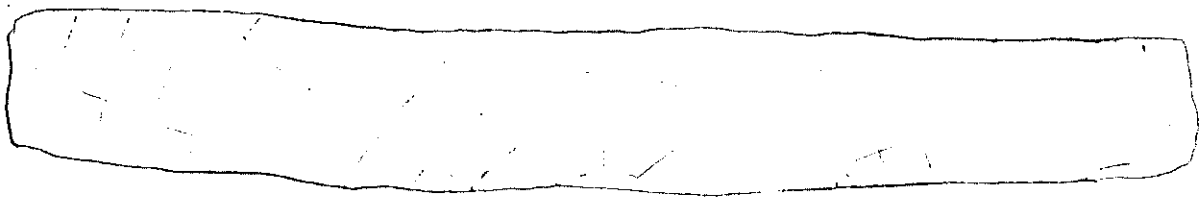
Context No	Context description		Taxon	Stem diameter (mm)	Wood description
1187 (T73)	Fence		Quercus sp	90	Post made from untrimmed branch or small trunk of oak. Bark
1189 (T75)	Wattle fence	A		19x10	
		B		22x13	
		C	Indeterminate	25x16	Flattened untrimmed branches with bark
		D	(badly crushed	27x13	
		E	and deformed)	27x13	
		F		30x18	
		G		24x18	
1191 (T38)	Brushwood layer etc.	A	Quercus sp	-	Fragment of mature oak wood
		B	Quercus sp	-	Tangentially split oak board, charred on exterior face
1192 (T48)	Wood scatter		Quercus sp	85	Stake/post made from untrimmed branch or small trunk. Bark.
1195	Isolated post		Quercus sp	190	Large post with sharpened tip made from untrimmed young trunk with bark
1203	Horizontal timbers	A	Ilex sp	60	Untrimmed stem
		B	Quercus sp	-	Fragments of mature oak
1205	Horizontal timbers	A	Corylus sp	-	Segments of branches or small trunks with bark
		B	Corylus sp	-	
2305	Pit		Quercus sp		Dowel (c. 10mm diameter) made from mature oak. One end burred by hammering

1079 B

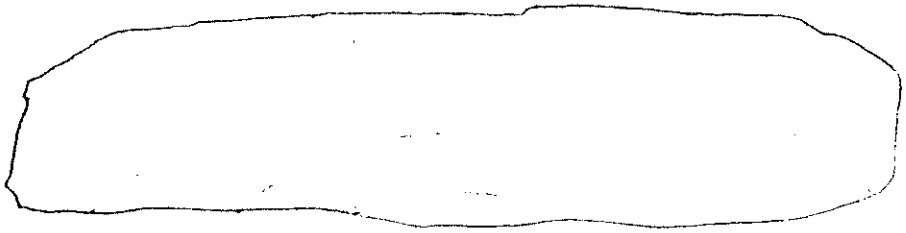
1079 E



1079 G



1079 H



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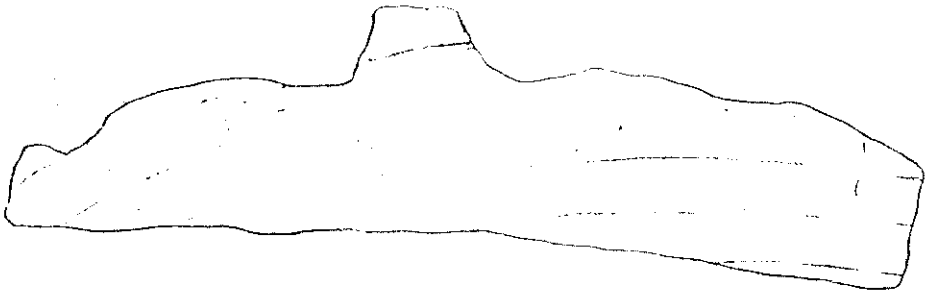

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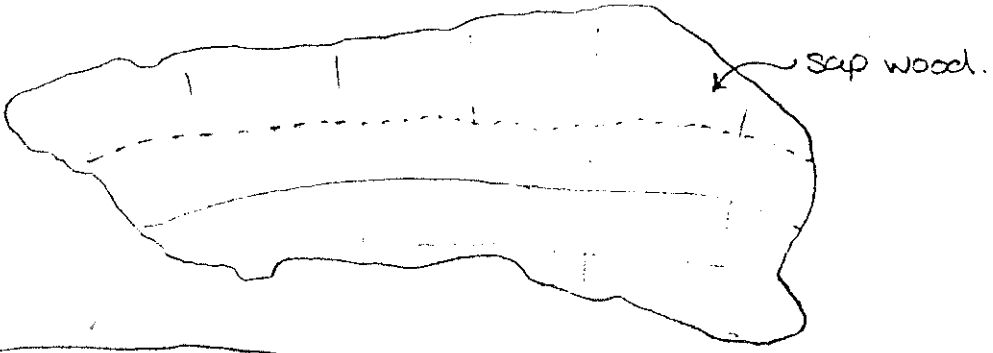

