Charred plant remains from The Magistrate's Court Excavation, Chesterfield, Derbyshire (DRE-01).

Angela Monckton May 2002 (ULAS Report Number 2002-063)

Introduction

Excavations were carried out by Archaeological Investigations Ltd. directed by Kath Crooks. Samples were taken for the recovery of charred plants or other remains in order to investigate the activities represented by three contexts on the site. A sample from a Roman ditch contained only a couple of charred seeds. Samples from two medieval contexts included a kiln lining and the later reuse of the kiln as a cesspit. The sample from the kiln produced a good group of charred grains and seeds suggesting cereal processing possibly malting of barley, little was found in the possible cesspit. The remains were compared with medieval pits from another site in the town excavated by Foundations Archaeology (Appendix 1, site LS-98E) and other sites in the area.

Methods

Samples were taken from the datable contexts to be investigated. The samples were of 10 litres in size and were wet sieved in a tank (recently obtained from York Archaeological trust) using pumped water circulation with a 0.5mm mesh and flotation into a 0.3mm meshes. The flotation fractions (flots) were air dried and all sorted for plant remains using a stereo microscope. The residues were refloated manually after drying, then the refloat dried and sorted as above, and the remains added to those from the flot. Recovery by flotation was poor as about half the charred plant remains were recovered from the residue. The plant remains were then identified by comparison with modern material in the Department of Archaeology of the University of Leicester. The remains were counted and listed (table 1), the plant names follow Stace (1991) and are charred seeds in the broad sense unless described otherwise.

Results

The cereals: Charred cereal grains were quite numerous in sample 2, the majority of the identified grains were of cultivated barley (*Hordeum* sp.) although some of the cereal grains were distorted and abraded so could not be identified further. Only one twisted barley grain was found suggesting little presence of six-row barley, although the surfaces were poorly preserved most of the grains were straight so this may include two-row barley. A single small rachis fragment of barley was found which could not be identified further. The grains were examined for evidence of germination, eight grains had impressions of the cereal sprout above the position of the embryo, a further nine grains had sunken furrows and ventral sides possibly caused by germination, many of the rest of the barley grains were sunken and pitted but too burnt and abraded to provide certain evidence of germination. Six detached germinated embryos with sprouts attached were also found, a complete one was 4.2mm long which is about the same length as the larger grains. Of the identified barley probably about 40% was germinated. A few oat grains were also present which could have been either cultivated or wild oats as a contaminant of the barley.

Possible food plants: Other food plants from sample 2 were possibly peas or beans (*Vicia/Pisum*) represented only by fragments showing the consumption of edible legumes. Some smaller fragments may be of cultivated vetch but no diagnostic parts were found. The legumes may therefore include some vetch as fodder or leguminous weeds of the crop.

Wild plants: The most numerous weed seeds found in sample 2 were those of weeds of disturbed or arable land such as corn marigold (*Chrysanthemum segetum*) which was the most numerous seed in the sample. This is a plant typical of spring sown crops and barley was often spring sown. Cleavers

(*Galium aparine*) and cornflower (*Centaurea cyanus*) were present in small numbers, these are more typical of autumn sowing suggesting perhaps some mixing of material in the deposit. Some of the seeds may be from weeds of the settlement such as docks (*Rumex* sp) and knotgrass (*Polygonum aviculare*) but these may also be arable weeds. Plants of damp ground such as buttercups (*Ranunculus* sp) which may have grown in damp area of the cultivated fields, field margins or damp grassy areas. Other plants typical of grassland include ribwort plantain (*Plantago lanceolata*), tormentil (*Potentilla erecta*) and vetches or vetchling (*Vicia/Lathyrus*) although these are all grassland plants most can also occur as arable weeds.

The contexts sampled

Roman ditch (5019): this contained only a fragment of a charred grass seed and a small tuber probably also of a grass, which is too little evidence for conclusions.

Medieval kiln base (5058): this was the most productive sample which included barley grains with some germination and weed seeds of spring sown crops. A few uncharred seeds were present including elder and a blackberry pip, both are robust seeds and ubiquitous in deposits. This layer was described as the kiln lining and the remains from the sample are discussed below.

Medieval cesspit layer (5035): this was above the kiln base from the secondary use of the feature, possibly as a cesspit. The sample contained only a couple of charred cereal grains and four uncharred seeds. Cesspits often contain a mixture of charred plant remains raked out from hearths and fires as well as sewage, but few charred remains were present in this sample. In cesspits uncharred plant remains can become densely mineralised by impregnation with the calcium phosphate minerals in the sewage. The uncharred seeds here were not in this condition, elder seeds are ubiquitous in deposits probably surviving because they are very robust. In the absence of bulk samples with fruitstones, pips or fish remains such as were found at Causeway Lane, Leicester (Monckton 1999) which indicate sewage, it can only be suggested that sediment is tested for the evidence of gut parasites which are often found in cesspits, as there is too little evidence from the seeds to suggest that this layer contained sewage.

