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Ancient Monuments Laboratory
Report 165/88

PALAEOECOLOGICAL STUDIES OF THREE BRONZE AGE 'BURNT FLINT' SITES NEAR WEST ROW, MILDENHALL, SUFFOLK

Peter Murphy BSc MPhil

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Summary

Samples were collected at sites MNL 124, MNL 137 and 204 for dating and analysis of wood, charcoal, fruits, seeds etc, molluscs and bone. The aims were to establish the dates, local environment and function of these sites. MNL 124 was dated to 1770bc and MNL 137 to 1700bc; the date for MNL 204 is awaited. All three sites were located in woodland clearances in or close to areas of fen, carr or marsh. MNL 204 produced bone and charred cereals, implying food consumption at the site, but this may not have been its primary function.

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Palaeoecological studies of three Bronze Age 'burnt-flint' sites near West Row, Mildenhall, Suffolk.

In addition to the known Bronze Age settlement sites in the West Row area a number of subsidiary sites, characterised by surface scatters of heat-shattered flints have been located by Mr Colin Pendleton. In this report results of palaeoecological studies at three of these sites (MNL 124, MNL 137, MNL 204) are presented and an assessment is made of the ecological situations and probable functions of these sites.

1. MNL 124

This site was detected as an amorphous spread of heat-shattered flint and charcoal scattered over the ploughed peat soil. A small trench close to the centre of the deposit provided a section through the charcoal and burnt flint layer underlying the ploughsoil, and through an organic buried soil cut by several small features.

Description of the section (Fig. 1).

At the eastern end of the trench the deposits were:

1	0 - 30cm	A_{op} black amorphous friable humified peat; some charcoal, heat-shattered flints and modern plant material; narrow boundary.
2	30 - 45cm	Dark brown (7.5 YR 3/2) peaty loam; chalk lumps up to 45mm (chalk content increasing with depth); flints (some heat-shattered) up to 60mm; small fragment of prehistoric pottery; woody roots, twigs, seeds; rare small scraps of charcoal; small mammal bone; chips of large mammal bone; insects, land molluscs; narrow boundary.
5	45cm+	Chalk lumps up to 80mm in greyish brown (10 YR 5/2) clay loam matrix; few flint chips up to 15mm; woody roots; small mammal tooth; land molluscs.

In the centre of the trench were two shallow gulleys into one of which was cut a small pit, (4), 30cm deep. The lower fill of pit 4 was a very dark grey (10 YR 3/1.5) uncompacted peaty loam with large wood fragments; chalk lumps up to 45mm; heat-shattered flints up to 20mm; small charcoal fragments; seeds; insect remains; land and freshwater molluscs.

Filling the upper 10cm of 4 and the two gulleys, and forming a thin spread between 1 and 2, was a deposit of charcoal (3) (lumps up to 35mm) and heat-shattered flints (up to 35mm) with roots, seeds, small mammal bone, tiny chips of large mammal bone and land molluscs.

At the western end of the trench was a larger pit, 47cm deep, containing the following deposits:

6	0 - 20cm	Very dark brown (10 YR 2/1.5) wood peat; roots and rhizomes; seeds; insect remains.
7	20 - 45cm	Very dark grey (10 YR 2.5/1) compact very fine-textured peaty loam; occasional small rounded and angular flint and quartz pebbles up to 6mm; gypsum crystals*; small fragments of wood and charcoal; Cladocera; insect remains; seeds, mosses.
8	45 - 47cm	Scatter of heat-shattered flint fragments up to 35mm, hazel-nuts, large wood fragments.

A large prostrate fen-oak (Quercus sp) protruded from the western end of the trench at the level of layer 6.

Sampling, recovery, etc.

1kg samples from layers 2, 3, 4 and 5 and a central column of small (200g) samples through layers 6, 7 and 8 were taken. The samples were disaggregated, plant remains extracted by flotation/washover, with a 250 micron collecting mesh and the non-floating residue was washed through a 0.5mm mesh sieve for the recovery of molluscs, bone, artefacts and any remaining plant material. The molluscs from the lower part of layer 2 (5-10cm; 10-15cm) and layer 5 have not been examined in detail, but the assemblages were essentially the same as that from 2 0-5cm.

Plant remains and molluscs identified are listed in Tables 1, 2 and 3. The composition of the land mollusc assemblages is summarised in Fig. 2. In the following discussion information about the ecology and distribution of snails is taken from Evans (1972).

*Footnote. MacFadyen (1970) suggests that gypsum formation in fenland clays results from the oxidation of pyrite forming sulphur acids which react with any calcium carbonate present. This may explain the absence of molluscs in this deposit.

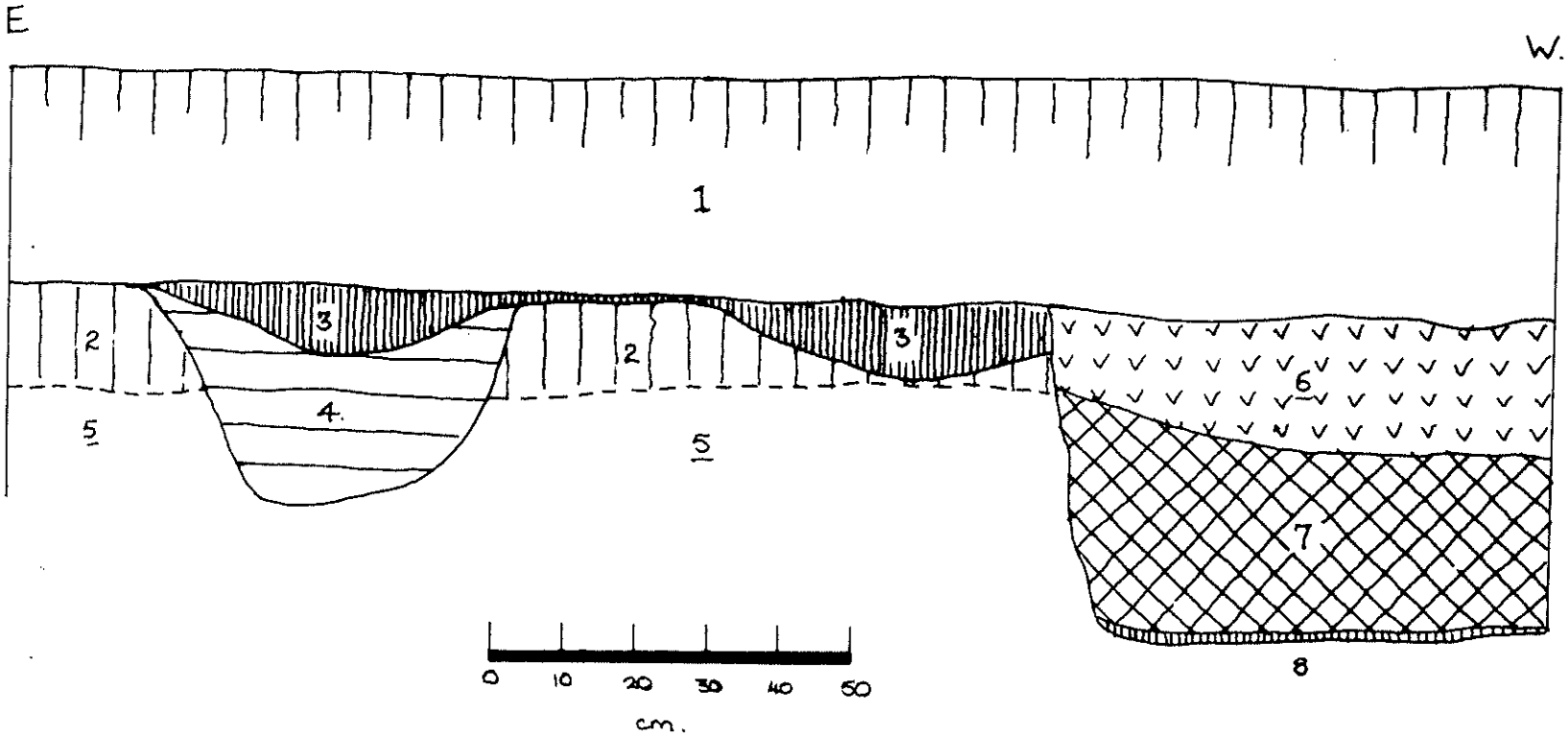


FIG. 1 : MNL 124 : SECTION. (MEASURED SKETCH).