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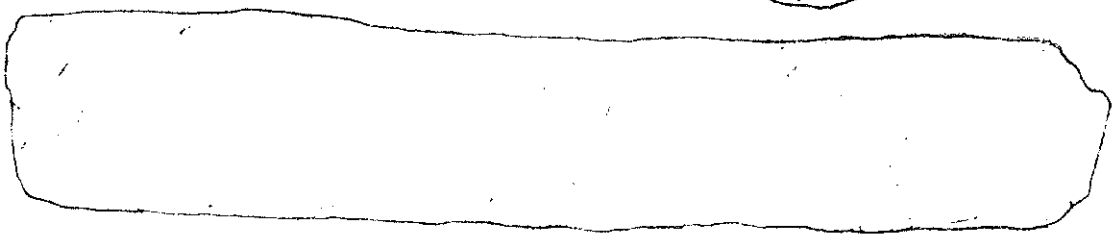
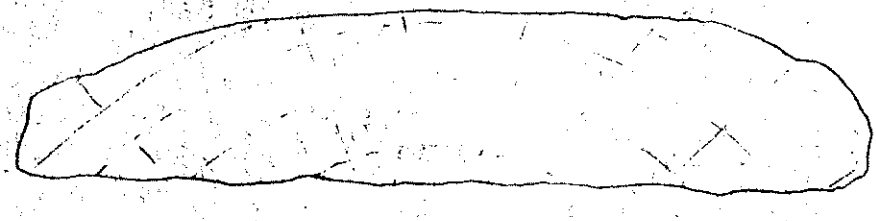


1079 L

1079M

1079O

1079P



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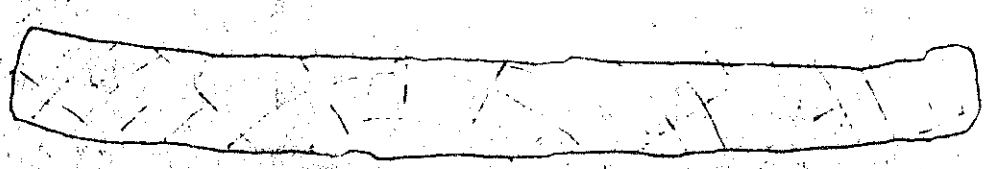

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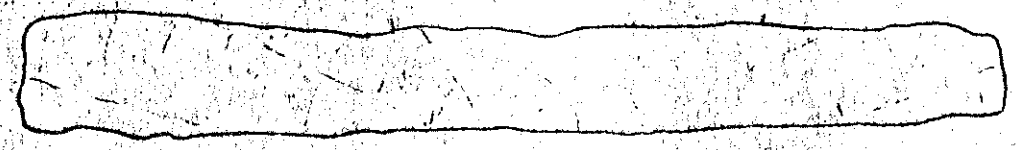

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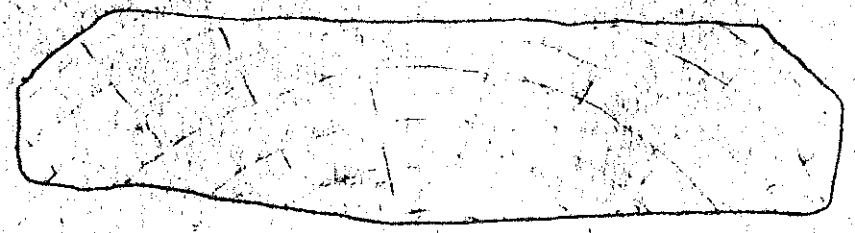

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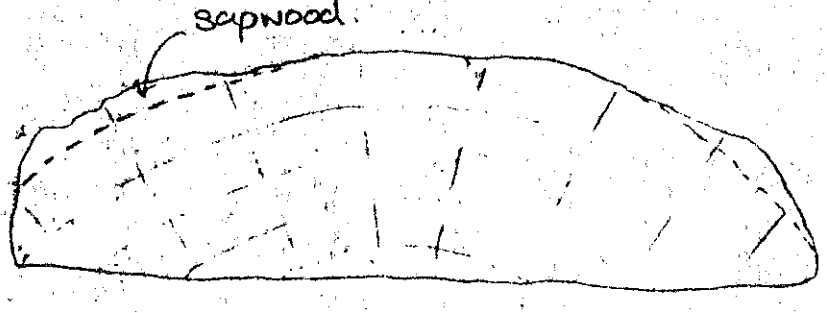

Sapwood

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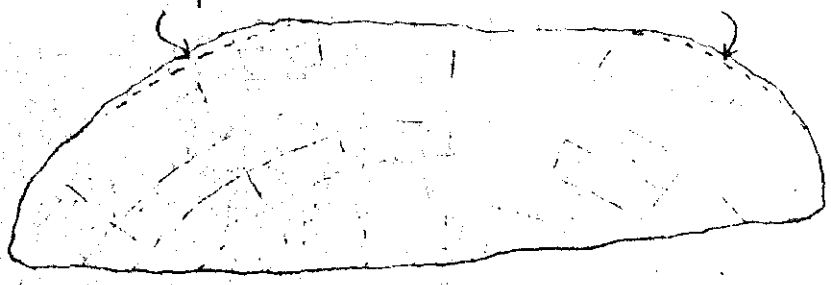

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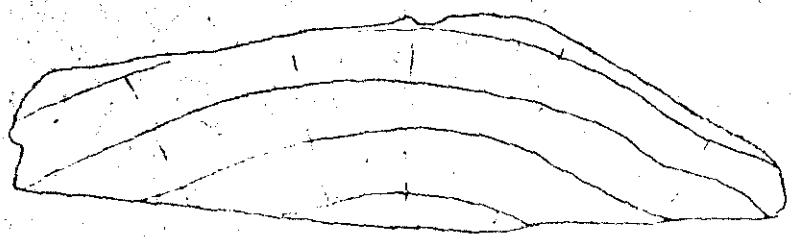

