AML Report 4565 P. Murphy SITE 1646

Site:	Ivy Chimneys, Witham
County:	Essex
Code:	IC 79-83
Director:	R. Turner
Type of contexts:	Ditches, pits, well, depressions, pond
Period:	Iron Age - Roman
Geology:	Chalky Till
Type of material:	Mollusca, plant macrofossils

This report includes results from the 1983 season and replaces A.M. Lab Report No. 3795.

Ivy Chimneys, Witham, Essex: Land and freshwater molluscs.

Mollusc shells were common in almost all deposits excavated at this site. Apart from the upper sediments in the main Roman pond, which were decalcified, the fills of the archaeological features consisted principally of re-worked Chalky Boulder Clay and were calcareous. The most informative contexts for reconstructing conditions at the site were the major features - the ponds and depressions: shells from these contexts appear to be derived from a relatively extensive catchment. Assemblages from ditches and pits are thought to provide more limited and local information on the stages of in-filling of each individual feature. Molluscs from the larger features will therefore be considered in the first part of this report in some detail, and assemblages from selected ditches will be discussed in outline subsequently.

Details of contexts sampled, extraction methods, and full species lists are given [on microfiche]. Nomenclature follows Kerney (1975) and Kerney and Cameron (1979). Ecological information is taken from Boycott (1936), Evans (1972), Kerney and Cameron (1979) and Sparks (1961).

The depressions and ponds.

The contexts discussed here are the Iron Age depression (4709, 4771, 4791), the re-cut of this feature (4658, 4773, 4792) the late Roman pond (1752, 1770, 1821, 1863, 2026) and two other hollows or depressions of Roman date (94, 95 and 3278). Full descriptions of sediments and deposits filling these features are given [on microfiche], but the fills in general consisted of dry greyish-brown to pale brown calcareous clay loam with prominent brownish and ochreous mottles and coarse angular blocky peds, more or less stony, with chalk pebbles and flints. Deposits differing markedly from this will be noted below. The results of mollusc analysis are summarised in Fig . This diagram is schematic, largely due to limitations of space, but also because juvenile and fragmentary shells of some closely related taxa have not been specifically identified.

Shell assemblages from layers 4709, 4771 and 4791 filling the first stage of the Iron Age depression (Phases 2-3) consist largely of terrestrial species. Shells of 'catholic' aquatic species (Valvata sp, Bithynia sp, Bathyomphalus contortus, Gyraulus albus, Sphaeriidae) are extremely rare and the specimens present are fragmentary, suggesting that they were derived from aquatic habitats elsewhere. Marsh and 'freshwater slum' snails including Lymnaea truncatula, Succineidae, Vertigo antivertigo and Vertigo angustior account for up to 11% of the assemblages

from layers in this feature, and this is thought to indicate the presence of some shallow, probably impersistent,pools and puddles with surrounding areas of marshy ground. Two other species commonly found in marshes, though not confined to them, are present: Carychium minimum and Vallonia pulchella. The remaining terrestrial species consist of a mixture of shade-requiring taxa (Carychium tridentatum, Lauria cylindracea, Ena obscura, Punctum pygmaeum, Discus rotundatus, Nesovitrea hammonis, Aegopinella sp, Euconulus fulvus and Clausiliidae) with open-country species (Vertigo pygmaea, Pupilla muscorum, Vallonia costata, Vallonia excentrica and Helicella itala) and catholic or intermediate species. Trichia spp. are particularly common, comprising up to 44% of total molluscs. Adults of T. hispida, T. plebeia and T. striolata are present, but most juveniles were not specifically identifiable. This poses problems in palaeoecological interpretation, though all three species could have occurred in tall damp grassland somewhat disturbed by human activity.

In summary the molluscs from this feature indicate that the depression included wet marshy ground, partly shaded. A fruitstone of Rubus fruticosus from 4709 suggests that local vegetation included some bramble scrub, but conditions were not generally suitable for the survival of plant macrofossils. There is no very marked change in the composition of the snail assemblages, though 4791 and the pit 4949 beneath it, at the base of the depression, contained fairly high frequencies of open-country terrestrial snails whereas in the topmost fills sampled these species were less common. Progressive slight shading-over of the habitat probably by tall grass and patchy scrub seems to be indicated. Bone fragments, oyster and mussel shell fragments, charcoal and charred cereals from the samples show that there was some refuse disposal in the feature, and the more stony fills (4709, 4791) appear to have been dumped artificially, but the fills also appear to include a component of in-washed sediment.

The lowest fill of the recut of this depression (4792) is of Late Iron Age date (Phase 2). It includes a fairly high proportion of shade-requiring terrestrial snails (48%) and also produced abundant seeds of elder (Sambucus nigra), apparently indicating some development of elder scrub in the vicinity. As in the first stage of the depression 'catholic' aquatic snails are very rare though marsh and 'freshwater slum' species are fairly common (up to 13%). Trichia spp. are again abundant. The upper fills (4773, 4658) are of later date (Phase 5-7; Late 3rd-5th century). The topmost fill, 4658, was still a clay-based deposit but it was less stony than the lower fills, and it included some small tufaceous concretions with impressions of plant stems and leaves. It is probable that these concretions formed in shallow swampy pools partly as a result of evaporation

of lime-rich water, though there may also have been some biogenic carbonate precipitation (Evans 1972, 299). The mollusc assemblage from this layer includes rare shells of catholic aquatic snails, rare valves of Sphaeriidae, and shells of some marsh snails, principally Succineidae with a few specimens of Lymnaea truncatula, Vertigo angustior and Vertigo antivertigo. Compared to the lower fills it contains fewer shells of shade-requiring terrestrial species (8-11%) and more shells of open-country species (29-31%). This deposit therefore seems to have accumulated in damp, fairly open conditions.

Despite some evidence for variations in the degree of shading, in part, apparently, by elder and bramble scrub, conditions in this depression seem to have remained consistently damp. However the feature certainly did not contain an extensive area of standing water: at most there could have been small stagnant pools, which were probably subject to seasonal drying out.

The assemblages from the 3rd-4th century pond are quite different in character, consisting almost entirely of aquatic species. Only two contexts produced useful assemblages: 2026, a wedge of shelly detritus up to 6cm thick, representing an accumulation of shells at the water's edge, and 1863 (68-72cm) a calcareous stony deposit at the base of the pond. The most abundant species in both contexts is Armiger crista (33-53%). Other aquatic snails include Valvata piscinalis, Bithynia sp, Lymnaea palustris, Lymnaea stagnalis, Lymnaea peregra, Gyraulus albus, Bathyomphalus cortortus, Hippeutis complanatus and Acroloxus lacustris. The bivalves include Sphaerium corneum, Sphaerium rivicola and Pisidium spp. This range of species clearly indicates that there was a slow but consistent flow of water, maintaining well-oxygenated conditions. 'Freshwater slum' species are absent and there is thus no reason to suppose that the pond was subject to seasonal drying. Freshwater species make up 98% of the assemblage from 1863, near the centre of the pond, but the marginal deposit 2026 includes a proportion of terrestrial species. Even in this deposit, however, marsh snails are rare. This reflects the fact that the pond had a wooden revetment on three sides, producing an unnaturally sharp distinction between aquatic and terrestrial habitats. The upper sediments in this pond were largely decalcified and the few shells which they contained could be intrusive, having been introduced via soil cracks and earthworm burrows. No information is therefore available on the subsequent environmental history of this feature.