Context No.	2	2	2	3	4	6	6	7	7	7	8
Depth (cms.)	0-5	5-10	10-15	-	-	0-10	10-20	20-30	30-40	40-45	-
Characeae	1	-	-	-	-	-	1	-	-	3	-
Ranunculus cf. repens L.	-	-	-	-	-	-	1	-	2	2	-
Ranunculus scleratus L.	-	-	-	-	1	3	1	-	-	-	-
Ranunculus sp.	-	-	-	-	1	-	-	-	1	-	-
Papaver rhoeas L.	-	-	-	-	-	-	-	-	1	-	-
Viola sp.	1	1	-	-	-	-	-	-	-	-	-
Lychnis flos-cuculi L.	-	-	-	-	-	-	-	-	-	1	-
Stellaria media (L) Vill.	cf.2	-	-	-	-	-	-	-	-	-	-
Arenaria serpyllifolia L.	-	-	-	-	-	-	-	-	1	1	-
Caryophyllaceae indet.	-	-	-	1	-	-	-	-	13	8	-
Chenopodium album L.	-	-	2	-	-	-	-	-	1	-	-
Chenopodiaceae indet.	3*	3	-	-	-	-	-	-	-	-	-
Linum cf. catharticum L.	-	-	-	-	-	-	-	-	2	-	-
Rubus fruticosus agg.	6	-	-	-	-	1	-	-	-	-	-
Rubus sp.	-	1	-	-	-	-	1	-	1	1	-
Epilobium sp.	-	-	-	-	-	-	1	-	-	-	-
Hydrocotyle vulgaris L.	-	-	-	-	-	-	-	-	-	2	-
c.f. Berula erecta	-	-	-	-	-	4	-	-	-	-	-
Polygonum cf. aviculare agg.	-	-	-	-	-	-	-	-	5	1	-
Polygonum cf. persicaria L.	-	-	-	-	-	-	-	-	17	1	-
Polygonum cf. lapathifolium L.	-	-	-	1	-	-	-	-	-	-	-
Urtica dioica L.	7	2	-	2	128	3	10	-	1	2	-
Alnus glutinosa (L) Gaertner	-	-	-	-	-	6	-	-	-	2	-
Corylus avellana L.	-	-	-	-	-	-	-	-	-	-	1
Solanum dulcamara L.	-	-	-	-	-	-	-	-	-	-	-

Context No.	2	2	2	3	4	6	6	7	7	7	8
Depth (cms.)	0-5	5-10	10-15	-	-	0-10	10-20	20-30	30-40	40-45	-
Mentha sp.	-	-	-	-	-	-	1	-	-	cf.1	-
Stachys sp.	2	6	1	3	2	-	-	-	-	-	-
Labiatae indet.	-	-	-	-	4	-	-	-	1	1	-
Sambucus nigra L.	17	3	2	36	7	-	-	-	-	-	-
Eupatorium cannabinum L.	-	-	-	-	-	-	4	1	-	1	-
Cirsium sp.	-	-	-	-	1	1	-	-	-	-	-
Compositae indet.	-	-	-	-	-	-	1	-	-	-	-
Juncus spp.	-	-	-	-	-	++	+++	+	+	+	-
Lemna sp.	-	-	-	-	-	1	-	-	-	-	-
Typha sp.	-	-	-	-	-	1	1	1	-	1	-
Carex spp.	-	-	-	5	-	18	4	-	48	27	-
Cyperaceae indet.	8	-	2	-	18	-	2	2	-	-	-
Gramineae indet.	-	-	-	-	-	-	-	-	1	5	-
Indeterminate	9	5	1	1	9	4	13	5	9	18	-
Sample weight (g)	1000	1000	1000	1000	1000	200	200	200	200	200	-
% sorted	50	50	100	100	10	100	33	100	100	100	-

Table 1: Fruits, seeds, etc.

* - lacking testas

\+ - present

++ - abundant

+++ - very abundant

	Context No.		2	3(a)	4
	Depth (cm. from surface)		0-5	-	-
'Shade' or 'woodland' snails	Carychium tridentatum (Risso)	(b)	159	45	64
	Carychium sp.		72	38	10
	Acanthinula aculeata (Müller)		11	8	5
	Clausilia bidentata (Ström)		4	-	-
	Clausiliidae indet.		5	1 (c)	1
	Punctum pygmaeum (Draparnaud)		4	2	1
	Discus rotundatus (Müller)		37	12	20
	Euconulus fulvus (Müller)		-	-	1
	Vitrea spp.	(d)	45	24	5
	Retinella spp.		9	11	1
	Oxychilus spp.		3	-	-
	Zonitidae indet.		14	9	12
	Vitrina sp.		2	2	-
'Catholic' molluscs (including P. elegans)	Pomatias elegans (Müller)		7	2	2
	Cochlicopa spp.		26	18	5
	Cepaea nemoralis Linne	(e)	1	-	-
	Cepaea/Arianta sp.		7	-	1
	Trichia hispida (Linne)		25	8	5
	Limacidae indet.		-	-	1
'Open-country' snails	Truncatellina cylindrica (Ferussac)		1	1	-
	Vertigo pygmaea (Draparnaud)	(f)	3	1	1
	Vertigo sp.		4	5	-
	Pupilla muscorum (Linne)		3	-	-
	Vallonia costata (Müller)		115	25	15
	Vallonia cf. pulchella (Müller)		8	-	2
	Vallonia cf. excentrica Sterki		8	-	-
	Vallonia sp.	(g)	76	35	18
'Marsh and freshwater' snails	Succinea sp.		-	1	-
	Planorbis sp.		-	1	-
	Bathyomphalus contortus (Linne)		-	-	1
Others	Unidentified	(g)	29	26	2

Table 2: Land and Freshwater Molluscs.

Notes (a) High proportion of very fragmentary specimens in this depos

(b) No definite specimens of C. minimum were seen.

(c) Whorl fragment.

(d) Includes V. contracta and V. crystallina adults.

(e) Lip fragment.

(f) Apertures. (g) Juvenile/fragmentary/eroded.

Table 3: Charcoal from layer 3

Alnus sp	alder (mature wood)
Corylus sp	hazel (mature wood)
Crataegus-type	hawthorn group (mature wood)
cf. Prunus sp	sloe? (twigs)
Quercus sp	oak (mature wood)

Unidentified diffuse porous (mainly distorted)

Dating

A charcoal sample from layer 3 gave a radiocarbon date of 3720 ± 70bp or 1770bc (HAR-1876).

Discussion

Layer 2, represents an organic buried soil formed on chalky drift. The ground was clearly very trampled and disturbed. 2 included large chalk lumps probably derived from the underlying deposit, along with quantities of occupation debris: heat-shattered flints, charcoal, bone fragments and a scrap of pottery. The majority of the fruits and seeds in the sparse assemblages from the layer are of Chenopodium album, Rubus fruticosus, Urtica dioica and Sambucus nigra, all typical synanthropic plants common in such conditions. This disturbance has disrupted any stratified sequence of macrofossils in the buried soil which might have reflected details of local habitat changes and perhaps given information about the environment of the site before human activity. However the snails from the upper 5cm of 2 are relatively fresh and unweathered in appearance, showing no obvious signs of derivation from earlier deposits, and thus give information about the character of the site at a late stage in its occupation (Fig. 2).