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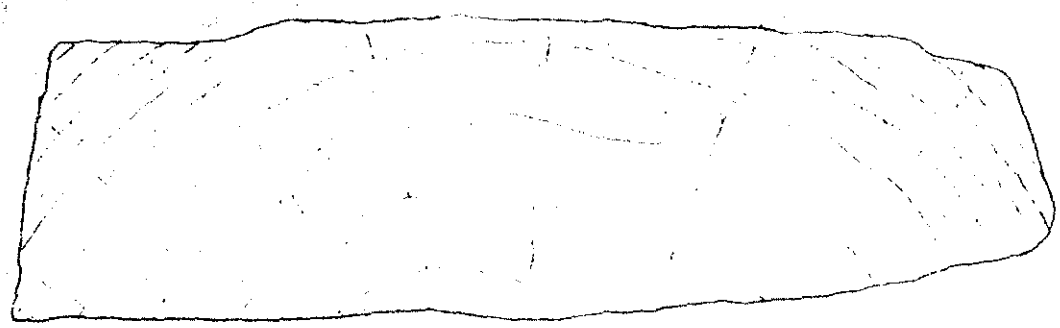

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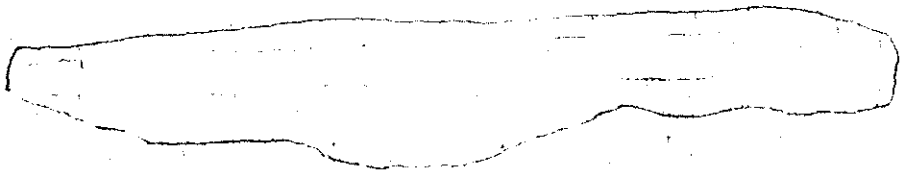
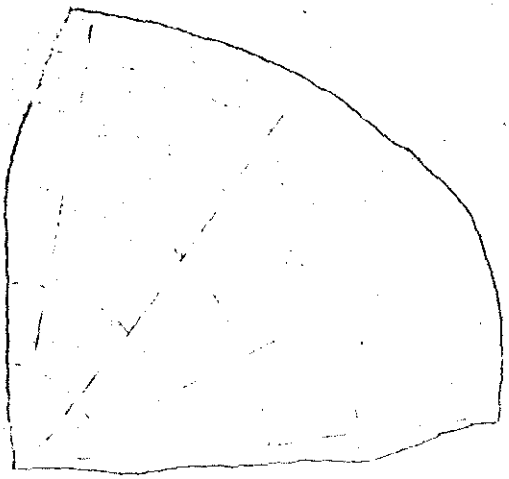


1069F



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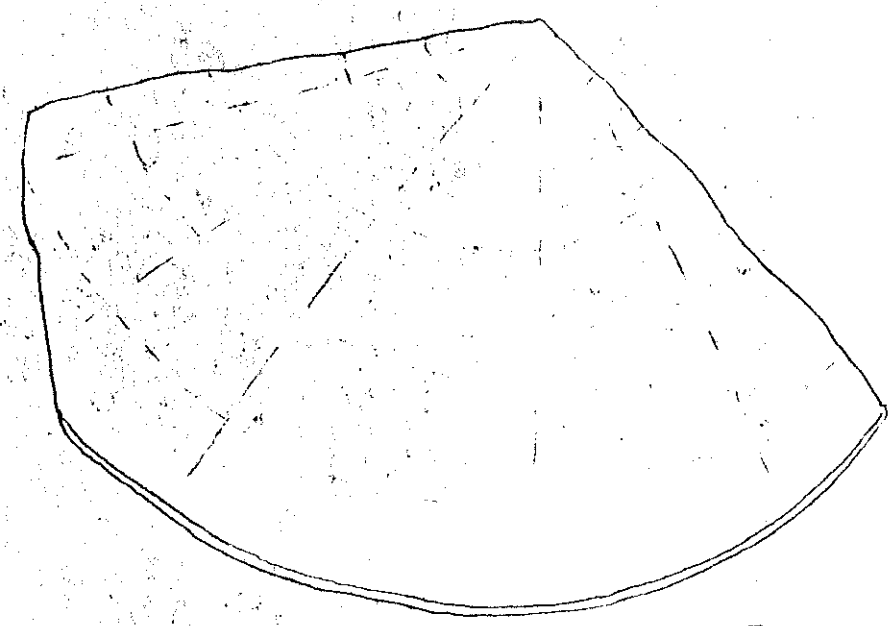

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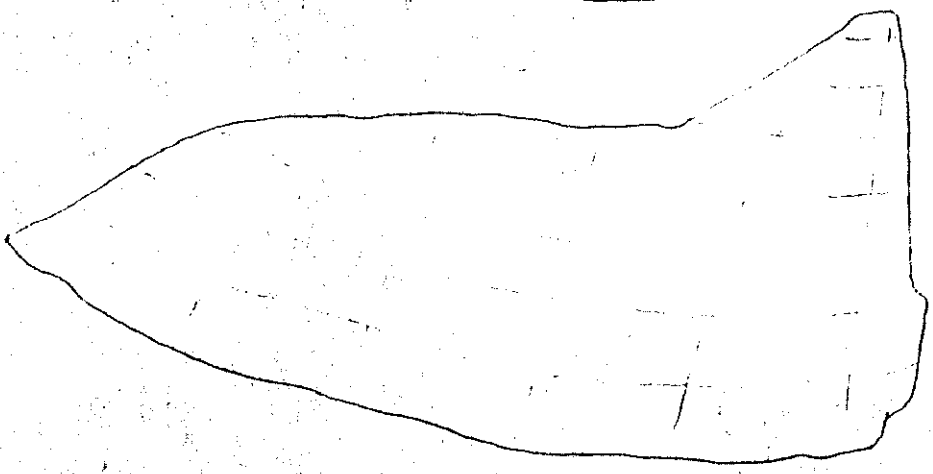
T62