The fills of the 2nd-4th century depression 3278, however, contained mollusc shells throughout. The assemblages from the base of this feature resemble those in the pond. Below 15cm depth aquatic molluscs make up 62-66% of the total and

since Bithynia tentaculata and Valvata piscinalis are present it seems that there was initially a through-flow of well-oxygenated water. Charophyte remains are also present. Above this, freshwater snails decline steadily in frequency and the proportion of terrestrial snails, particularly shade-loving species, increases. At 5-10cm depth shade-loving taxa, notably Discus rotundatus reach a peak of 53% but above this decline slightly. This sequence is thought to indicate initial deposition of sediment in flowing water, but as the system of ditches became choked there was a change to a quieter sedimentary environment and ultimately to the development of drier and more shaded conditions, probably scrub and tall herbs, subject to periodic flooding. The presence of marine mollusc shells, bone fragments and charred plant remains indicates some refuse dumping whilst sediment accumulated.

The 2nd-4th century depression adjacent to the pond (94, 95) has not been included in Fig for two reasons. Firstly, it included large quantities of tile, bone, marine mollusc shell, charcoal and carbonised cereals and its fills clearly include much dumped material. Secondly the mollusc assemblages recovered are sparse and consist principally of fragments of Pisidium valves which have not been identified specifically.

The ditches.

Samples were taken from several Iron Age and Roman ditches mainly in order to establish whether their lower fills were deposited in flowing water. Results from four ditches will be discussed here. Notes on others which produced only sparse mollusc assemblages are given [on microfiche].

1. 4728: Iron Age ditch (Phase 2) adjacent to depression.

Two samples from the lowest 20cm of this feature at 86-106cm depth were examined. The lower sample at 95-106cm contained few shells, but a larger assemblage was obtained from 86-95cm. Lymnaea truncatula is common in this ditch fill, accounting for 45% of total shells. By contrast, in the depression this species never exceeds 8.5% is generally present at lower frequencies. It thus appears that the ditch was markedly wetter than the depression, though aquatic snails requiring well-oxygenated bodies of permanent freshwater are absent. From this it seems that the ditch held stagnant or very slow-flowing water and probably dried out periodically. The remainder of the assemblage consists of a mixture of marsh and terrestrial snails with Trichia spp making up 21% of the total.

2. 4703: Early Roman ditch (Phase 3) adjacent to depression.

A single sample from the base of this ditch at 50-61cm was examined. Terrestrial snails predominate: 'shade-loving' taxa make up 29% of the assemblage, 'open-country' taxa 22% and Trichia spp. account for 33%. Lymnaea truncatula and Succineidae are rare (4% and 6% respectively). This ditch was apparently drier than 4728.

3. 1061/1130: Roman inlet ditch for pond.

A central column sample though this shallow feature was examined. The lower fills produced very few shells, almost entirely of terrestrial species apart from two small fragments of Sphaeriidae valves. In the topmost 10cm shade-loving taxa (Carychium tridentatum, Clausilia bidentata, Discus rotundatus, Zonitidae) make up just under 60% of the total assemblage. The fill of this ditch is obviously related to a period after the ditch itself had ceased to function as part of the drainage system of the site, when it was becoming overgrown with tall herbs or scrub.

4. 1613/1634: Roman overflow ditch from pond.

Unlike 1061, freshwater molluscs are present throughout the central column sample from this ditch. These include Valvata piscinalis, Bithynia tentaculata, Bithynia leachi, Lymnaea truncatula, Lymnaea peregra, Planorbis planorbis and Anisus cf. leucostoma. Terrestrial species, mainly Vallonia spp. and Trichia spp, are also present, but snails characteristic of shaded conditions are not common. It appears that this ditch continued to function as a drain whilst it became infilled with sediment.

Marine molluscs.

Fragments of marine mollusc shell were present in many samples (Table). As most of these are non-hinge and non-apical fragments, direct counting is impossible, though the frequencies with which fragments of different species occur in these samples are thought to be a reasonably reliable indicator of their relative importance. Fragments of fossil shells from Mesozoic and Tertiary deposits, glacially transported, were also present in some samples.

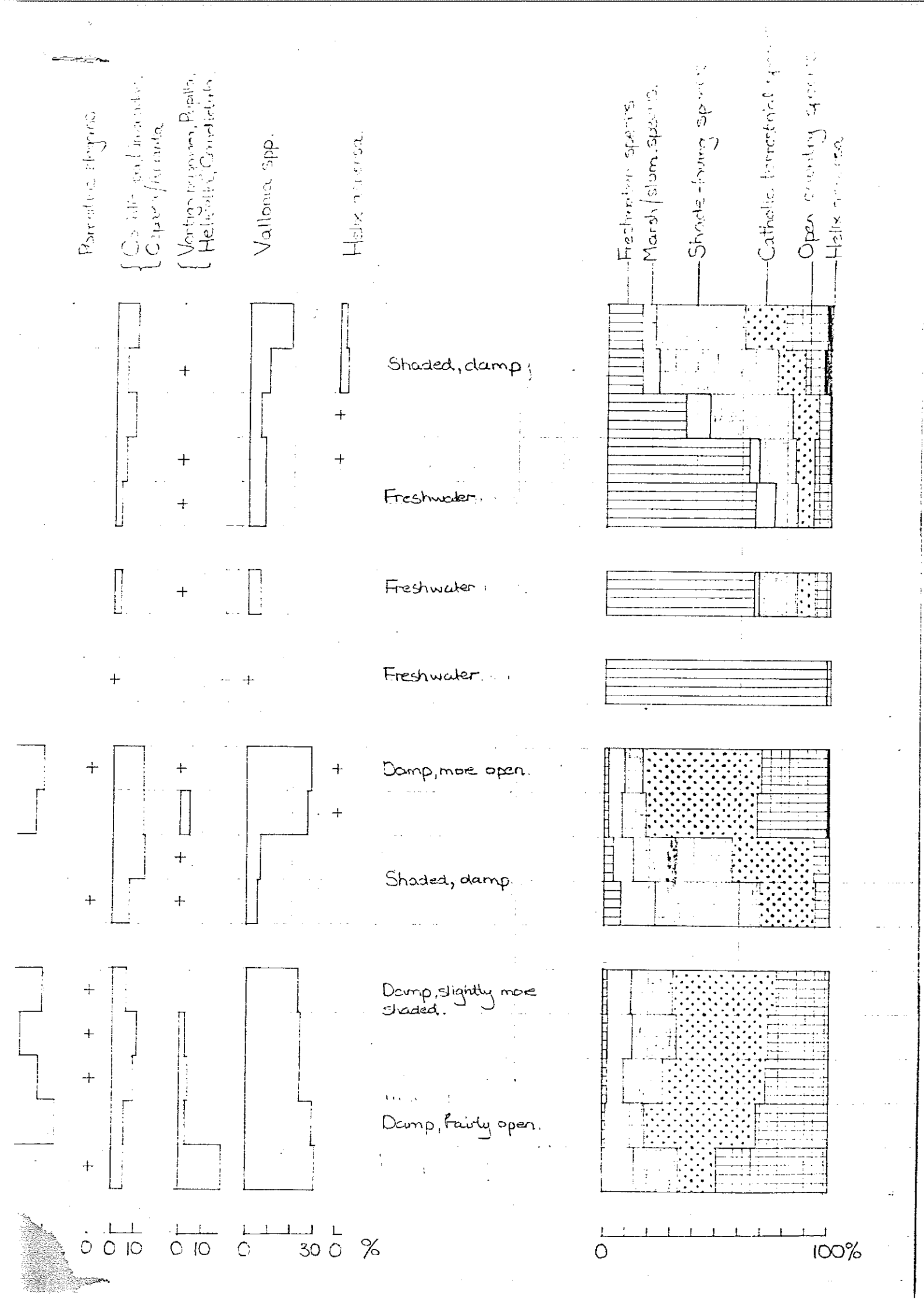
	Number of samples in which present	
	Iron Age	Roman
Ostrea edulis L.	4	28
Mytilus edulis L.	3	25
Cerastoderma sp.	1	2
c.f. Buccinum undatum L.	-	1
Hydrobia ulvae (Pennant)	-	1

