Ancient Monuments Laboratory
Report 1/97

FENLAND MANAGEMENT PROJECT: PLANT MACROFOSSILS. CHAPPELLS FIELD, DEEPING ST. JAMES, LINCOLNSHIRE

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Summary

Ninety-two bulk samples were processed to retrieve charred plant macrofossils from a buried soil and shallow cut features associated with a Bronze Age settlement, sealed beneath later alluvium. Two samples from the basal fills of a shallow well were also examined. The charred assemblages were dominated by hazel nutshell, with sparse remains of cereals (barley, emmer, bread-type wheat) and flax, rare charred fruits and seeds of weeds and grassland plants, and vegetative plant material. The well fills produced macrofossil assemblages pointing to predominance of open weedy grassland in the vicinity with occasional trees and shrubs. Seeds of halophytes indicated proximity of salt-marsh, and uncharred flax macrofossils were recovered. A predominantly pastoral economy locally, perhaps with some cultivation of flax on fen-edge soils was inferred. The charred assemblages were of a type more characteristic of Neolithic/Early Bronze Age sites than later prehistoric ones and may indicate a non-intensive type of agriculture supplemented by foraging.

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Introduction

This site was selected for partial excavation as part of the Fenland Management Project because it was considered potentially to be a well-preserved Bronze Age settlement, sealed beneath alluvium of Roman or later date. The preliminary aim was to establish the state of preservation , with a view to Scheduling. Excavations directed by Tom Lane (Heritage Lincolnshire) revealed an intact palaeosol under the alluvium, associated with structural features (ring-gullies and post-holes of round-houses), pits and other archaeological features, including a shallow well (cut 150) of a type very characteristic of Bronze Age fen-edge settlements.

Methods

In order to retrieve charred plant material, potentially valuable both for AMS dating and to provide palaeoeconomic information, 30 bulk samples were collected from the palaeosol with a further 62 from cut features. Samples were collected from the palaeosol in a grid pattern, in an attempt to detect any spatial variation in density and composition of charred macrofossil assemblages. Sample volumes and contexts are detailed in Tables 1 and 2. The samples were processed by Mrs. Val Fryer by manual water flotation, (since disaggregation of fine-textured deposits proved difficult, and machine flotation would have been ineffective), using a 0.5mm collecting mesh. The dried flots were assessed by examination under a binocular microscope at low power (up to x 50) and proved to contain few charred plant macrofossils (Murphy, unpublished assessment report). However, data on Bronze Age agrarian economies in eastern England, as elsewhere, are still sparse and it was therefore thought that the samples merited analysis: particularly since the flots were generally small and would be inexpensive to process fully.

Samples from the fills of cut 150 were also assessed. The two basal waterlogged fills (178 and 179) were selected for full analysis. Plant macrofossils were extracted by the methods of Kenward *et al* (1980), using a minimum mesh of 250 microns. Retents > 500 microns from both samples were fully sorted, and the fraction 250-500 microns was 50% sorted. Macrofossils extracted were identified by comparison with modern reference material, and are listed in Table 3.

Crops

Hordeum sp. (barley)

A few characteristically rounded caryopses of barley were noted, but all were deformed and with abraded surfaces, making close identification impossible. The buried soil (Sample 51, co-ordinates 139/97) included a short rachis section from the base of an ear, including the basal rachis internode and fragments of the ascending internode above.

Triticum dicoccum (emmer)

Characteristically elongate drop-shaped grains were noted in samples 44 (224) and 51 (145/89). The only emmer glume base, narrow, asymmetrical and without prominent venation came from sample 13 (111).

Triticum aestivum s.l. (bread wheat-type)

A short rounded wheat grain was noted in sample 11 (108) and the alluvium overlying the buried soil (Sample 52, 151) produced an abraded node of free-threshing hexaploid wheat.