'Shade-requiring' or 'woodland' snails, notably Carychium tridentatum, comprise 53.9% of the total assemblage in the buried soil. This is thought to indicate that clearance around the site was not extensive, and that recolonisation of secondary scrub and ruderal vegetation by shade-requiring snails was occurring. Areas of nettles, brambles and elder would have provided suitable shaded habitats for many molluscan species formerly present in the primary woodland, and once this secondary vegetation was established layers of leaf litter would have accumulated, probably accounting for the high levels of Carychium. Open-country snails make up 32.1% of the assemblage, and of these Vallonia costata is the predominant species. Unlike other open-country species this snail was also present in primary woodland. Consequently it was usually the first 'open-country' mollusc

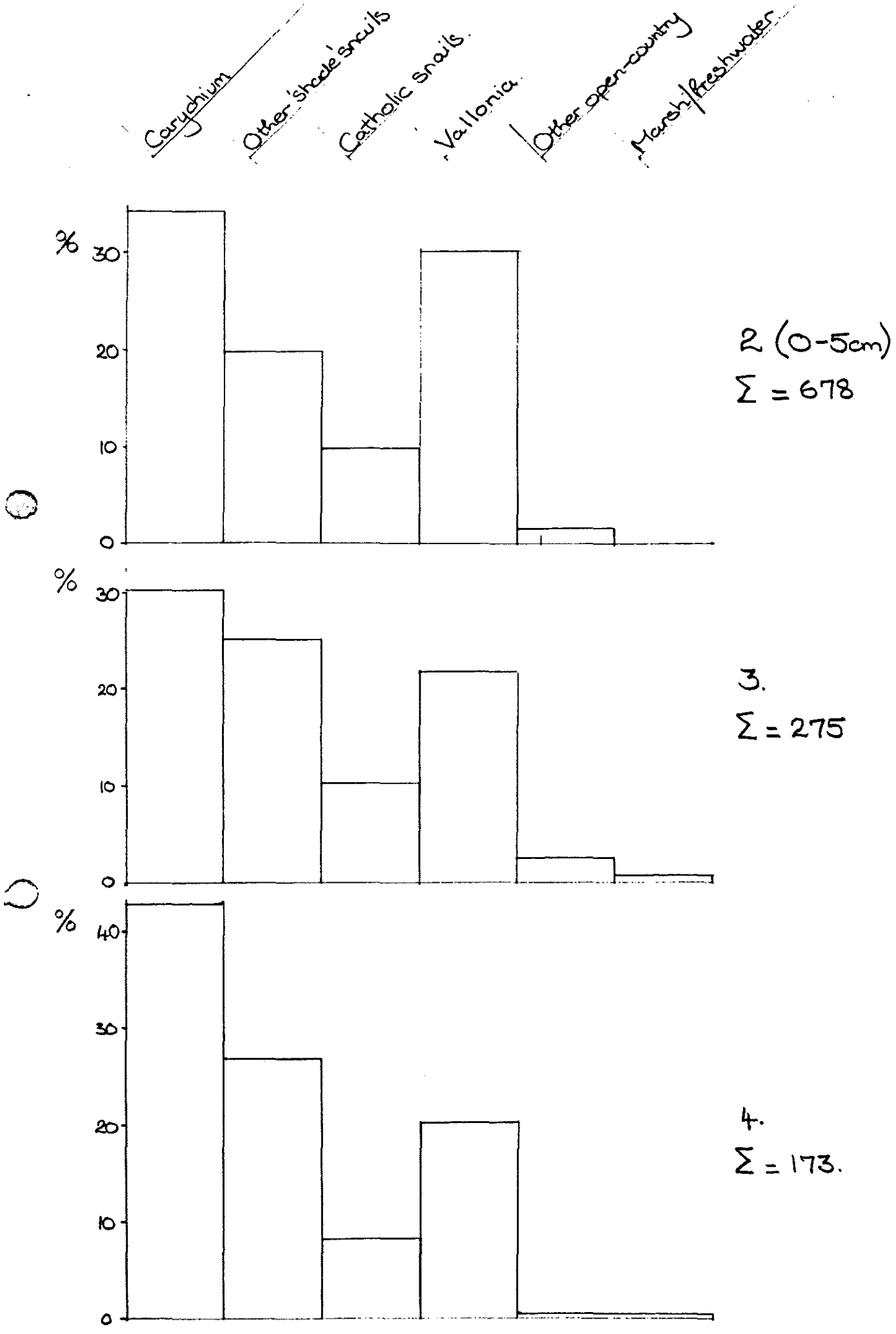


Fig 2 : Summary histograms of snail assemblages from MNL 124, contexts 2, 3 and 4.

to attain large populations in newly cleared land, as in this case. Overall the plant macrofossils and snails from the upper 5cm of the buried soil seem to indicate a relatively small-scale clearance of woodland including areas of disturbed, trampled ground partly overgrown by elder, brambles and other weed plants.

Partly overlying this occupation surface and most of the features cutting through it, was the deposit of burnt flint and charcoal (3), dated to 3720 ± 70bp. The charcoal can be used to give some idea of the composition of local woodland, so long as it is remembered that wood of certain trees may have been preferentially utilised. In this case the woodland included alder, hazel, hawthorn-type, oak and probably sloe. The presence of alder suggests damp conditions in the vicinity of the site. This layer also contained seeds and molluscs, generally unburnt and therefore introduced after the deposition of 3. The assemblages are broadly similar to those of the buried soil.

Small samples were also taken in an attempt to determine the function of the features cutting through 2 and 5. The lower fill of the pit 4 produced similar assemblages of snails and plant remains to the occupation surface 2. The only real differences are the very high frequency of nettle seeds (Urtica dioica) and the occurrence of specimens of marsh or freshwater snails in 4. During excavation it seemed possible that the larger pit, containing layers 6, 7 and 8, and cutting through 3, 2 and 5 might represent a sump or shallow well. However 8 and the lowest 5cm of 7 did not contain significant numbers of seeds from aquatic plants (molluscs had not survived in the fill of this feature), and it may therefore be suggested that this pit did not reach the level of the water table prevailing during the Bronze Age. On the present evidence it seems impossible to suggest any other function for this, or the other, features.

The upper 20cm of 7 and layer 6 were formed naturally after the abandonment of the site, and reflect later changes in the local environment. 7 is fine-textured and seems to represent material washed into the pit. Fen and carr species predominate, with a few aquatics, though plants from drier habitats are also present. 6 is a layer of brushwood peat with fruits and seeds of alder, scrub plants, wetland and terrestrial herbs, Juncus spp, Typha, Carex spp and a few aquatics. Both 6 and 7 indicate wetter conditions than existed during the occupation of the site.

Local habitat changes may be summarised as follows:

8. Arable, probably following use of land for pasture.
7. Drainage.
6. Generally wetter conditions; widespread peat development.
5. Abandonment of site; natural filling of large pit (6 and 7); conditions at least locally wetter; brushwood peat formation.
4. Excavation of pits and gulleys; deposition of charcoal and burnt flint layer.
3. Development of scrub and ruderal vegetation in parts of clearing.
2. Small Bronze Age clearance. Conditions locally fairly dry, though alder charcoal and shells of Succinea and Bathyomphalus contortus suggest wetter areas nearby.
1. Woodland.

2. MNL 137

The site was first detected as an ill-defined scatter of heat-shattered flint and charcoal, very approximately 12 x 8m strewn over the ploughed field surface. A small trench (2 x 1m) was dug across the apparent centre of the deposit, exposing a thin layer of charcoal with burnt flints, resting on a calcareous marl or soft tufa, sandy towards the base of the section, and resting in turn on a loose gravel. The section was as follows:

Sediments

1. 0 - 35cm — A_{op} black friable humified peat with traces of sand; heat-shattered flints and lumps of calcareous marl brought up by ploughing; occasional angular flints up to 14mm; derived chalk brachiopods; wood; arable weed seeds; land and freshwater molluscs; boundary disturbed by ploughing.
2. 35 - 40cm (maximum surviving thickness). Layer of charcoal and burnt flints, shattered by heat (fragments up to 40mm, cortex curvature suggests these were river gravel pebbles); uncarbonised intrusive weed seeds, probably intrusive molluscs; upper surface grooved by ploughing, lower boundary sharp.
3. 40 - 70cm — Calcareous marl or soft tufa. Upper 5cm; Greyish-brown (10 YR 5/2.5) with brownish yellow mottles (10 YR 5.5/6); plastic with a trace of sand; flints,

some heat-shattered, up to 15mm (probably pressed into this layer from 2); decayed wood fragments; impressions of plant material; land molluscs; small mammal bone; narrow boundary.
Lower 25cm; very pale brown (10 YR 7.5/3) and brownish yellow (10 YR 6/8); sand content increases with depth; plastic at top, friable at base; content of angular flint pebbles (9mm maximum at top, 19mm maximum at base) increases with depth; decayed wood fragments, impressions of plant material, molluscs; ostracods and Characeae oogonia in lower 15cm; narrow boundary.