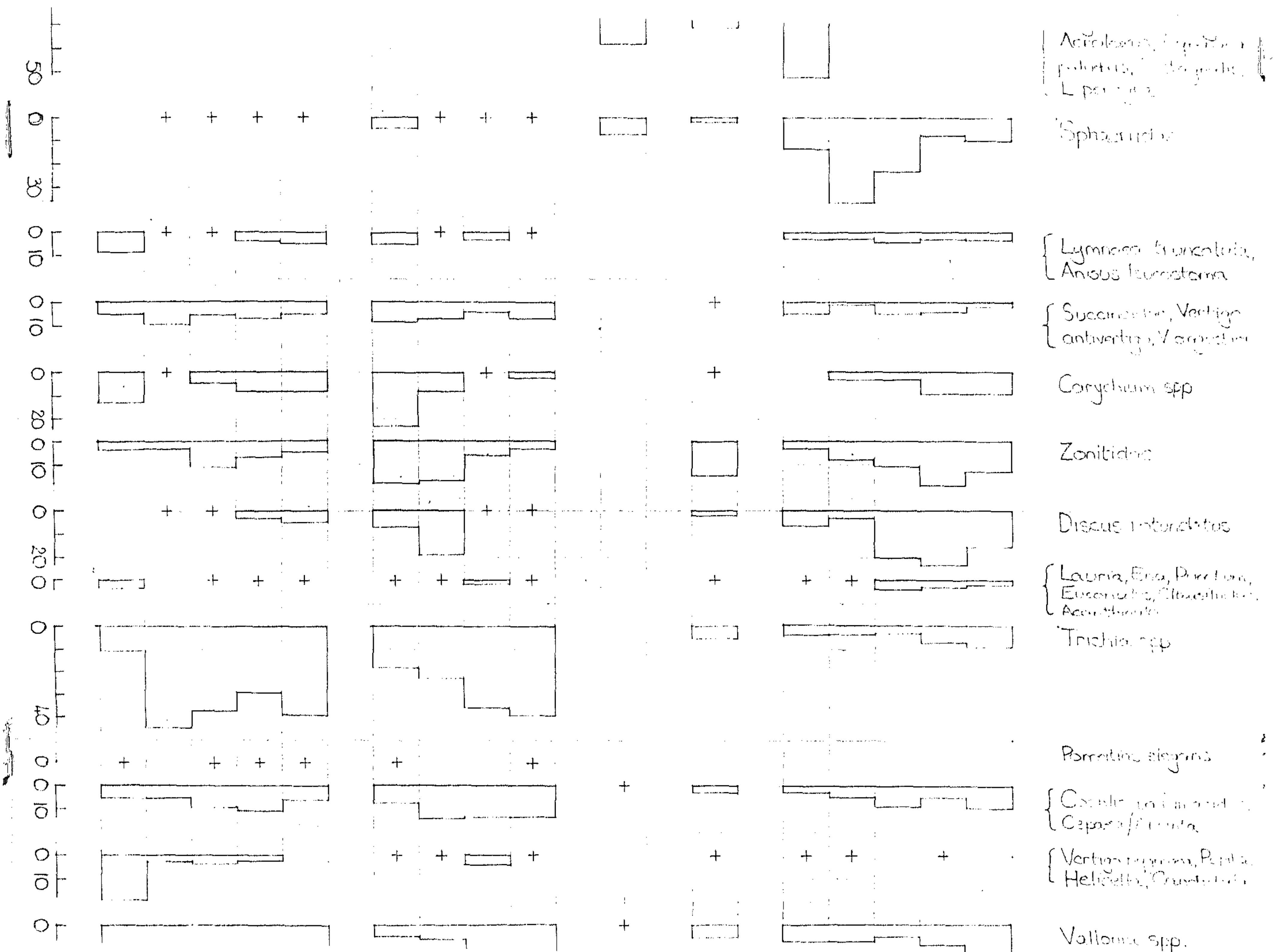
Table : Marine molluscs (fragments)

Oysters and mussels clearly predominate. These shellfish were presumably shipped up-river from the Blackwater estuary. The badly abraded shell of Hydrobia ulvae (from 4080) was probably accidentally imported with the edible shellfish.