Linum sp. (flax)

Fragments of charred seeds were present in samples 34 and 39. Both were fractured across the basal constriction, so that lengths cannot be determined, though they were 0.6 - 0.7 mm broad. The epidermal patterning of polygonal cells was well preserved in places. Though small, these seeds are thought to be of a cultivated species, most likely *L. usitatissimum*.

Sample 67, from the base of the well, cut 150, included a fragmentary seed and capsule segment of *Linum* cf *usitatissimum* preserved by waterlogging.

Vegetative plant material

This included fragments of stem (with a scrap of grass/cereal culm node in sample 51 (139/88), and fragments of roots, rhizomes and 'tubers'. The 'tubers' from samples 9, 11, 30, 43 and 51 (133/85) are perhaps in fact fragmentary basal internodes of the grass *Arrhenatherum elatius*. All show elongate striations and constrictions towards the nodes. There are no intact pyriform examples; they are all fragmentary or/or under-developed. Apparent rhizome fragments from sample 53 are up to 0.9 mm wide, with very short internodes and projecting side roots.

Mollusca

Mollusc shells were very uncommon at this site and do not merit a separate report. Samples 68 and 69 (cut 150) included individual shells of the grassland species *Vallonia excentrica* and the freshwater slum snail *Anisus leucostoma*, with an abraded apex possibly of the freshwater *Bithynia* sp.

Discussion

Charred macrofossils

The composition of the charred assemblages was broadly similar in the buried soil and the cut features. Of 30 samples from the buried soil, only 8 included charred cereal remains but 27 produced scraps of hazel nutshell, never representing more than one nut. 62 samples were processed from the fills of cut features: cereal remains were again rare, occurring in only 10 samples, with flax in 2 and hazel nutshell in 40. The cereal crops identified were indeterminate barley, emmer and bread-type wheat. Charred fruits and seeds of herbs (weeds and grassland species) were infrequent and rare, whilst a few samples included vegetative plant material.

The results closely resemble those from Hagnaby Lock, Stickford (Murphy, forthcoming.), particularly in terms of the rarity of cereal remains compared to the relative abundance of hazel

nutshell fragments. Assemblages of this type are more characteristic of Neolithic/Early Bronze Age sites than later prehistoric ones (Moffett *et al.* 1989), and have been interpreted as indicating non-intensive cultivation supplemented by foraging.

There was certainly no evidence for any large-scale cereal processing on site. The presence of charred and uncharred flax macrofossils (see below) is very characteristic of marginal wetland Bronze Age sites in eastern England. Flax has a very shallow root system and hence is drought-sensitive, particularly in its early stages of growth (Renfrew 1973, 124). It would appear that it was cultivated in the Bronze Age on fen-edge soils where soil water deficits did not develop.

The well (cut 150)

Shallow wells of this type are very characteristic of Bronze Age sites in Eastern England and are often associated with co-axial field systems. Examples include those from the fen-edge, at Fengate, Peterborough and Barleycroft, Needingworth, (Cambridgeshire), West Deeping (Lincolnshire), West Row Fen (Suffolk) and Lofts, Chigborough and Slough House Farms, near Heybridge (Essex) (Martin and Murphy 1988; Murphy 1988; Pryor 1996 and references therein; Wiltshire and Murphy 1993 and in prep.). Pyor (ibid) has argued that these field systems were related to stock management, principally of sheep. The associated wells would therefore have been primarily for watering animals, though of course would also have provided a human water supply.