4. 70 - 80cm — Light yellowish brown (10 YR 6/4) loose highly calcareous sand with cemented patches; angular flint and chalk pebbles up to 25mm and derived chalk fossils; some decayed plant material; freshwater molluscs, ostracods and Characeae oogonia; narrow boundary.

5. 80 - 92cm — Similar highly calcareous sand, with a larger proportion of cemented patches; less plant material; freshwater molluscs, ostracods and Characeae oogonia; sharp boundary.

6. 92 - 105cm (base of trench). Coarse loose slightly calcareous brownish yellow (10 YR 6/6) sand and gravel, with small cemented patches; angular and rounded flint pebbles up to 40mm; freshwater molluscs.

A transect of auger holes at 10m intervals was made across the field for a distance of 20m to the north-west and 30m to the south-east. In all bores shallow peat soils overlay calcareous marl deposits at depths of 38 - 59cm from the present field surface. Impenetrable sandy horizons were encountered between 90 and 120cm from the surface.

Contamination

The layer of burnt flint and charcoal (2) had been almost destroyed by ploughing. Only 5cm survived, and this residue had ploughmarks scoured across it. By careful sampling of the undisturbed deposit between the ploughmarks gross contamination has been avoided, although the sample of this material did contain a few intrusive arable weed seeds and fragments of wheat rachis with some straw. The few molluscs from this layer are also thought to be intrusive. The lower layers were undisturbed at the point of sampling.

Sampling and recovery

A column of samples was taken through the undisturbed deposits. Charcoal was extracted from a 2kg sample from layer 2 by water flotation, collecting the flot in a 250 micron mesh sieve. 1kg samples from layers 3, 4, 5 and 6 were disaggregated and washed through a 0.5mm mesh sieve for the recovery of molluscs, small mammal bone, ostracods and a proportion of the Characeae oogonia.

Biological remains

(1) Charcoal. Fragments from layer 2 larger than 0.5cm were identified. The taxa present, in order of abundance, were as follows:

Fraxinus sp	(ash)
Quercus sp	(oak)
Corylus sp	(hazel)
Corylus/Alnus sp	(hazel or alder)

(2) Characeae oogonia. These can range from 0.2mm - 0.9mm in length; only specimens >0.5mm were extracted.
This partial recovery serves, however, to establish the relative frequencies of oogonia at different depths in the section. The numbers of specimens recovered are noted in Table 4.

(3) Small mammal bone. The sample from the upper 5cm of the marl produced two teeth (identified by John Goldsmith, Norwich Castle Museum):

Cheek tooth: Clethrionomys glareolus (Schreber) (bank vole)
Juvenile carnassial tooth: Unidentified small carnivore.

(4) Ostracods. The frequencies of ostracod valves are given in Table 4.

(5) Molluscs. The molluscs recovered are listed in Table 4 and the results summarised in Fig. 3.

Dating

Charcoal from layer 2 was dated to 3650 ± 100bp, or 1700bc (HAR-2690).

Discussion

The basal deposit (6) was a river gravel containing small numbers of molluscs and plant remains indicating freshwater conditions. The date of the gravel is not known.

The calcareous sediments overlying the gravel appear to have been deposited

	Context No.		3	3	3	3	3	3	4	5	6
	Depth (cm) from surface		40-45	45-50	50-55	55-60	60-65	65-70	70-80	80-92	92-105+
'Shade' or	Carychium tridentatum (Risso)	(1)	44	4	1	-	-	-	-	-	-
'woodland'	Carychium sp	(2)	34	6	2	-	-	1	-	-	-
snails	Vertigo substriata (Jeffreys)		1	-	1	-	-	-	-	-	-
	Acanthinula aculeata (Müller)		5	-	1	-	-	-	-	-	-
	Clausilia bidentata (Ström)	(3)	1	-	-	-	-	-	-	-	-
	Clausiliidae indet	(4)	9	1	1	-	-	-	-	-	-
	Punctum pygmaeum (Draparnaud)		-	-	1	-	-	-	-	-	-
	Discus rotundatus (Müller)		4	-	-	(1)	-	-	-	-	-
	Euconulus fulvus (Müller)		-	-	-	-	-	1	-	-	-
	Vitrea sp		3	-	-	-	-	-	-	-	-
	Zonitidae indet		9	1	-	-	-	2	-	-	-
'Catholic' molluscs	Pomatias elegans (Müller)		3	(1)	-	-	-	-	-	-	-
(inc. P. elegans)	Cochlicopa spp		2	-	-	-	-	-	-	-	-
	Cepaea/Arianta	(2)	4	(1)	-	-	-	-	-	-	-
	Trichia hispida (Linné)		4	-	-	-	-	-	-	-	-
Open-country	Vallonia costata (Müller)		4	1	1	-	-	2	-	-	-
snails	Vallonia pulchella (Müller)		-	-	4	-	3	cf.1	-	-	-
	Vallonia sp	(2)	5	1	2	3	-	2	1	-	-
Freshwater gastropods	Bithynia tentaculata (Linné)	(5)	-	-	-	1	-	-	1	2	-
	Lymnaea sp	(2)	-	-	-	-	-	-	1	13	-
	Armiger crista (Linné)		-	-	-	-	-	-	-	3	-
Freshwater bivalves	Sphaeriidae	(6)	-	-	1	2	-	1	25	30	3
	Unidentified molluscs	(2)	9	1	2	-	-	1	-	2	2
Miscellaneous	Ostracods		-	-	-	1	-	2	4	26	-
macrofossils	Characeae oogonia (>0.5mm)		-	-	-	12	17	23	101	218	7

Table 4: Molluscs etc. from the marl and underlying sediments

Notes: (1) Apparently all C. tridentatum; no definite specimens of T. minimum observed.
(2) Fragmentary/Juvenile. (3) Aperture. (4) Eroded - colour + sculpturing lost.
(5) Opercula. (6) Mainly Pisidium; a few possible fragmentary Sphaerium.