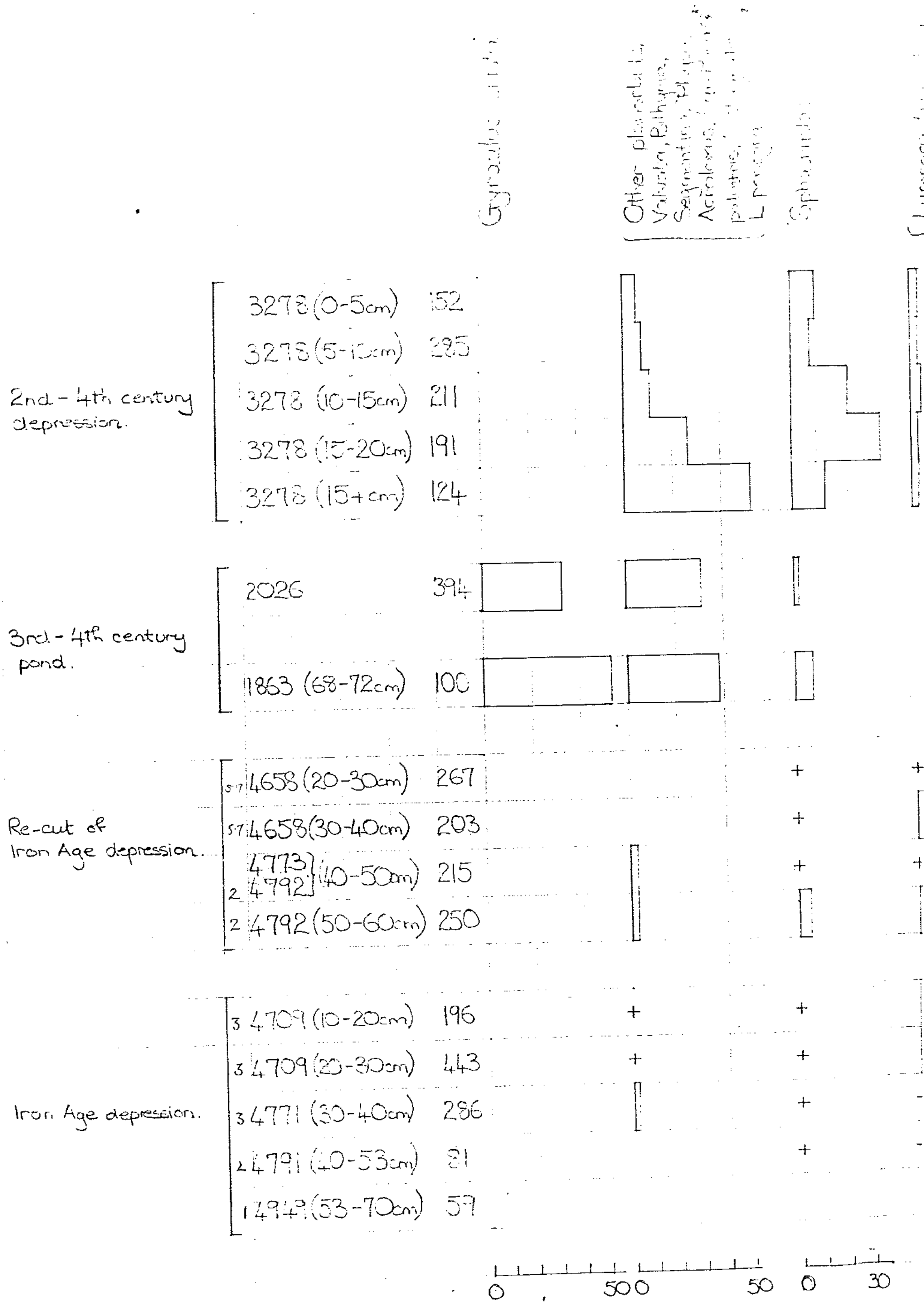
Table : Summary of results from the main ponds and depressions.

Shells of Cecilioides acicula are excluded from this diagram and were not included in calculations of percentage frequencies. Opercula of Bithynia were included only where no apices were present. Percentage frequencies for Sphaeriidae were calculated from the numbers of valves divided by two.


Freshwater spp.
Marsh/slum. spp.
Shade-loving spp.
Catholic herbland spp.
Open country spp.
Helix aspersa
Shaded, damp
Freshwater
Freshwater
Freshwater
Damp, more open
Shaded, damp
Damp, slightly more shaded
Damp, fairly open
0 0 10 0 10 0 30 0 %
0 100%



Lymnaea truncatula,
Anisus leucostoma
Carychium spp
Zonitidae
Discus rotundatus
Trichia spp
Pomatias elegans
Vallonia spp.


Other planorbids
2nd - 4th century depression.
3278 (0-5cm) 152
3278 (5-10cm) 285
3278 (10-15cm) 211
3278 (15-20cm) 191
3278 (15+cm) 124
3rd - 4th century pond.
2026 394
1863 (68-72cm) 100
Re-cut of Iron Age depression.
4658 (20-30cm) 267
4658 (30-40cm) 203
4773 4792 (40-50cm) 215
2 4792 (50-60cm) 250
Iron Age depression.
3 4709 (10-20cm) 196
3 4709 (20-30cm) 443
3 4771 (30-40cm) 286
4791 (40-53cm) 81
4949 (53-70cm) 57
0
50
0
50
0
30

Ivy Chimneys, Witham, Essex: Plant macrofossils.

Plant macrofossils were preserved in three main ways at this site. The lower fills of the Iron Age well (5056, 5059) contained plant material preserved in wet conditions. Carbonised plant remains, mainly charcoal and cereals were present in almost all samples examined. Samples from the ponds and depressions included some calcified plant material and impressions, produced partly by biogenic concentration of carbonates and partly by evaporation of lime-rich water. Details of methods used for the recovery of plant remains and full species lists are given in Tables - [microfiche].

1. The Iron Age well.

The seed assemblages from this feature are dominated by common weeds. Urtica dioica is the most abundant species, but fruits or seeds of Papaver cf. dubium, Papaver argemone, Stellaria media, Chenopodium album, Atriplex sp, Malva sylvestris, Aethusa cynapium, Rumex sp, Urtica urens, Hyoscyamus niger, cf. Ballota nigra, Plantago major and Cirsium/Carduus sp. also occur. There are a few seeds of grassland and wetland species (Ranunculus acris/repens/bulbosus, Ranunculus subg. Batrachium, Apium cf. nodiflorum). Scrub plants and trees are also represented at low frequencies (Rubus fruticosus, Sambucus nigra, Betula sp). Overall the assemblages indicate that whilst the well filling accumulated, local vegetation consisted predominantly of nettles and other weeds, with some wet grassy areas. Some bramble and elder scrub was apparently present nearby and birch was growing in the general area. This type of seed assemblage very commonly occurs in the vicinity of settlement sites.

2. Carbonised plant remains.

Charcoal was present in almost all samples examined, but has not been identified. Other carbonised plant remains consist of cereals, weed seeds, hazel nutshell fragments and fragments of stems and tubers.

Most Iron Age samples contained some remains of cereals, but usually only small numbers of grains and spikelet fragments. However, in 5059, a layer within the well, there was a concentration of carbonised cereal remains, including grains, 'sprouts' from germinated grains, rachis internodes, spikelet forks, glume bases and culm fragments. This material seems to consist largely of crop-cleaning waste. The two main species represented are the glume wheats spelt (Triticum spelta) and emmer (Triticum dicoccum). Other layers in this well contained

further wheat remains including carbonised awn fragments. 5059 also produced a single fragmentary rachis internode of barley (Hordeum sp). Carbonised weed seeds were relatively common in this layer: species identified include Ranunculus cf. flammula, Montia fontana subsp. chondrosperma, Medicago lupulina, Trifolium sp, Vicia/Lathyrus sp, Rumex sp, Plantago lanceolata, Tripleurospermum maritimum, Avena cf. fatua and Bromus sp. Anthemis cotula, a characteristic weed of cereal crops on heavy alkaline clay soils has not been identified from Iron Age contexts at this site, although it has been reported from contemporary deposits elsewhere (Jones 1978, 105). Here the only mayweed species is Tripleurospermum maritimum. This gives some grounds for suggesting that the arable fields of the settlement were not on clay soils in the immediate vicinity of the site but may have been on terrace gravels in the river valley. The few seeds of plants characteristic of damp soils (R. flammula, M. fontana subsp. chondrosperma) could indicate that cultivation extended onto poorly-drained land at the edge of the river floodplain.