The macrofossil assemblages from cut 150 consisted mainly of grassland plants and weeds (Table 3), indicating a local environment of disturbed and nutrient-enriched grassland. In the basal sample (67) there were no macrofossils of grassland plants, though sample 66 produced fruits and seeds of Alismataceae (water plantain family), possibly *Berula erecta* (narrow-leaved water parsnip) and *Ranunculus* subgenus *Batrachium* (water crowfoot). This may imply that during the formation of the basal fill, growth of aquatic plants was prevented either by covering the well or regularly cleaning it out; on abandonment, however, aquatic vegetation colonised the feature. Macrofossils of trees and shrubs were rare. The taxa present (*Sambucus nigra*, elder; *Rubus* section *Glandulosus*, bramble; *Corylus avellana*, hazel; *Prunus* sp., probably sloe) could be derived from shrubs growing locally or could be food waste. Two macrofossils of halophytes, characteristic of salt-marsh habitats, were identified: a seed of *Juncus gerardii* (mud rush) and a fragmentary seed of *Suaeda maritima* (annual seablite). The presence of salt-marsh within the catchment of the site is indicated, though not necessarily in the immediate vicinity, for these seeds could easily have reached the site on the hooves or coats of animals pastured on coastal marshes. The only crop remains from this feature were of *Linum* cf *usitatissimum* (flax), which was also represented by charred seeds from other contexts (see above).

Virtually identical results came from the lower fills of a later Bronze Age well at Lofts Farm, Essex (Murphy 1988), again indicating damp weedy grassland locally, very few trees or shrubs and the proximity of saltmarsh. At Chigborough and Slough House Farms, near Lofts Farm, palynological and macrofossil studies of Bronze Age well fills again pointed to predominantly open grassland conditions, though with a higher representation of trees, particularly oak. This might indicate nearby areas of scrub and isolated trees, or possibly hedgerows. Macrofossils of flax were present in one feature (Wiltshire and Murphy 1993 and in prep.). Similar shallow wells at West Row Fen, Suffolk

have also produced results indicating local weedy grassland with some scrub and/or woodland nearby; flax was again identified (Martin and Murphy 1988 and in prep.).

In summary, then, the results from cut 150 are similar to those from other Bronze Age wells in comparable marginal wetland locations. Local predominance of weedy grassland is indicated, and a dominantly pastoral economy may be inferred. In the vicinity of these sites, woodland cover was variable, but low; and it is quite possible (though impossible to prove) that some macrofossils and pollen of trees and shrubs were derived from hedgerow trees and bushes. As noted above, the fairly consistent presence of flax remains could indicate that this crop was locally grown on fen-edge soils.

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Tables 1-3: notes.

All the flots from bulk samples were < 0.1 litres in volume, except sample 1 (*c.* 0.2 litres). All flots were fully sorted. No charred macrofossils were recovered from samples 8, 21, 51 (133/94, 142/86), 56, 57, 59. 69 and 71. All taxa listed in Tables 1 - 3 were represented by fruits or seeds except where indicated.

Abbreviations:

Contexts.
a - alluvium; d - ditch; g - gulley; p - pit; ph - posthole.

Botanical.
brn - basal rachis node; ca - caryopsis; cap - capsule; cn - culm node; co - cotyledon; fr - fragment; gb - glume base; rn - rachis node; s - seed.

Table 1: Deeping St. James. Charred plant macrofossils from the buried soil (Sample 51)

Co-ordinates	133	133	133	133	133	133	136	136	136	136	136	136	139	139	139	139	139	139	142	142	142	142	142	142	142	145	145	145	145	145
	85	88	91	94	97	100	85	88	91	94	97	100	85	88	91	94	97	100	85	86	88	91	94	97	100	86	89	92	95	98
Cereals																														
Cereal indet. (ca)	1								1			1	1																1	
Hordeum sp. (ca)								1																						
Hordeum sp. (brn)																	1													
Triticum dicoccum-type (ca)																											1			
Herbs (weeds/grassland)																														
Atriplex patula/hastata																														1
Stellaria media-type					x																									
Chenopodium album L.																1														
Chenopodiaceae indet.													1																	
Galium aparine L.																									1					
Vicia/Lathyrus sp. (co)																											1			
Indeterminate (s/fr)																									1				1	
Nutshells																														
Corylus avellana L.	x	x	xx		xx	xx	x		x	x	x	x	x	xx	x	x	x	x	x		x	x	x	x	x	x	x	x	x	xx
Vegetative material																														
Poaceae indet. (cn fr)														x																
Tuber frag.	x																													
Sample volume (l.)	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	8.5	12	12	12	12	12	12	9	12	12	12	

Flot volumes all < 0.1 litres. All flots 100% sorted. xx = >10 Corylus fragments.