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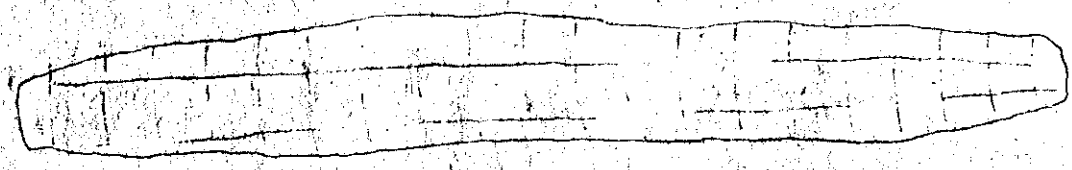

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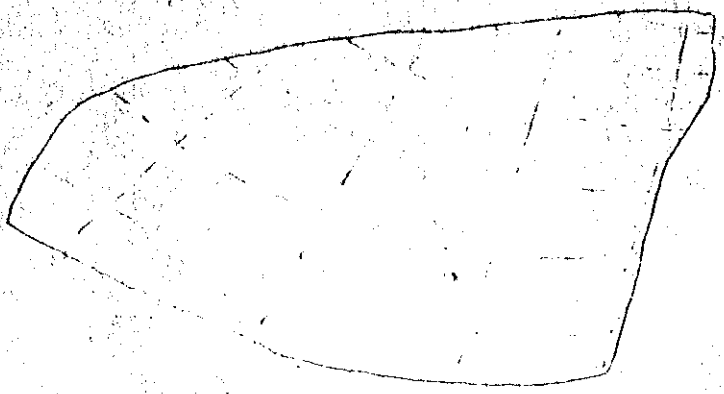
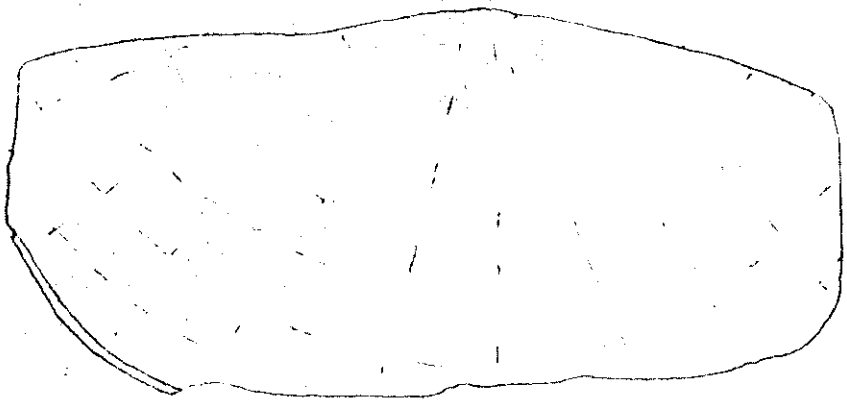
T30



1164A
T43



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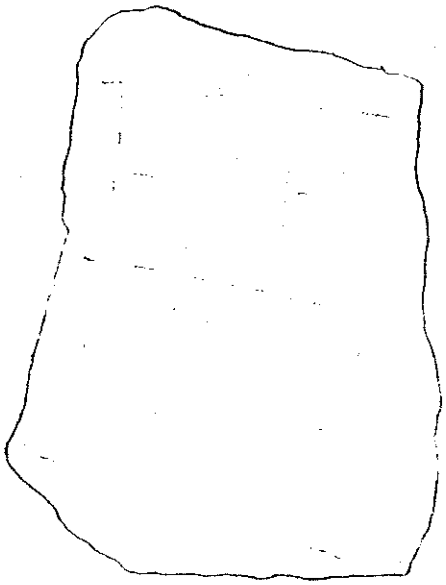
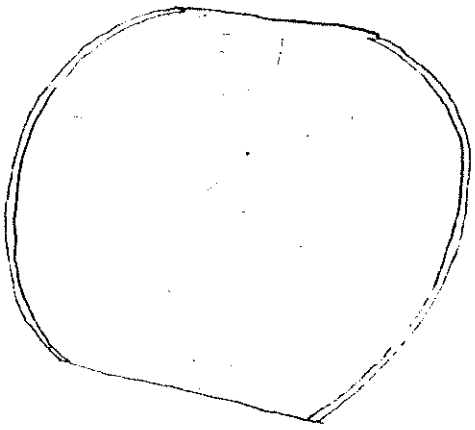
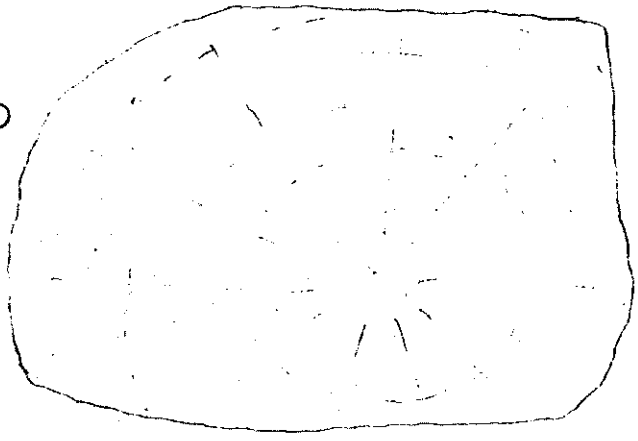
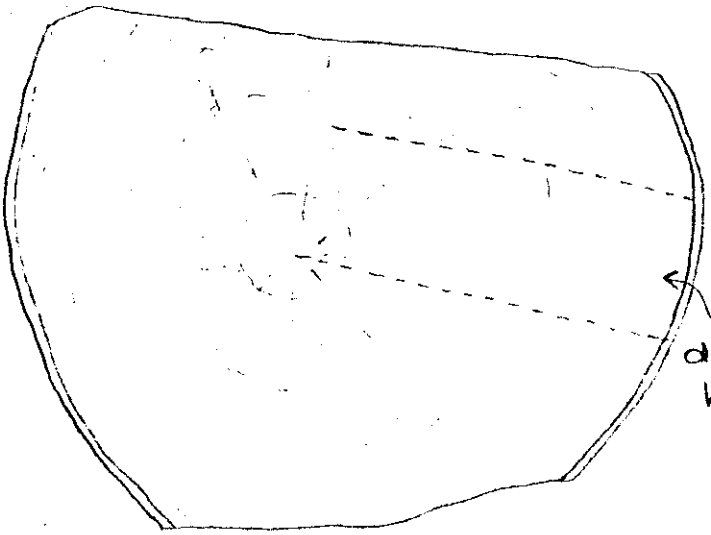