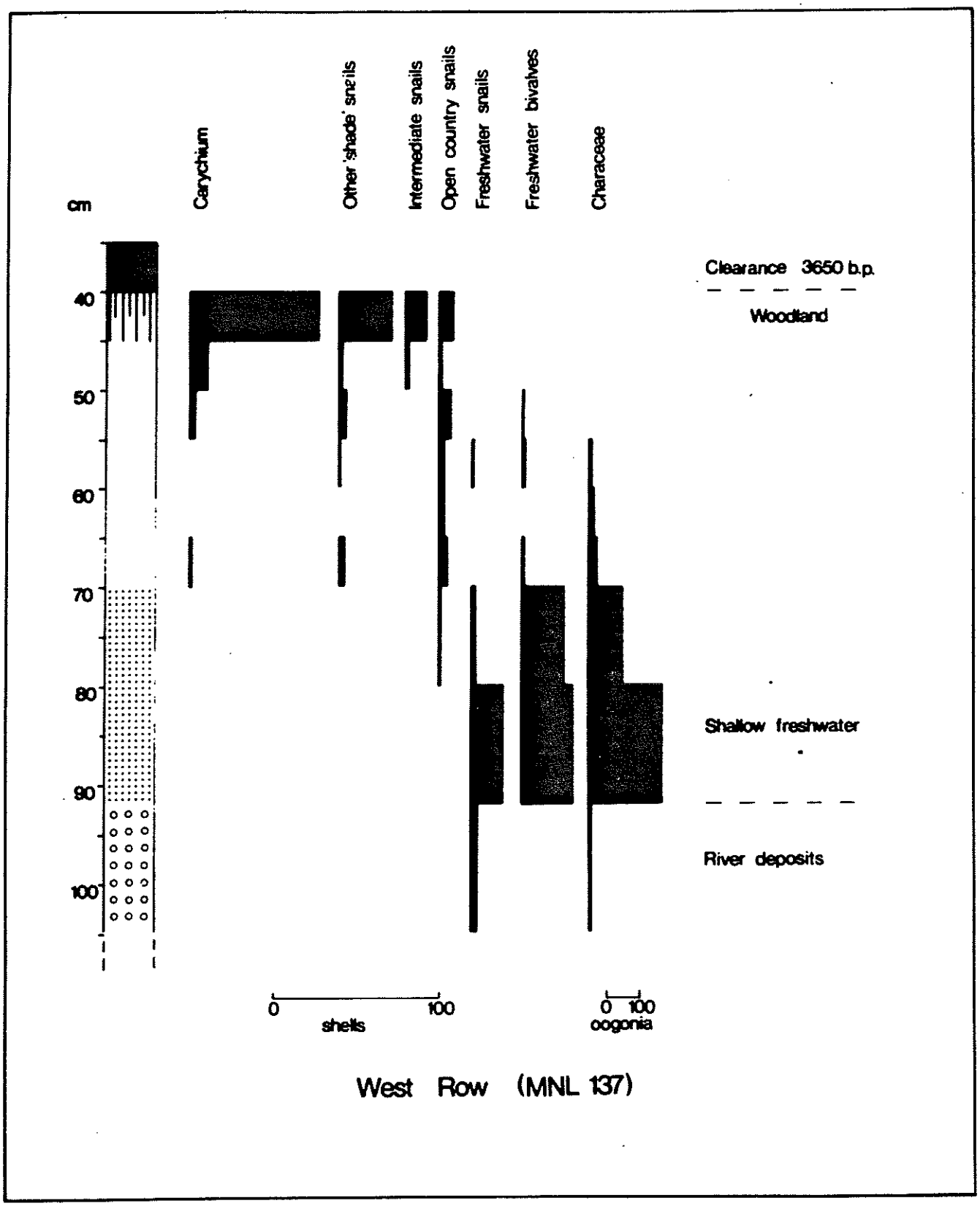

cm
Carychium
Other shade snails
Intermediate snails
Open country snails
Freshwater snails
Freshwater bivalves
Characeae
40
50
60
70
80
90
100
Clearance 3650 b.p.
Woodland
Shallow freshwater
River deposits
0
100
shells
0 100
oogonia
West Row (MNL 137)

Fig. 3

continuously. There is no direct dating evidence for the beginning of their deposition, but they are assumed to be all postglacial. The highly calcareous sands (4 and 5) contained many oogonia of stoneworts (Characeae) and freshwater molluscs. These macrofossils suggest that the sediments were formed in still or slowly-flowing water. The lower part of the calcareous marl (3) was also slightly sandy, but the proportion of sand decreased in the upper part of the deposit. The molluscs and other macrofossils from the marl indicate increasingly dry conditions as sedimentation continued, and the development of scrub and woodland. No Characeae oogonia and ostracods and only one freshwater mollusc were found in samples above 55cm depth. The uppermost 5cm of greyish-brown, slightly organic, marl seems to represent an immature rendzina-like soil forming under woodland, marl deposition having practically ceased. The molluscs from this upper horizon are mainly woodland species (Evans 1972), though there are a few open-country snails (Vallonia) and specimens of Pomatias elegans. This deposit also produced a tooth of the bank vole, normally found in woodland and scrub. In summary layers 5, 4 and 3 appear to represent a continouous sere from an open freshwater environment to woodland.

Continued development of the vegetation and the immature soil was abruptly truncated by human activity in the area. Layer 2, consisting of charcoal and burnt flint is interpreted as a clearance horizon; the woodland of the immediate area was felled and burnt. The charcoal from layer 2 indicates that in its final stage this woodland included ash and oak, with hazel and possibly some alder. The precise nature of activity represented by layer 2 is unclear, though obviously it involved the burning of locally-derived timber and the heat-shattering of river gravel pebbles.

In a final phase peat developed over the Bronze Age horizon. Unfortunately this upper 35cm of peat was humified and completely disturbed by modern ploughing. It included terrestrial molluscs (Vallonia, Cepaea) and aquatic species (Pisidium, Lymnaea, Bithynia and Planorbis) concentrated in the surviving peat by a winnowing process as peat wastage progressed. The original thickness of peat present before drainage in this area is unknown. The local sequence may be summarised as follows:

(8) Arable, presumably following use of land for pasture.
(7) Drainage.
(6) Peat development.
(5) Bronze Age clearance.
(4) Woodland development.

(3) Swamp, becoming shaded.
(2) Still or slowly-flowing water.
(1) River gravel.

3. MNL 204

This site on Swales Fen was excavated more fully (by E.A. Martin) than MNL 124 and MNL 137. It was associated with deep deposits of fen and wood peat, overlying greyish-brown stony sand on chalk marl. Plans and sections of feature 0001, a large pit with central wood-lined circular 'trough', are given in Figs. 4-6. Samples from the main layers in this feature were examined.

The deposits

0002	Very dark brown slightly sandy wood peat; very rare small fragments of heat-shattered flint and charcoal.
0003	Black slightly sandy wood peat; fragments of heat-shattered flint; charcoal abundant; mammal bones.
0004	Black sandy peat; heat-shattered flints and charcoal common; pieces of partly charred roundwood.
0005	Black sandy peat; heat-shattered flints and charcoal common.
0006	Grey coarse organic sand; rounded and subangular flint pebbles common; some heat-shattered flint; twigs.

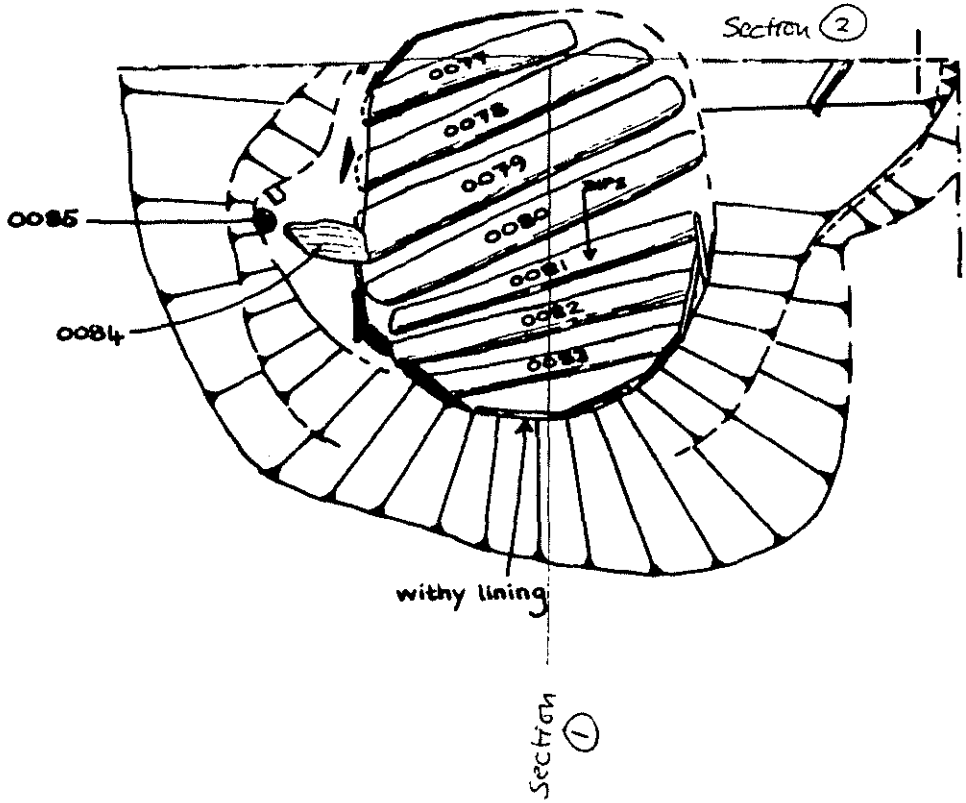
Sampling and retrieval

0.5kg samples from the above deposits were disaggregated, and their organic fractions separated from mineral material (heat-shattered flint etc) by washover. The organic fractions were graded in a sieve bank, with a minimum mesh size of 0.5mm, before shorting wet under a binocular microscope at low power.