Table 2: Deeping St James. Charred plant macrofossils from other contexts.

Sample number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Context number	3	7	155	156	157	11	12	158	17	18	108	107	111	113	119	21	23	25	122	27	29	137	138	31	124
Context-type	ph	ph	p	p	p	d	p	p	g	p	g	g	g	g	g	p	ph	ph	g	ph	ph	g	g	ph	g
Crops																									
Cereal indet. (ca)							1						1	1											
Hordeum sp. (ca)	1																								
Hordeum sp. (brn)																									
Triticum dicoccum-type (ca)																									
Triticum dicoccum Schubl. (gb)													1												
Triticum aestivum-type (ca)											1														
Triticum aestivum s.l. (rn)																									
Linum sp. (s)																									
Herbs (weeds/grassland)																									
Atriplex patula/hastata																									
Eleocharis sp.																									
Fallopia convolvulus (L.) A. Love																			1						
Stellaria media-type																			1						
Chenopodium album L.																									
Chenopodiaceae indet.																									
Galium aparine L.																									
Malva sp.												1													
Poaceae indet.															1										
Polygonaceae indet.							1					1													
Rumex acetosella agg.									1		1				1										
Rumex sp.																									
Vicia/Lathyrus sp. (co)												1													
Indeterminate (s/fr)				3																		1			
Wetland plants																									
Carex sp.																									
Sparganium sp.																									
Nutshells																									
Corylus avellana L.	x	x			x	x	x			x		x		xx		x	x	x	x	x			x	x	x
Vegetative material																									
Poaceae indet. (cn fr)																									
Rhizome fragments																									
Stem/root fragments															x										
Tuber frag.			?						x		x														
Sample volume (l.)	12	13	9	8.5	9	8	9.5	8	14	13	13	8.5	8	12	8.5	10	8	3	9.5	3.5	1.5	7.5	9.5	1.5	7.5

Flot volumes all , 0.1 litres, except Sample 1 (0.2 litres). All flots 100% sorted.

Table 2, continued.

Sample number	26	27	28	29	30	31	32	33	34	35	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Context number	39	140	140	141	145	147	205	148	203	206	212	209	210	207	215	200	218	224	222	227	201	200	230	231
Context-type		g	g	g	g	g	g	g	g	g	g	g	g	g	g	ph	p		g	p	ph	ph	g	g
Crops																								
Cereal indet. (ca)						1									2							1		
Hordeum sp. (ca)																								
Hordeum sp. (brn)																								
Triticum dicoccum-type (ca)																		1						
Triticum dicoccum Schubl. (gb)																								
Triticum aestivum-type (ca)																								
Triticum aestivum s.l. (rn)																								
Linum sp.(s)									1				1					?fr						
Herbs (weeds/grassland)																								
Atriplex patula/hastata																								
Eleocharis sp.							1																	
Fallopia convolvulus (L.) A. Love																1								
Stellaria media-type																								
Chenopodium album L.						1																		
Chenopodiaceae indet.																								
Galium aparine L.																						fr		
Malva sp.																		1						
Poaceae indet.																1								
Polygonaceae indet.												1												
Rumex acetosella agg.																								
Rumex sp.																	2			1			1	
Vicia/Lathyrus sp. (co)										1					2					2		1		
Indeterminate (s/fr)				x						1		1		2	2		1		1		1			1
Wetland plants																								
Carex sp.																								
Sparganium sp.										1														
Nutshells																								
Corylus avellana L.	x	x	x	x		x	x	x	x	x	x			x	x	x	x		x	x	x	x	x	
Vegetative material																								
Poaceae indet. (cn fr)																								
Rhizome fragments																								
Stem/root fragments																								
Tuber frag.					x												2							
Sample volume (l.)	8	12	9	7.5	7.5	7	7.5	8	8	8	7	7.5	3	4.5	12	8	8	8	2.5	7.5	5.5	7	6	3.5

Table 2, continued.