1164C
T47

1164D
T66





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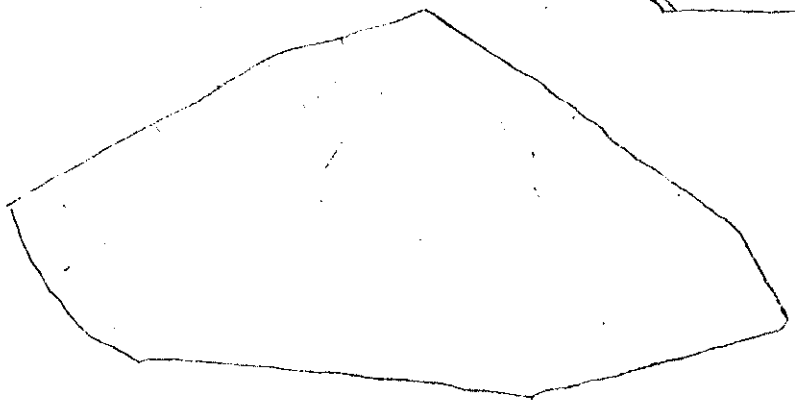
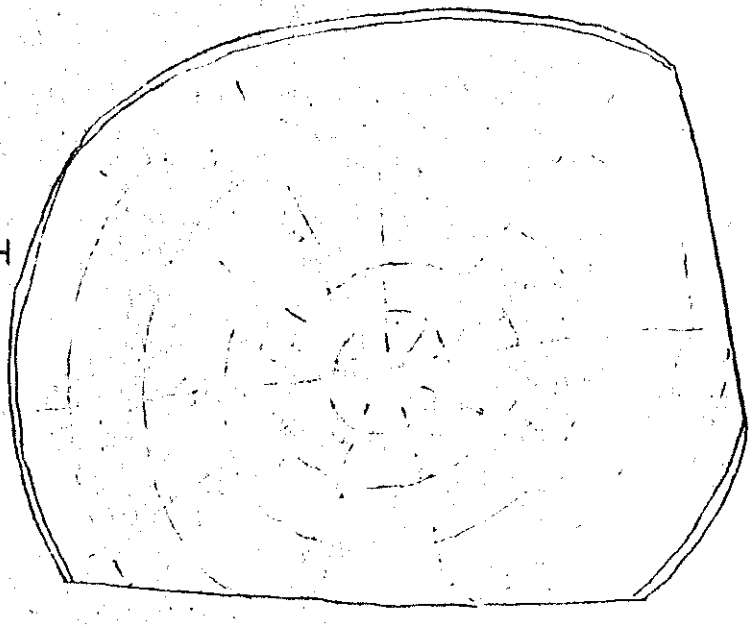
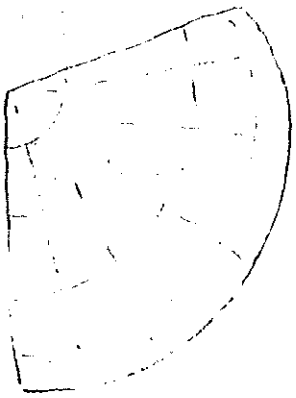