Wood samples were collected from 0001, but, unfortunately, not from its wattle lining. Bone fragments were collected by hand during excavation (and await identification) and small fragments of burnt and unburnt bone were present in the sieved mineral residues of 0003 and 0004.

Identifications of fruits, seeds and other plant macrofossils are listed in Table 5, and wood identifications in Table 6. The macrofossil results are summarised in Fig. 7, and cross-sections of the wood samples are illustrated in Fig. 8.

MNL 204



FEATURE 0001
UNDER PLAN
SCALE 1:20

Fig. 4

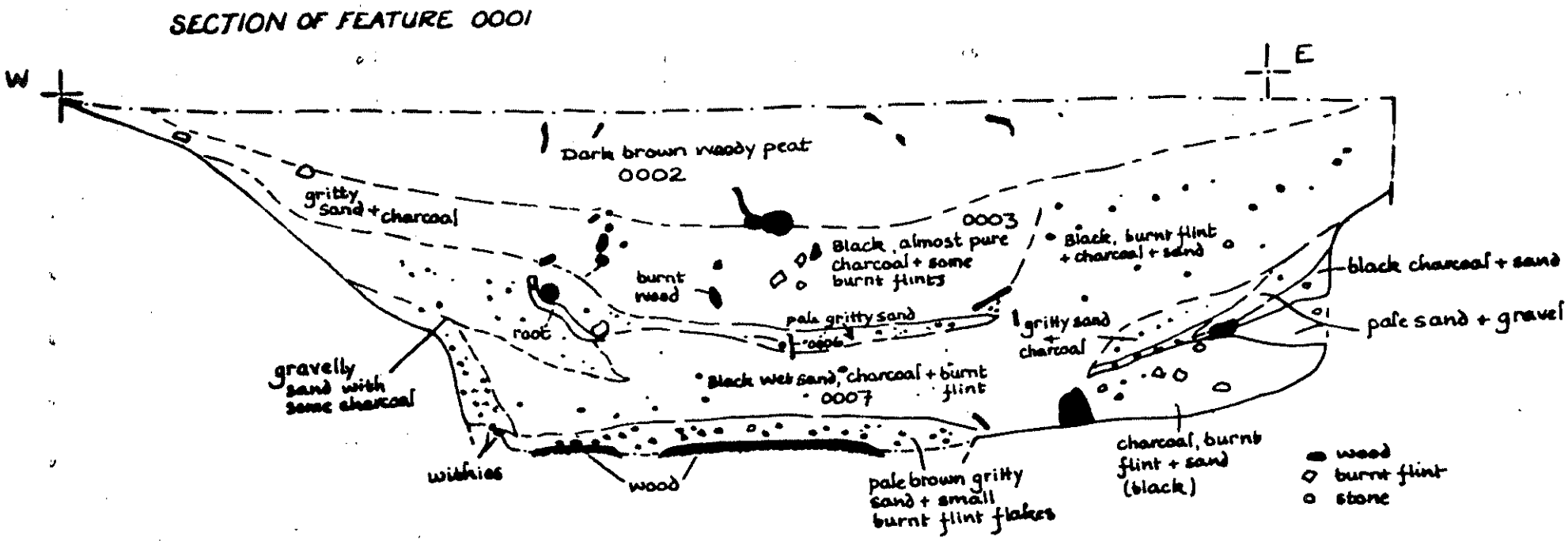

SECTION OF FEATURE 0001
W
E
Dark brown woody peat
0002
gritty sand + charcoal
0003
Black, almost pure charcoal + some burnt flints
Black, burnt flint + charcoal + sand
black charcoal + sand
pale sand + gravel
burnt reed
root
pale gritty sand
0006
gritty sand + charcoal
gravelly sand with some charcoal
Black wet sand, charcoal + burnt flint
0007
withies
wood
pale brown gritty sand + small burnt flint flakes
charcoal, burnt flint + sand (black)
wood
burnt flint
stone

Fig. 5

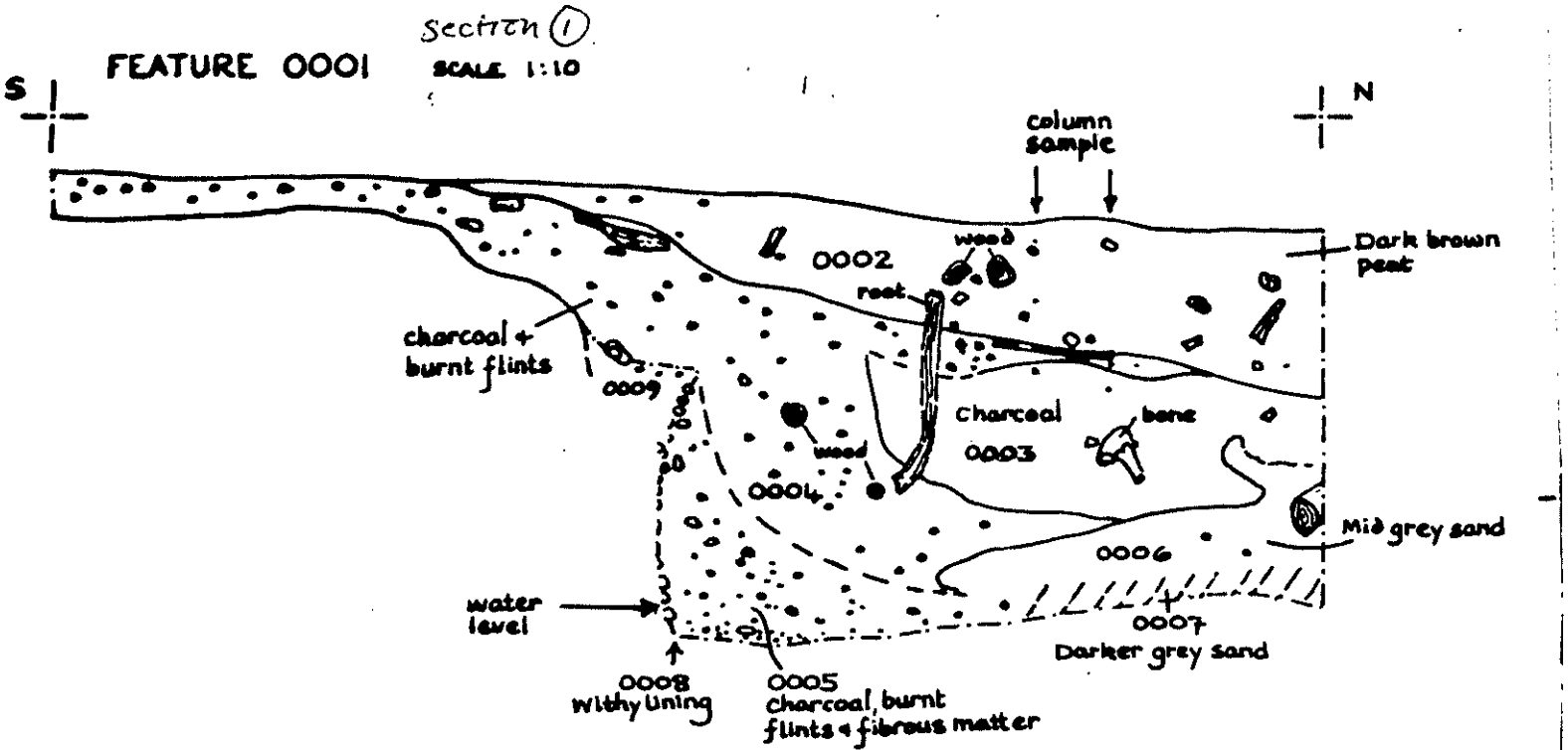

Section (1)
FEATURE 0001
SCALE 1:10
S
N
column sample
0002
wood
root
Dark brown peat
charcoal + burnt flints
0009
charcoal
0003
bone
wood
0004
Mid grey sand
0006
water level
0007
Darker grey sand
0008
Withy lining
0005
charcoal, burnt flints + fibrous matter