Samples from Roman contexts contained fairly similar assemblages of carbonised cereals to those of the Iron Age. Again, there were small quantities of grains and spikelet fragments in most samples. The depression 94/95 contained a concentration of charred cereals, predominantly wheat grains and glume bases of Triticum spelta. Triticum dicoccum is tentatively identified from a few damaged glume bases, but no remains of barley were recovered. Weed species identified were Anthemis cotula, Avena sp and Bromus sp. Interpretation of this rather sparse material is difficult, but it is possible that use of incompletely-threshed cereal ears for fuel or kindling could be indicated.

3. Calcified plant remains.

A single oogonium of Chara sp.was recovered from the lowest fill of the Roman depression 3278. The rarity of charophyte remains in the pond and ditch sediments is surprising, though it is possible that aquatic vegetation was regularly cleaned out when these features were in use and that when the system became defunct the growth of phytoplankton inhibited growth of charophytes by shading.

The upper fill of the re-cut Iron Age depression, 4658, produced some small tufaceous concretions with impressions of stems and leaves. These, however, were only partial impressions and have not been identified.

References

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Ivy Chimneys, Witham, Essex: Fiche/Archive text.

Mollusca

a) Methods.

Column samples, subdivided at 5 or 10cm intervals as appropriate were taken from the archaeological features. Single samples were also taken from further deposit of particular interest, such as the marginal layer of shelly detritus (2026) at the edge of the pond or from the lower fills of ditches where complete sampling was thought unnecessary.

1-2kg sub-samples were examined in the laboratory. The clay loam sediments at this site were unusually difficult to disaggregate. In some cases thorough air-drying followed by immersion in hot water was sufficient, but several samples required treatment with hydrogen peroxide, and even after this some soil aggregates remained. After disaggregation the samples were wet-sieved in a 0.5mm mesh. The residues were dried and sorted under a binocular microscope at low power.

Identification also presented difficulties. Commonly at terrestrial sites the presence of some species can be discounted on ecological grounds. At this site the assemblages were very mixed and this criterion could not be applied safely. Consequently separation of juvenile and fragmentary shells from closely related taxa (e.g. Trichia hispida and Trichia plebeia) has not been attempted. In general specific identifications within 'difficult' groups have not been made unless useful palaeoecological information could be gained by so doing. Mr Philip Cambridge and Mr Gordon Osborn kindly identified some problematical specimens, notably in the families Sphaeriidae and Zonitidae and the genus Trichia.

b) Deposits.

Descriptions of the main deposits sampled are given here.

(i) Iron Age depression.

The fills of the first phase of this depression were as follows:

0-30cm	4709	Pale brown clay loam (10YR 6/3; dry) with common distinct brownish yellow mottles; stony with small-medium flints and chalk pebbles; coarse angular blocky peds; common fine pores and fissures; fibrous and fleshy roots; charcoal flecks.
30-40cm	4771	Pale brown/light brownish grey clay loam (10YR 6/2; 6/3; dry), with brownish-yellow mottles; slightly stony, small flints and chalk pebbles; angular blocky

		peds; fine pores and fissures; rare roots; charcoal flecks.
40-53cm	4791	Light grey/light brownish grey clay loam (10YR 7/2; 6/2; dry) with brownish-yellow mottles; stony, small flints and chalk pebbles; angular blocky peds; fine pores and fissures; rare roots; charcoal flecks.

At the point of sampling a small pit, 4949, underlay 4791. The fill of this feature was light grey clay loam (10YR 7/2; dry) with brownish yellow mottles including few flints but with abundant small chalk pebbles.

The recut of this depression included the following deposits:

0-40cm	4658	Pale brown/light brownish-grey clay loam (10YR 6/2; 6/3; dry) with brownish-yellow and strong brown mottles; slightly stony, small flints and chalk pebbles; coarse angular blocky peds; fine pores and fissures; tufaceous concretions; some fibrous and fleshy roots; charcoal flecks.
40-50cm	4773	Similar to 4658, but including angular flint and quartzite gravel, giving a 'gritty' texture.
50-60cm	4792	Similar fill but with higher proportion of small-medium flints and chalk pebbles.

The fills are thus all essentially similar, consisting of a matrix of re-worked till, gleyed due to fluctuating groundwater levels and with varying amounts of stones.

(ii) The Roman pond.

At the point of sampling, the sediments filling the pond were as follows:

0-45cm	1752	Dark greyish-brown clay loam with medium distinct strong brown mottles; slightly stony, rare small flints and very rare chalk fragments; coarse angular blocky peds; common fine pores and fissures; common fibrous and fleshy roots; narrow boundary.
45-60cm	1770	Very dark greyish brown clay loam with medium distinct brownish mottles; slightly stony, rare small flints and very rare small chalk fragments; medium-fine angular blocky peds; common fine pores and fissures; fibrous and fleshy roots.
60-68cm	1821	Similar matrix to 1770 but with large tile fragments; sharp boundary.

68-80cm	1863	Very pale brown clay loam with common distinct yellowish-brown to strong brown mottles; very stony, abundant small-medium chalk fragments.

1752 was a more weathered form of 1770; the distinction between these two horizons did not reflect a depositional change. 1863 was the disturbed till surface. 1863 was calcareous (vigorous effervescence with dilute HCl), but 1752 and 1770 were largely decalcified (weak effervescence).

Closer to the edge of the pond, sediments equivalent to 1770 contained a layer of shelly detritus (2026) some 6cm thick. Given its marginal situation this seems to represent accumulation of shells at the water's edge over a considerable period.

Context No.	4709	4709	4771	4791	4949	4949
Depth (cm)	10-20	20-30	30-40	40-53	53-60	60-70
Sphaeriidae (valves)	5	11	1	1	-	-
Valvata sp		-	1	-	-	-
Pomatias elegans (Müller)	(+)	(+)	(+)	-	(+)	-
Bithynia sp (operculum)	-	1	-	-	-	-
Carychium spp (a)	16	35	13	1	2	6
Lymnaea truncatula (Müller)	9	18	3	1	4	1
Bathyomphalus contortus (L)	1	3	-	-	-	-
Gyraulus albus (Müller)	-	-	(+)	-	-	-
Planorbidae indet	-	-	3	-	-	-
Succineidae	4	7	8	8	-	2
Cochlicopa spp	10	44	13	3	-	1
Vertigo antivertigo (Draparnaud)	1	11	6	-	-	-
Vertigo pygmaea (Draparnaud)	-	5	2	-	-	-
Vertigo angustior Jeffreys	-	-	1	-	1	-
Vertigo sp	6	18	4	-	-	-
Pupilla muscorum (L)	-	-	5	(+)	3+cf2	6
Lauria cylindracea (da Costa)	-	2	1	-	-	-
Vallonia costata (Müller)	25	26	21	9	-	2
Vallonia pulchella (Müller)	4	10	8	3	1	1
Vallonia excentrica Sterki	1	2	3	2	1	2
Vallonia sp	15	67	37	10	2	9
Ena obscura (Müller)	2	-	-	-	-	-
Punctum pygmaeum (Draparnaud)	-	2	2	-	-	-
Discus rotundatus (Müller)	9	17	2	1	-	-
Nesovitrea hammonis (Ström)	3	4	3	-	1	-
Aegopinella sp	1	7	6	-	-	-
Zonitidae indet. (b)	5	18	21	3	-	1
Limacidae	2	6	10	-	-	1
Euconulus fulvus (Müller)	-	-	-	-	-	1
Cecilioides acicula (Müller)	14	7	1	1	-	1
Clausiliidae (c)	(+)	3	1	-	-	1
Helicella itala (L)	-	-	-	1	-	-
Trichia spp (d)	77	130	106	36	3	3
Cepaea/Arianta	-	-	3	1	1	-
Ostracods	-	+	+	-	-	-
Sample weight (kg)	2.0	2.0	2.0	2.0	1.8	2.0

Table : Mollusca from the first phase of the Iron Age depression (4709, 4771, 4791) and underlying pit (4949).