1164H

T52





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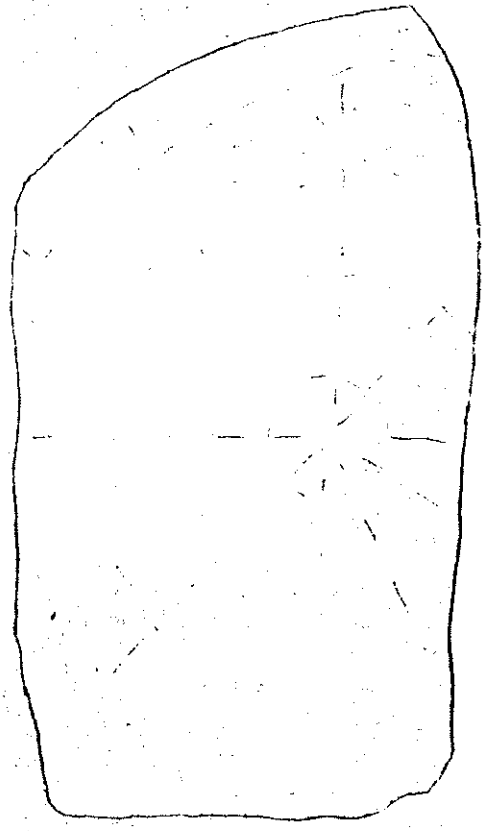
T55



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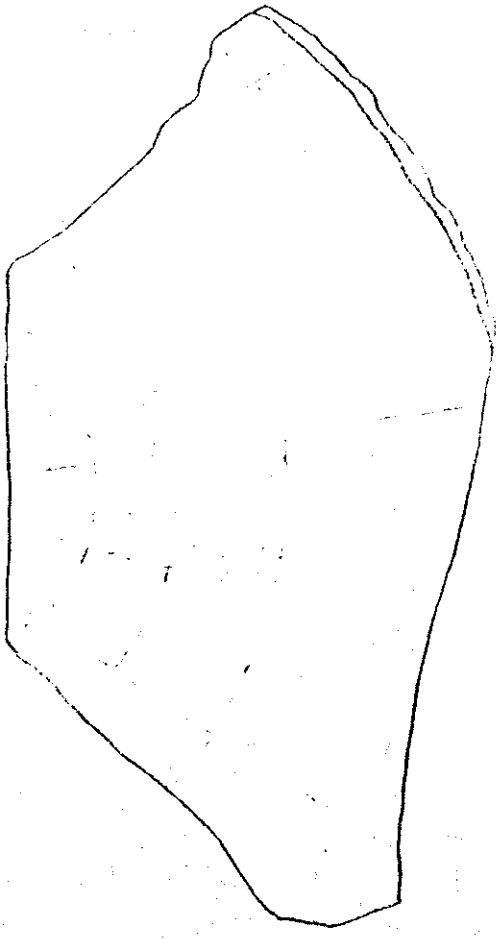
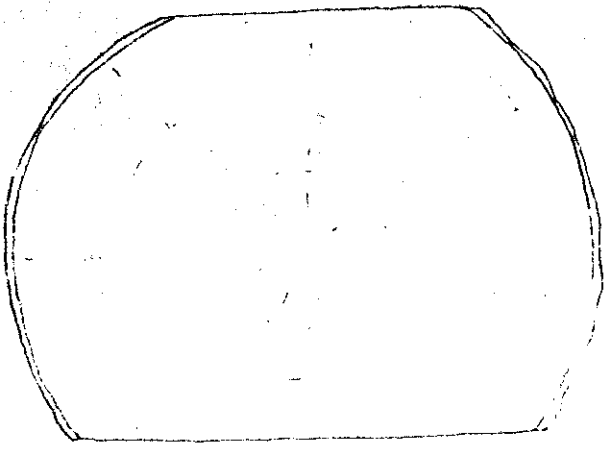


1164M

T59



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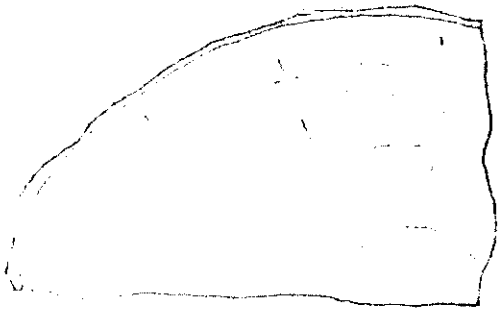
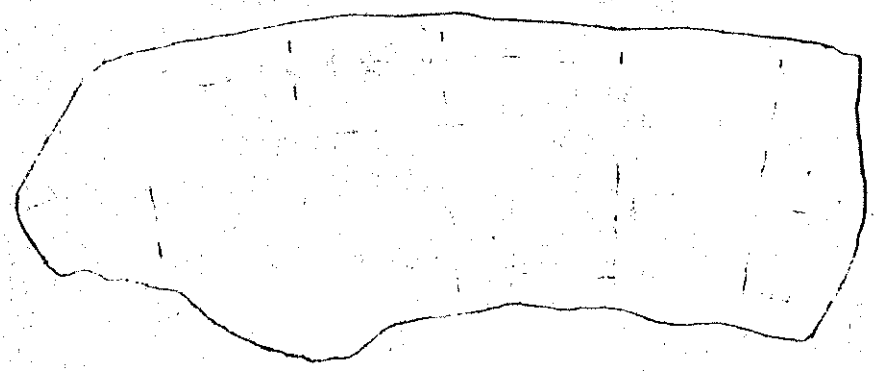
T50