Fig. 6

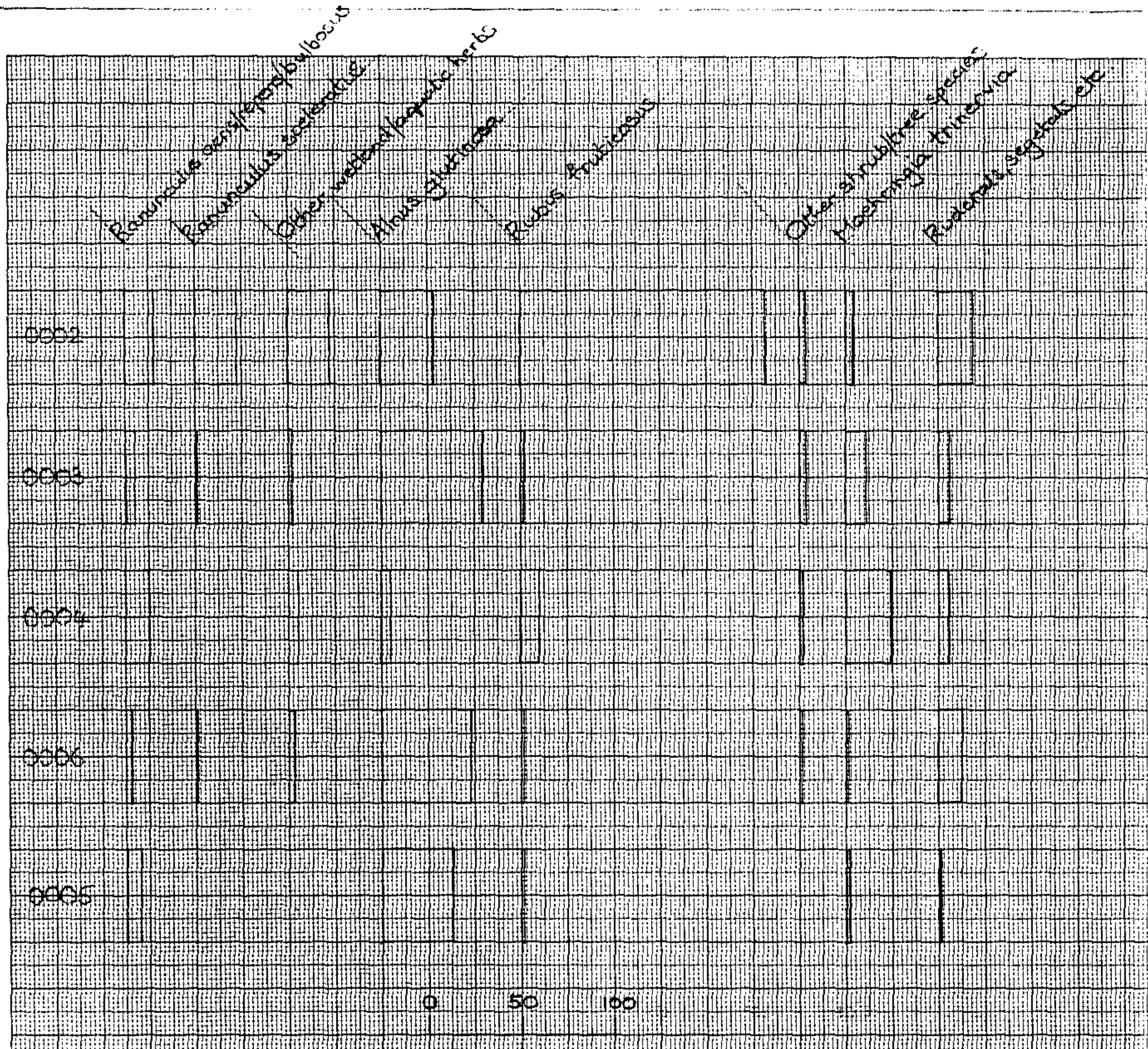
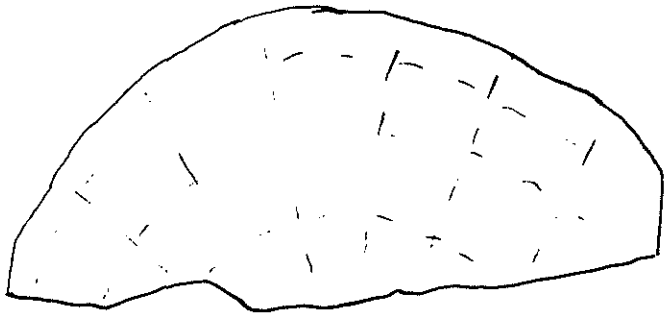
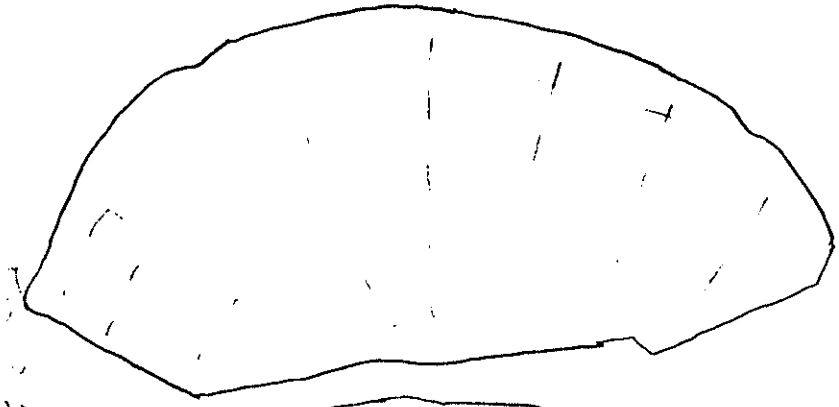


Fig 7 Plant macrofossils from feature 0001 (HAL 204)

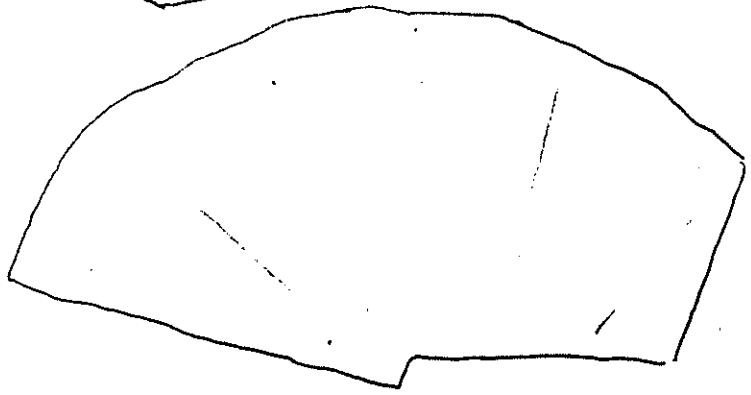
Unidentified and incompletely identified macrofossils are omitted



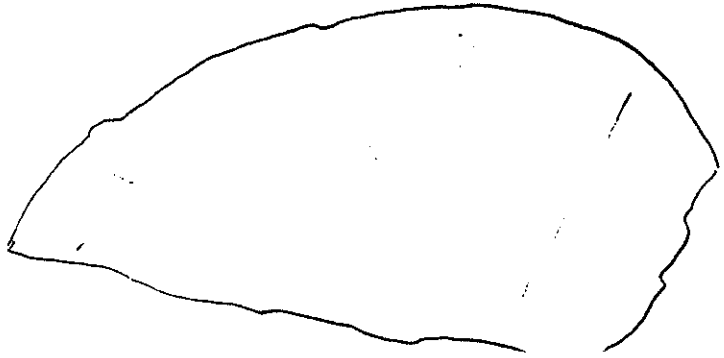
0077



0078



0079

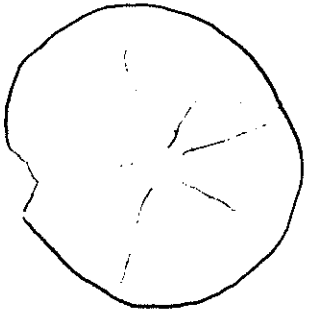


0080

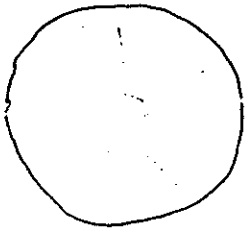
0081

0082

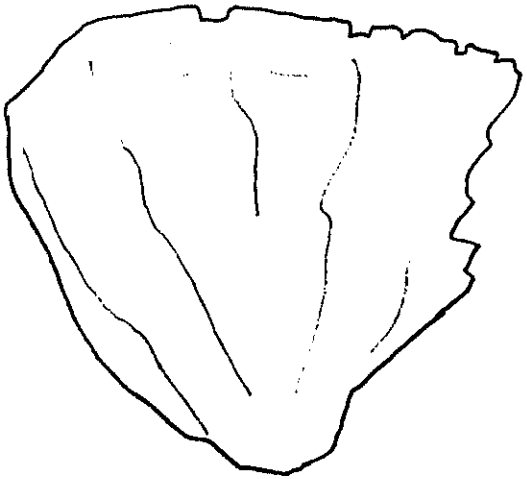
0083 – degraded fragments.