Notes (a) Includes adult C. minimum and C. tridentatum.

(b) Small apical fragments and abraded shells lacking surface detail.

(c) Abraded apices mostly.

(d) Includes adult T. hispida, T. plebeia and T. striolata.

Context No.	4658	4658	4773/4792	4792
Depth (cm)	20-30	30-40	40-50	50-60
Sphaeriidae (valves)	6	2	6	22
Pomatias elegans (Müller)	(+)	-	-	(+)
Bithynia sp (operculum)	-	-	1	-
Carychium spp (a)	7	3	17	57
Lymnaea truncatula (Müller)	2	7	3	3
Bathyomphalus contortus (L)	-	-	3	4
Planorbis cf. planorbis (L)	-	-	2	4
Anisus leucostoma (Millet)	-	-	-	9
Succineidae	14	3	13	17
Cochlicopa spp	19	14	12	11
Vertigo antivertigo (Draparnaud)	3	4	1	1
Vertigo pygmaea (Draparnaud)	2	5	-	-
Vertigo angustior Jeffreys	1	2	1	-
Vertigo sp	3	3	1	3
Pupilla muscorum (L)	1	-	-	1
Lauria cylindracea (da Costa)	-	-	-	2
Vallonia costata (Müller)	11	9	4	8
Vallonia pulchella (Müller)	12	6	-	-
Vallonia excentrica Sterki	4	2	-	-
Vallonia sp	47	38	9	6
Punctum pygmaeum (Draparnaud)	3	3	2	-
Discus rotundatus (Müller)	1	3	40	18
Vitrea crystallina (Müller)	1	-	-	-
Vitrea sp	-	2	1	1
Aegopinella sp	-	1	-	5
Nesovitrea hammonis (Ström)	2	6	-	4
Zonitidae indet (b)	7	3	34	34
Limacidae	16	12	9	4
Euconulus fulvus (Müller)	-	1	-	-
Cecilioides acicula (Müller)	21	8	4	-
Clausiliidae (c)	-	-	-	-
Candidula sp	-	1	-	-
'Helicella' sp (d)	-	-	1	-
Trichia spp (e)	105	73	49	44
Cepaea/Arianta	1	1	9	2
Helix aspersa (Müller)	(+)	1	-	-
Ostracods	-	-	-	+
Sample weight (kg)	1.5	1.8	2.0	1.8

Table : Mollusca from the re-cut of the Iron Age depression (4658, 4773, 4792).

Notes: (a) Includes adult C. minimum and C. tridentatum.
(b) Small apical fragments and abraded shells lacking surface detail.
(c) Badly abraded apices.
(d) Abraded - no surface detail.
(e) Includes adult T. hispida, T. plebeia and T. striolata.

Context No.	2026	1752	1752	1752/1770	1770	1821	1863	1863	1863
Depth (cm)	-	20-30	30-40	40-50	50-60	60-68	68-72	72-75	75-80
Sample weight (kg)	2	2	2	2	2	2	2.2	2	1
Valvata piscinalis (Müller)	2	-	-	-	-	-	-	-	-
Bithynia sp. (opercula)	16	-	-	-	-	-	-	-	-
Pomatias elegans (Müller)	-	-	-	-	+	-	-	-	-
Carychium tridentatum (Risso)	1	-	-	-	-	-	-	-	-
Carychium sp.	2	-	-	-	-	-	-	-	-
Lymnaea spp. (a)	50	-	-	-	-	+	21	2	-
Gyraulus albus (Müller)	18	-	-	-	-	-	6	-	-
Armiger crista (L)	130	-	-	-	-	1	53	3	1
Bathyomphalus contortus (L)	2	-	-	-	-	-	-	-	-
Planorbis sp.	11	-	-	-	-	-	10	1	-
Hippeutis complanatus (L)	10	-	-	-	-	-	-	1	-
Acroloxus lacustris (L)	14	-	-	-	-	-	1	-	-
Succinea c.f. putris (L)	5	-	-	-	-	-	-	-	-
Cochlicopa sp.	4	-	-	-	-	-	-	-	-
Vertigo cf. pygmaea (Drap.)	1	-	-	-	-	-	-	-	-
Vertigo sp.	3	-	-	-	-	-	-	-	-
Vallonia costata (Müller)	12	-	-	-	-	-	-	-	-
Vallonia sp.	10	1	-	-	-	-	1	-	-
Clausilia bidentata (Ström)	1	-	-	-	-	-	-	-	-
Cecilioides acicula (Müller)	2	-	-	-	-	-	-	-	-
Cepaea/Arianta sp.	2	-	-	-	-	-	-	-	-
Trichia spp. (b)	19	-	-	4	-	-	-	-	-
Helicella itala (L)	-	-	-	1	-	-	-	-	-
Helicidae indet.	-	1	+	-	-	-	1	-	-
Discus rotundatus (Müller)	9	-	-	-	-	-	-	-	-

Euconulus fulvus (Müller)		1	-	-	-	-	-	-	-	-
Vitrea crystallina (Müller)		2	-	-	-	-	-	-	-	-
Zonitidae	(c)	56	-	-	-	-	-	-	-	-
Limacidae	(plates)	6	-	-	-	-	-	-	-	-
Sphaeriidae (valves)	(d)	14	-	-	-	-	-	14	2	-
Indeterminate		10	-	-	-	-	-	-	-	-

Notes

(a) Mainly juveniles; in 2026 includes L.palustris, L. stagnalis, L. peregra.

(b) Mainly juveniles; adult T.striolata and T.plebeia present in 2026

(c) High proportion of abraded and juvenile shells. Oxychilus helveticus and Aegopinella nitidula adults present in 2026

(d) Count refers to intact valves, which include Pisidium sp. Sphaerium corneum and S.rivicola. Abundant fragments equivalent to about 50 further valves.

\+ refers to non-hinge or non-apical fragments

Table : Mollusca from the pond

Context No.	94	95	95
Depth (cm)	40-50	50-60	60-65
Sample weight (kg)	1	1	1
Bithynia sp. (operculum)	2	-	-
Lymnaea sp.	2	1	2
Carychium tridentatum (Risso)	2	-	-
Carychium sp.	1	1	-
Cochlicopa sp.	-	2	-
Vertigo pygmaea (Draparnaud)	2	-	-
Acanthinula aculeata (Müller)	1	1	-
Vallonia sp.	7	3	-
Cecilioides acicula (Müller)	11	4	2
Trichia sp.	5	-	-
Discus rotundatus (Müller)	2	2	+
Nesovitrea hammonis (Ström)	2	-	-
Zonitidae indet	3	-	-
Limacidae	1	1	-
Pisidium sp. (a)	33(+108)	51(+50)	42(+22)

Note

(a) Figure in brackets refers to estimated number of valves represented by fragments.