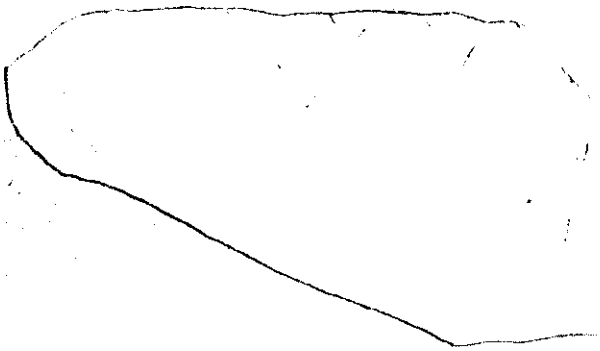
1164

T54

1164 T63



1164 T40



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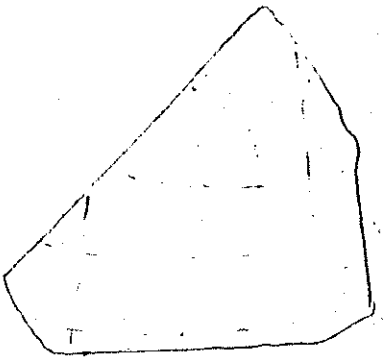
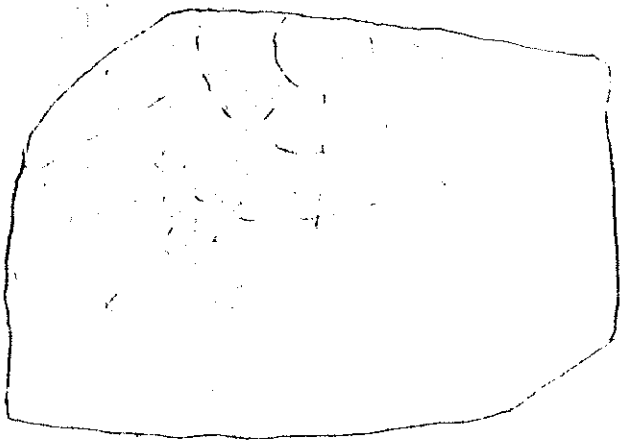
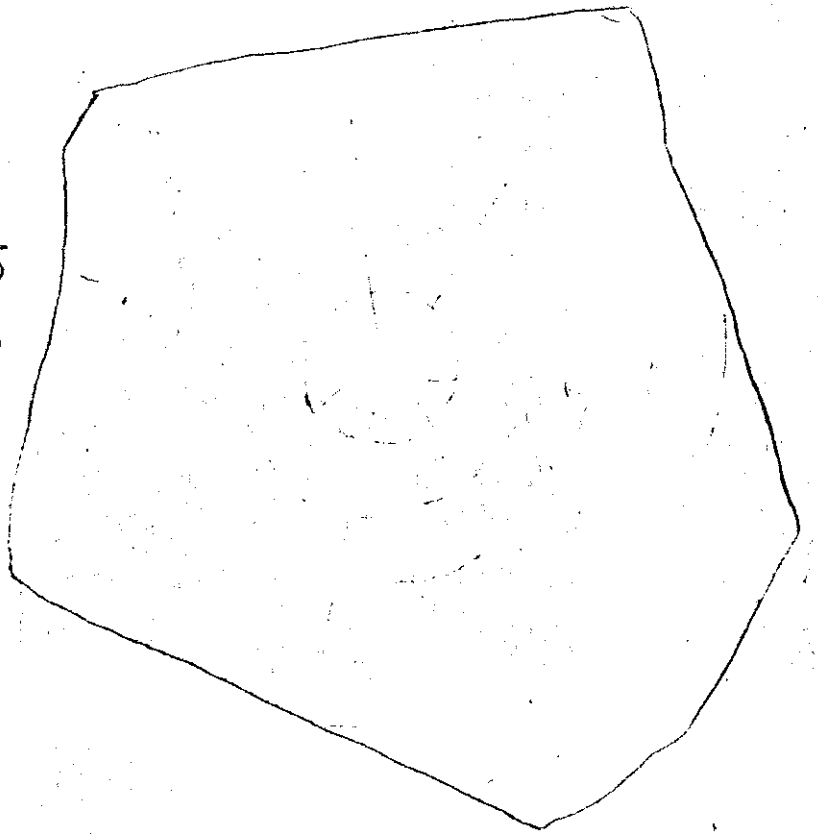
T67