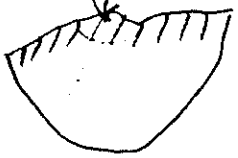
0073



0085

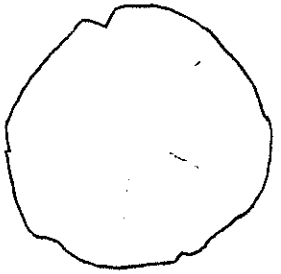


unnumbered.



charred.

0004.



5cm.

Mosses	+	+	+	+	++
Filicales (pinnules)	-	+	-	+	+
Insects	+	+	+	+	+

Table 5: Fruits, seeds and other macrofossils from Feature 0001, MNL 204

	0002	0003	0004	0005	0006
Ranunculus acris/repens/bulbosus	15	5	12	8	3
Ranunculus sceleratus L	22	1	-	-	1
Thalictrum/Clematis sp	-	1	-	-	-
Lychnis flos-cuculi L	4cf	-	-	-	-
Stellaria cf. graminea L	-	-	-	2	-
Moehringia trinervia (L) Clairv	4	11	24	2	1
Caryophyllaceae indet	2	2	3	3	2
Chenopodium album L	4	2	-	-	4
Rubus fruticosus agg	132	2	10	1	-
Potentilla sp	-	1	-	1	1
Prunus spinosa L	-	1	-	-	-
Crataegus monogyna Jacq	-	-	-	-	1
Epilobium sp	1	-	-	-	-
Thelycrania sanguinea (L) Fourr	1	1	1	-	1
Umbelliferae indet	1	-	-	-	-
Polygonum spp	6	-	1	1	4
Rumex sp(p)	6	3	2	-	2
Urtica dioica L	-	-	2	-	1
cf. Humulus lupulus L	1frag	-	-	-	-
Alnus glutinosa (L) Gaertner (female 'cones')	-	3	2	3	2
" (bracts)	1	2	-	2	4
" (fruits)	28	54	3+2cf	38	48
Corylus avellana L (nutshell frags)	+	-	+	+	-
Mentha arvensis/aquatica	3	-	1	-	-
Lycopus europaeus L	1	-	-	-	-
Stachys sp	-	-	-	-	1
Galeopsis tetrahit/speciosa	1	-	-	-	-
Sambucus nigra L	2	1	1	-	-
Eupatorium cannabinum L	1	-	-	-	-
Cirsium/Carduus sp	-	1	1	-	-
Lapsana communis L	1	-	-	-	1
Compositae indet	2	-	-	-	-
Iris pseudacorus L (frags)	+	-	-	-	-
Lemna sp	-	-	1	-	-
Sparganium sp	4	-	-	-	-
Carex sp(p)	7	2	3	-	2
Hordeum sp (carbonised grain)	-	-	-	1	-
Indeterminate seeds etc	17	8	3	7	8
" leaf frags	-	+	-	+	+
" buds	+	+	+	-	-
" thorns	+	-	-	-	-
" catkin frag	-	-	-	-	+

0004	Alnus sp (alder)
	Corylus sp (hazel)
0073	Corylus sp
0077	Alnus sp
0078	"
0079	"
0080	"
0081	"
0082	"
0083	Indeterminate (decayed)
0085	Corylus sp

Unnumbered specimen. Indet (desiccated)

Table 6: MNL 204 Wood identifications

Dating

A sample of charcoal from 0005 has been submitted for radiocarbon dating.

Discussion

The 'seed' diagram (Fig. 7) summarises the changing frequencies of macrofossils in layers 0002-0006 of feature 0001. The more abundant taxa are plotted individually, but less common taxa have been grouped together. The group of 'other wetland/aquatic taxa' comprises Lychnis flos-cuculi, Epilobium sp, Mentha arvensis/aquatica, Lycopus europaeus, Eupatorium cannabinum, Iris pseudacorus, Lemna sp, Sparganium sp. and Carex spp. 'Other shrub/tree species' include Prunus spinosa, Crataegus monogyna, Thelycrania sanguinea and Sambucus nigra: Corylus nutshell fragments are not readily quantifiable and hence do not appear in the diagram. The final group of ruderals and segetals consists of Chenopodium album, Polygonum spp, Rumex spp, Urtica dioica, Galeopsis tetrahit/speciosa, Cirsium/Carduus sp. and Lapsana communis.

The changing macrofossil frequencies reflect local vegetational change in the last stages of activity at the site, whilst 0001 became infilled.

Fruits of alder (Alnus glutinosa), usually associated with female 'cones' of this tree are common in most feature fills, indicating the proximity of alder woodland in low-lying poorly-drained situations around the site. Of the wood samples identified alder is the predominant species.

On better-drained calcareous soils in the vicinity grew sloe, hawthorn, dogwood, hazel, elder and brambles. Seeds of the woodland herb Moehringia trinervia (three-veined sandwort) occurred in all five samples, and this species would have grown as part of the ground layer of vegetation below scrub and woodland on the drier soils. Grassland plants, notably buttercups (Ranunculus acris/repens/bulbosus), and various weeds grew on open ground immediately around the site. The sample from 0005 produced a single carbonised barley grain (Hordeum sp).

The topmost fill, 0002, was a natural fen peat formed in the hollow left after the feature had been largely infilled and the site abandoned. Abundant fruitstones of Rubus fruticosus indicate that the area became overgrown with brambles, whilst a wetland/aquatic flora including Ranunculus sceleratus developed in low-lying areas.

General conclusions

Limited macrofossil investigations were undertaken at these three sites with the objectives of establishing their dates, local environmental conditions and, if possible, their functions. MNL 124 was dated to 3720 ± 70bp or 1770bc, and MNL 137 to 3650 ± 100bp or 1700bc; the date for MNL 204 is awaited. The first two sites, however, are clearly contemporary with the earlier phases of activity at the Bronze Age settlement site of MNL 165. At that site, a partly-charred *in situ* root system of oak was dated to 3650 ± 100bp or 1700bc (HAR-5637); this is probably the date of site clearance for the main phase of settlement.

At all three 'burnt flint' sites there are indications from mollusca and/or plant macrofossils that the sites were located in clearings within woodland: at MNL 124 local woodland included alder, hazel, hawthorn-type, oak and *Prunus* sp; at MNL 137 ash, oak, hazel and hazel or alder; and at MNL 204 alder, sloe, hawthorn, dogwood and hazel. Activity was sufficiently prolonged for weed and scrub vegetation to develop.

There was no clear evidence for the functions of sites MNL 124 and MNL 137. The presence of bone and a single charred barley grain at MNL 204 seem to indicate consumption of food at this site, though whether this was its primary function cannot be established.

References

Evans, J.G., (1972) Land snails in Archaeology London

MacFadyen, W.A., (1970) Foraminifera from Roddon Sults at Welney Washes, Norfolk, in Salway, P., et al. The Fenland in Roman Times RGS Res. Ser. No. 5 London.