Table : Mollusca from the hollow 94/95

Depth (cm)	0-5	5-10	10-15	15-20	20-base
Sample weight	2	2	2	2	2
Valvata piscinalis (Müller)	-	-	1	4	6
Valvata sp.	-	3	7	8	12
Bithynia tentaculata (L) opercula	12	12	22	33	41
apices	4	1	7	10	19
Carychium sp.	13	24	7	6	-
Lymnaea truncatula (Müller)	5	8	9	6	4
Lymnaea/Bithynia sp. ap.	-	6	4	24	25
cf. Physasp.	-	-	-	-	cf.1
Bathyomphalus contortus (L)	4	10	4	3	1
Hippeutis complanatus (L)	-	2	-	-	-
Planorbis sp.	-	-	1	1	1
Succinea sp.	2	11	8	3	6
Cochlicopa sp.	9	8	7	3	3
Vertigo antivertigo (Draparnaud)	1+cf.1	1	2	-	-
Vertigo pygmaea (Draparnaud)	-	cf.1	-	-	-
Lauria cylindracea (da Costa)	1+cf.1	5	7	2	-
Vallonia costata (Müller)	2	6	4	6	2
Vallonia pulchella (Müller)	cf.7	cf.1	cf.2	cf.2	-
Vallonia excentrica Sterki	-	-	cf.1	-	-
Vallonia sp.	19	16	4	5	7
Clausiliidae	(+)	3	-	-	1
Cecilioides acicula (Muller)	54	62	83	56	58
Cepaea nemoralis (L)	-	-	-	-	-
Cepaea sp.	3	3	2	-	-
Helix aspersa Müller	4	9	1	(+)	-
Trichia spp.	13	21	7	7	5
Helicella itala (L)	-	-	-	1	1
Punctum pygmaeum (Draparnaud)	-	-	1	-	-
Discus rotundatus (Muller)	24	67	43	7	8
Vitrea contracta (Westerlund)	4	2	-	-	-
Vitrea sp.	-	-	-	1	-
Nesovitrea hammonis (Strom)	2	-	-	-	-
Aegopinella sp.	2	-	-	3	-
Zonitidae indeterminate	12	51	23	12	4
Indeterminate gastropod apices	7	13	8	5	1
Limacidae	3	4	10	6	1
Sphaeriidae (valves)	29	43	97	140	34

Table : Molluscs from 3278

Context No.	4703	4728	4728
Depth (cm)	50-61	86-95	95-106
Sphaeriidae (valves)	1	-	-
Pomatias elegans (Müller)	(+)	-	-
Carychium spp	8	2	1
Lymnaea truncatula (Müller)	9	73	6
Succineidae	14	6	1
Cochlicopa sp	6	1	1(?)
Vertigo sp	1	-	-
Pupilla muscorum (L)	2	-	1(?)
Vallonia costata (Müller)	38	19	2
Vallonia pulchella (Müller)	1	-	1
Vallonia sp	14	12	5
Ena obscura (Müller)	-	2	1
Discus rotundatus (Müller)	10	-	-
Zonitidae	52	9	-
Limacidae	1	-	1
Euconulus fulvus (Müller)	1	-	-
Cecilioides acicula (Müller)	6	5	-
Clausiliidae	2	-	-
Helicella itala (L)	-	1	-
Trichia spp	82	35	8
Cepaea/Arianta	4	3	-
Ostracods	+	+	+
Sample weight (kg)	2	1.7	2

Table : Mollusca from ditches 4703 and 4728.

Context No.		1061	1061	1130
Depth (cm)		0-10	10-20	20-25
Sample weight (kg)		1	1	1
c.f. Bithynia sp.		1	-	-
Carychium tridentatum (Risso)		1	-	2
Carychium sp.		4	7	1
Cochlicopa sp.		4	3	-
Vallonia pulchella (Müller)		3	-	-
Vallonia excentrica (Sterki)		2	-	-
Vallonia sp.		4	1	4
Clausilia bidentata (Ström)		3	1	1
Clausiliidae indet.		-	-	1
Cecilioides acicula (Müller)		24	45	48
Cepaea/Arianta sp.		2	2	2
Helix aspersa Muller		2	1	+
Trichia spp.		9	3	4
c.f. Helicella itala(L)		-	1	-
Discus rotundatus (Müller)		24	7	8
Euconulus fulvus (Müller)		-	1	-
Vitrea crystallina (Müller)		2	-	-
Vitrea contracta (Westerlund)		1	1	-
Vitrea sp.		2	-	-
Aegopinella pura (Alder)		-	1	-
Oxychilus sp.		-	1	-
Zonitidae indet.	(a)	13	5	1
Limacidae		7	6	2
Sphaeriidae	(b)	-	1	1
Indeterminate		-	-	2

Notes:

(a) Includes some Aegopinella nitidula in 1061 0-10

(b) Small fragments

Table : Mollusca from 1061

Context No.	1613	1613	1613	1634
Depth (cm)	0-10	10-20	20-30	30-37
Sample weight (kg)	1	1	1	1
Valvata piscinalis (Müller)	1(?)	-	3	3
Bithynia tentaculata (L)	-	3	1	-
Bithynia leachi (Sheppard)	-	-	2	-
Bithynia sp. (operculà)	3	6	13	7
Bithynia sp. (apex)	-	-	-	1
Carychium tridentatum (Risso)	1	-	-	-
Carychium sp.	3	6	1	1
Lymnaea truncatula (Müller)	-	-	2	1(?)
Lymnaea peregra (Muller)	-	-	-	1
Lymnaea sp.	1	-	4(?)	1
Planorbis planorbis (L)	-	4	5	1
Anisus cf. leucostoma (Millet)	-	-	-	2
Planorbis sp.	1	-		-
Succinea sp.	-	1	1	1
Cochlicopa sp.	-	1	3	-
Vertigo sp.	-	1	-	-
Vallonia costata (Muller)	-	4	1	-
Vallonia pulchella (Muller)	-	-	5	-
Vallonia excentrica Sterki	2	1	4	-
Vallonia sp.	6	13	19	7
Cecilioides acicula (Muller)	34	50	55	89
Cepaea/Arianta sp.	1	1	-	1
Cepaea nemoralis L.	-	-	1	-
Trichia sp. (a)	8	12	3	4
Punctum pygmaeum (Draparnaud)	-	1	-	-
Discus rotundatus (Muller)	3	2	1	3
Zonitidae indet.	2	4	3	6
Linacidae	-	-	1	1
Sphaeriidae (b)	(5)	(7)	(7)	3 + (3)

Notes

(a) 1613 10-20 includes T.striolata and T.plebeia adults

(b) Numbers of valves estimated from fragments.

Table : Mollusca from ditch 1613

Plant macrofossils: methods.

Macrofossils were extracted from the wet deposits using the methods of Kenward et al (1980) after pre-soaking in NaOH solution. Carbonised and calcified macrofossils were recovered from the wet-sieved fractions of samples taken primarily for analysis of mollusca.