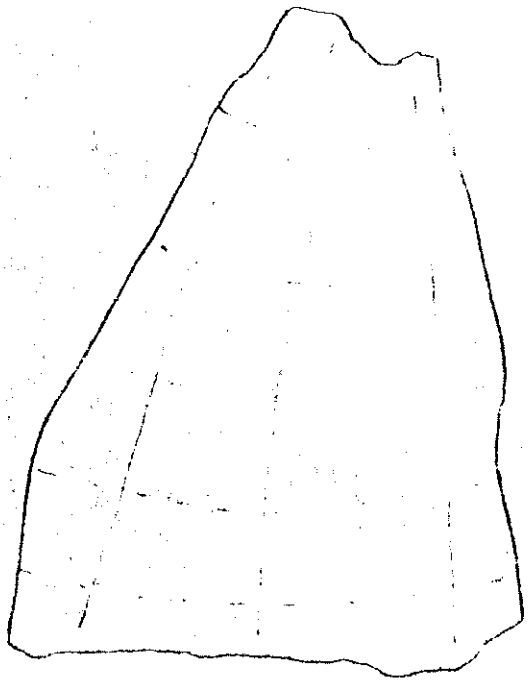




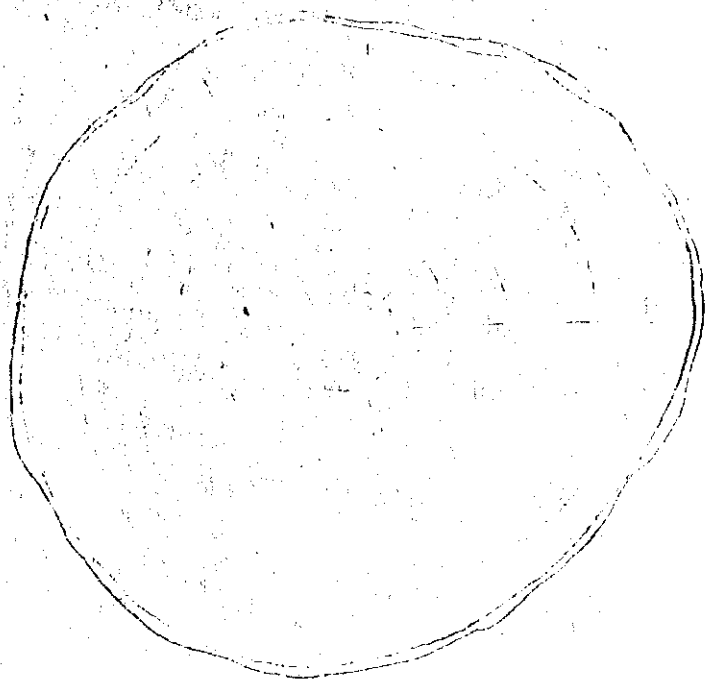
1164
T42

1165
T56





1166
T6



1187 T73

1191 T38

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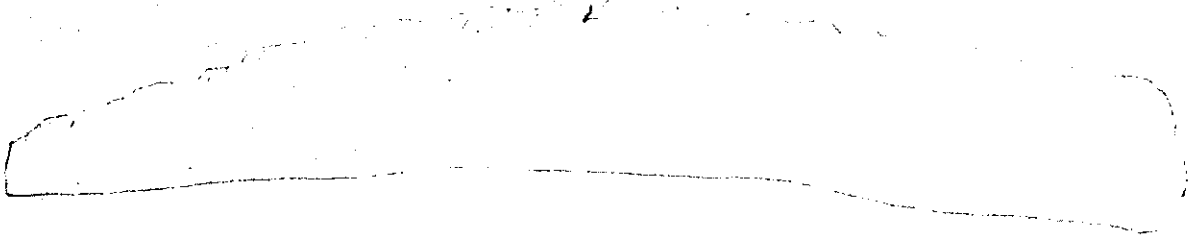
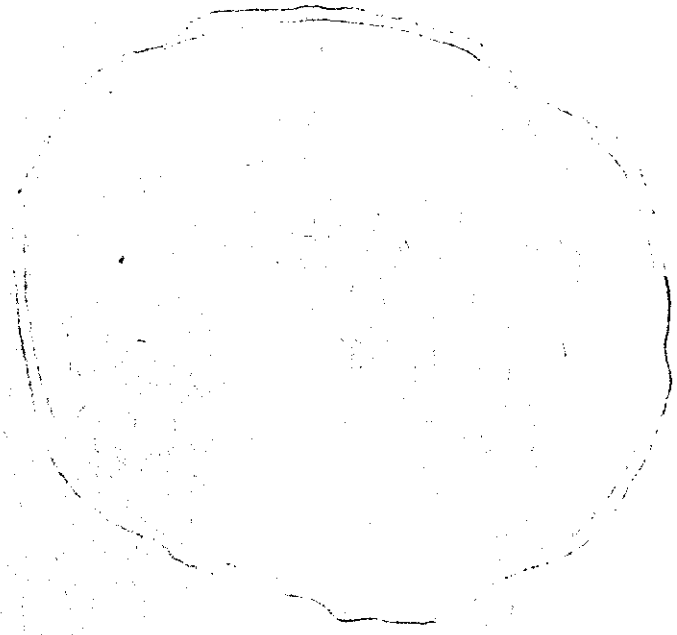


1191 T38



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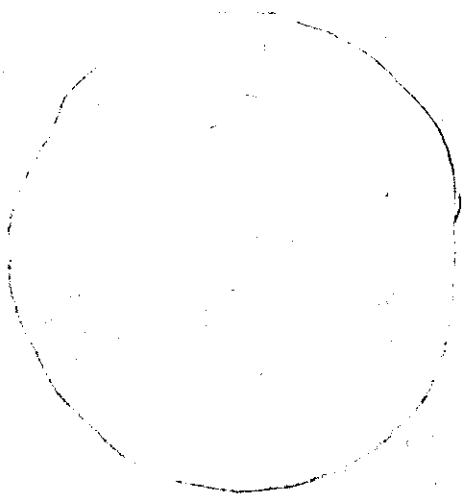

1203A

1203B

Note on soil at Whitefriars, Norwich 1981

R. I. Macphail

The grey coloured soil which overlies orange sands containing graves appears to be a narrow Ap horizon or "dug soil". It results from anthropogenic activity mixing in organic matter, charcoal and perhaps a small amount of cultural material into the sandy parent material, most probably for cultivation. There is no way of knowing how long this type of horizon took to form because it could gain a similar character over a number of seasons. Only dateable inclusive material may suggest the length of time the soil was actively in use. However, reworking by earthworms has taken some of this dark soil down into the sandy grave layer and so caution must be exerted in case artefacts from the overlying levels have been similarly intruded. The activity of earthworms and oxidation in this soil layer most probably account for some humus loss in this Ap horizon. However, the degree of disturbance by earthworms into the sandy soil beneath may suggest that use and development of the Ap horizon was not a completely short-lived event. The Ap horizon seems to have been truncated by later activity and buried by further layers.