Sample number	52	53	54	55	56	57	58	59	60	65	68	69	71
Context number	151	153	154	155	156	157	158	180	162	159	170	169	161
Context-type	a	p	p	p	p	p	p	p	p	p	p	p	p
Crops													
Cereal indet. (ca)													
Hordeum sp. (ca)													
Hordeum sp. (brn)													
Triticum dicoccum-type (ca)													
Triticum dicoccum Schubl. (gb)													
Triticum aestivum-type (ca)													
Triticum aestivum s.l. (rn)	1												
Linum sp. (s)													
Herbs (weeds/grassland)													
Atriplex patula/hastata													
Eleocharis sp.													
Fallopia convolvulus (L.) A. Love													
Stellaria media-type													
Chenopodium album L.													
Chenopodiaceae indet.													
Galium aparine L.													
Malva sp.													
Poaceae indet.													
Polygonaceae indet.		1											
Rumex acetosella agg.													
Rumex sp.			1										
Vicia/Lathyrus sp. (co)							1						
Indeterminate (s/fr)	1	7	1	2									
Wetland plants													
Carex sp.		1											
Sparganium sp.													
Nutshells													
Corylus avellana L.			x				x		x	x	x		
Vegetative material													
Poaceae indet. (cn fr)													
Rhizome fragments		3	?	?									
Stem/root fragments		3		3									
Tuber frag.													
Sample volume (l.)	7	7.5	6.5	8	8.5	7.5	7.5	7	7	7.5	8	?	5

Table 3: Deeping St. James. Plant macrofossils from the well, cut 150.

Sample number	66	67
Context number	178	179
Crops		
Linum cf usitatissimum L. (s)		(fr)
Linum cf usitatissimum L. (cap fr)		fr
Herbs (weeds/grassland)		
Aethusa cynapium L.		(x)
Alopecurus sp.		2
Aphanes arvensis/microcarpa	2	2
Atriplex sp.	5	3
Capsella-type	8	7
Caryophyllaceae indet.	2	1
Cerastium sp(p)	5	3
Chenopodiaceae indet.	2	3
Chenopodium album L.	7	2
Chenopodium sp.	1	1
Cirsium/Carduus sp.	10	2
Hyoscyamus niger L.	1	
Leontodon sp.	fr	
Malva sp.		1
Mentha arvensis/aquatica	2	
Plantago major L.	1	1
Poaceae indet.	2	6
Polygonaceae indet.	1	1
Polygonum aviculare agg.	9	8
Potentilla anserina L.	13	9
Prunella vulgaris L.	1	
Ranunculus acris/repens/bulbosus	1	2
Rumex sp(p)	19	15
Sisymbrium-type	8	6
Solanum nigrum L.	2	2
Sonchus sp.	1	
Stellaria media-type	17	14
Trifolium sp. (cal)	fr	
Urtica dioica L.	10	10
Wetland/aquatic plants		
Alismataceae indet.	2	
cf. *Berula erecta* (Hudson) Coville	1	
Carex sp.	4	1
Juncus sp.	2	1
Ranunculus subg. *Batrachium*	2	
Halophytes		
Juncus gerardii Loisel.	1	
Suaeda maritima (L.) Dumort	fr	
Trees/shrubs		
Sambucus nigra L.	1	1
Rubus section *Glandulosus* Wimmer and Grab	4	1
Corylus avellana L.	fr	
Prunus sp.		(fr)
Other plant macrofossils		
Charcoal	x	
Wood/twig fragments	x	x
Stem fragments	xx	xx
Leaf fragments		xx
Buds	x	
Mosses	x	x
Indeterminate seeds etc.	8	12
Sample wt. (kg)	2	1

All taxa represented by fruits or seeds except where indicated. Abbreviations: cap - capsule; fr - fragment; s - seed. Entries in parenthesis indicate taxon noted during assessment, but not during analysis.