Context No.	4981	5056	5059(1)	5059(2)
Ranunculus acris/repens/bulbosus	-	10	-	6
Ranunculus subg. Batrachium	-	1	-	-
Papaver cf. dubium L.	-	5	-	-
Papaver argemone L.	-	5	-	-
Papaver sp	-	2	1	4
Stellaria media-type	-	9	-	23
Caryophyllaceae indet (a)	-	32	-	-
Chenopodium album L.	-	4	fr	3
Atriplex sp	-	2	2	2
Chenopodiaceae indet (a)	-	2+fr	fr	23
Malva sylvestris L.	-	fr	-	fr
Rubus fruticosus agg.	1	4	-	1
Potentilla sp	-	1	-	-
Conium maculatum L.	fr	fr	-	-
Apium cf. nodiflorum (L) Lag.	-	5	-	-
cf. Apium sp (a)	-	-	-	2
cf. Torilis sp (a)	-	-	-	1
Aethusa cynapium L.	-	2+fr	-	-
Umbelliferae indet.	-	2	-	-
Polygonum sp	-	fr	-	-
Rumex sp	-	13+fr	-	13+fr
Urtica urens L.	-	6	-	61
Urtica dioica L.	1	471	-	262
Betula sp	-	-	-	1+cf1
Hyoscyamus niger L.	1	8	3	11+fr
cf. Ballota nigra L.	-	60+fr	-	63+fr
Labiatae indet.	1	-	5	-
Plantago major L.	-	9	-	1
Sambucus nigra L.	-	2	-	-
cf. Achillea millefolium L.	-	-	-	2
Cirsium/Carduus sp	1	16	-	15+fr
Gramineae indet.	-	6	-	15
Indeterminate seeds etc.	3	17	1	13
Buds	-	+	-	-
Budscales	-	+	-	-
Leaf fragments	-	-	-	+
Twigs	-	+	+	+
Thorns	-	+	-	+
Sample weight (kg)	2	2	2	2

Table : Non-carbonised macrofossils from the Iron Age well.

Taxa are represented by fruits or seeds except where indicated.

(a) Regarded as fragmentary specimens

		Iron Age Well				Pit		Ditches		
		4981	5056	5059	5059(2)	4883	4974	4728 86-95cm	4728 95-106cm	5
Cereal indet.	(caryopsis fragments)	+	-	+	-	-	-	+	+	
	(caryopses)	-	-	2	-	-	-	5	-	
	('sprouts')	-	-	+	-	-	-	-	-	
	(culm node fragments)	-	-	+	-	-	-	+	-	
Triticum sp.	(caryopses)	3	1	11	-	-	-	9	-	
	(rachis internodes)	3	-	36	-	-	-	-	-	
	(spikelet bases)	9	-	39	-	-	-	1	-	
	(terminal spikelet fork)	-	-	1	-	-	-	-	-	
	(spikelet forks)	-	-	1	-	-	-	-	-	
	(glume bases)	-	-	83	1	-	-	2	-	
	(awn fragments)	+	-	-	-	-	-	-	-	
Triticum spelta L.	(spikelet forks)	-	-	-	-	-	-	-	-	
	(glume bases)	-	1	22	-	-	-	-	-	
Triticum dicoccum Schübl.	(spikelet forks)	-	-	3	-	-	-	-	-	
	(glume bases)	-	2	5	2	-	-	-	-	
Hordeum sp.	(caryopses)	-	-	-	-	-	-	-	-	
	(rachis internodes)	-	-	1	-	-	-	-	-	
Ranunculus cf. flammula L.		-	-	1	-	-	-	-	-	
Chenopodiaceae indet.		-	-	-	-	-	-	2	-	
Montia fontana subsp. chondrosperma		-	-	1	-	-	-	2	-	
Medicago lupulina-type		-	-	8	-	-	-	-	-	
Trifolium sp.		-	-	3	-	-	-	-	-	
Vicia/Lathyrus sp.	(seeds/cotyledons)	1	2co	5+4co	-	-	-	3+2co	-	
Rubus fruticosus agg.	(uncarbonised)	-	-	-	-	-	-	-	-	
cf. Polygonum sp.		-	-	1	-	-	-	-	-	
Rumex sp.		-	-	6	-	-	-	-	-	
Corylus avellana L.		-	-	-	-	-	-	-	-	

Plantago lanceolata L.		-	-	1	-	-	-	-	-
Sambucus nigra L.	(uncarbonised)	-	-	-	-	1	-	1	-
Tripleurospermum maritimum L.		-	-	25	-	-	-	-	-
Avena sp.	(awn fragments)	+	-	+	-	-	-	-	-
	(floret bases)	-	-	4	-	-	-	-	-
Avena fatua-type	(floret bases)	-	-	1	-	-	-	-	-
Bromus sp.		-	2+fr	16+fr	fr	-	-	5+fr	-
cf. *Arrhenatherum elatius* tu fr.		-	-	-	+	-	-	-	-
Gramineae indet.		5+fr	2	2	-	-	17	2	1
Leaf impressions	(fragments)	-	-	-	-	-	-	-	-
Stem fragments	(carbonised)	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
Indeterminate seeds etc.		2	-	24	-	-	2	3	-
Sample weight (kg)		2	2	2	2	2	2	1.7	2

Table : Carbonised plant remains from the Iron Age well; plant remains from other Iron Age contexts.

Taxa are represented by fruits or seeds except where indicated.

Depression				Depression				Pit	Ditch
4658 20-30cm	4658 30-40cm	4792/4773 40-50cm	4792 50-60cm	4709 10-20cm	4709 20-30cm	4771 30-40cm	4791 40-53cm	4949	710 70-80cm
-	-	-	-	-	+	-	+	+	-
-	-	-	-	-	-	1	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	+

-	-	-	-	-	-	-	-	-	-
2	-	1	+++	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
+	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	5	-	-	-	-	-
1.5	1.8	2	1.8	2	2	2	2	2	2

Context No.	94	95	95	1613	1613	1613	1729	1863	2026	2569	3278	3278	3509	3714	3717
Depth (cm)	40-50	50-60	60-55	0-10	10-20	20-30	80-92	68-72	-	-	10-15	15-20	-	40-50	50-5!
Period							ROMAN								
Indeterminate cereal fragments	+	-	-	1	1	2	-	-	1	-	-	-	1	-	-
Triticum sp. (caryopses)	11+3*	1+1*	2	-	-	1	-	-	-	1	1	-	-	1*	2
Triticum sp. (sprouts)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum sp. (spikelet bases)	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum sp. (internodes)	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-
Triticum sp. (internode and glume fragments)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta L. (glume bases)	32	1	-	-	-	-	-	1	-	-	3	1	-	-	-
Triticum spelta L (spikelet fork)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum cf. dicoccum Schübl (glume bases)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena sp. (caryopses)	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena sp. (awn fragments)	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sp. (caryopses)	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Gramineae indet. (caryopses)	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Anthemis cotula L. (cypsela)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table : Charred cereals, crop weeds etc. from Roman contexts

Germinated grains indicated by asterisk