Comparison with other sites

The medieval sample from (5058) shows only the use of barley although other excavations in Chesterfield by Foundations Archaeology (Site LS 98E) in 1998 recovered medieval charred plant remains which included grains of free threshing wheat, hulled barley, rye and oats (Monckton unpublished). Chaff was not recovered there, so it was not possible to say if the wheat was bread wheat or rivet wheat. No evidence for rivet wheat has been found in Derbyshire to date although rivet wheat has been found on a number of sites in the region (Moffett 1991), for example in medieval Leicester (Moffett 1993, Monckton 1999). More samples are needed from Derbyshire to investigate this. Fragments of peas or beans were also found in Chesterfield from the 1998 excavation with the addition of few hazel nut shell fragments as evidence of gathered food. As here the seeds found were mainly those of plants of arable or disturbed ground, however the large grasses (Poaceae) were most numerous and stinking mayweed, an indicator of clayland cultivation, was present which was not found here. Plants of grassy vegetation were present at both sites. More evidence for domestic waste was suggested there by the presence of not only fragments of legumes but the presence of nutshell and fish scale. The plant remains there were at a fairly low concentration comparing with the scatter of waste from many medieval domestic contexts in the region. A higher concentration of remains was found in the sample here associated with the kiln although there are very few samples from the area for comparison.

Discussion and conclusions

The plant remains from the layer at the base of the kiln are quite numerous and occurred together with charcoal interpreted by the excavator as remains from the use of the kiln, possibly as a malting kiln, which was an oblong-shaped stone lined structure with a flue. The plant remains consisted mainly of barley grains including germinated grains, with only one chaff fragment and quite numerous weed seeds. Grain may germinate due to spoilage by damp or by deliberately to produce malt. Considering the context this could be waste from malting. Malting involves the soaking and germination, or sprouting, of cereal grain to produce sugars which causes the grain to shrivel. When the sprout is about the length of the grain germination is halted by roasting in a malting kiln. The grain is then coarsely milled and the malt extracted by boiling in water and the liquid fermented to make ale or beer. The grain here has about 40% germination, although this seems a low percentage for successful malting this could still be malted grain because control of conditions was less efficient and cereals were less uniform in the past (Murphy 1985).

The sample here differs from a deposit of malted barley grain from a kiln in Norwich which was thought to be burnt accidentally during roasting (Murphy 1995). Here the sample (5058) has fewer grains and more weed seeds. This sample is thought to be from the base of the fire in the kiln, and grain may enter the fire in a number of ways. During heating some of the grain may spill from the heating platform into the fire below and so be charred. Another possible way for grains and seeds to be put into the fire was the use of cereal cleaning waste for fuel or kindling. After roasting the malted grain may be sieved to remove sprouts, seeds and chaff and this together with accidentally included grains would be burnt. The sample here may consist of a mixture of these. It should be noted that cereals could be parched or roasted in a kiln for other purposes; hulled barley was parched before milling to remove the papery hulls, or grains could be parched to facilitate grinding for flour, or damp cereal could be parched before storage, and sometimes grain was roasted to improve flavour. Hence there are a number of cereal related uses for such kilns as well as the preparation of malt for brewing. Ale or beer was an important part of the medieval diet (Dyer 1989), it was a palatable use of the cereal, and it is said that it was a way of avoiding contaminated water. Barley was often used for brewing in medieval times, although use of other cereals and mixtures of grains are known. The remains here show the use of barley on the site, possibly for malting to brew ale or beer.

Acknowledgements

I am grateful to Kath Crooks and Benedikte Ward for information about the site and to Andy Boucher for interesting discussion and the opportunity to work on the project.
Work carried out at ULAS, University of Leicester. Report Number 2000-063

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Table 1. PLANT REMAINS FROM CHESTERFIELD, DERBYSHIRE (DRE-01).

	Date	**RB**	**Med**	**Med**	
	Sample No.	**3**	**2**	**1**	
	Context	**5019**	**5058**	**5035**	
	Feature type	**Ditch**	**Kiln**	**Cesspit**	
Cereals, charred					
Hordeum sp. L. grain		-	44	-	Barley
Hordeum sp. L. rachis		-	1	-	Barley chaff
Avena sp. grains		-	8	-	Oat
Cereal grains		-	25	2	Cereal
Cereal/Poaceae grains		-	14	-	Cereals/Grasses
Cereal sprouts with embryo		-	6	-	Cereal sprouts
Other charred plants					
Ranunculus subgen *Ranunculus*		-	1	-	Buttercups
Stellaria graminea/palustris		-	1	-	Stitchwort
Polygonum aviculare agg.		-	1	-	Knotgrass
Rumex sp		-	1	-	Docks
Rumex acetosella L.		-	3	-	Sheep's sorrel
Brassica sp.		-	1	-	Cabbage/mustard
Potentilla erecta (L.) Rausch		-	1	-	Tormentil
Vicia//Pisum		-	15	-	Beans/Peas
Vicia/Lathyrus		-	7	-	Vetch/Vetchling
Plantago lanceolata L.		-	1	-	Plantain
Galium aparine L.		-	1	-	Cleavers
Centaurea cyanus L.		-	2	-	Cornflower
Chrysamthemum segetum L.		-	43	-	Corn Marigold
Poaceae (large)		1	9	-	Grasses large
Poaceae (small)		-	3	-	Grasses
Indeterminate seeds		-	3	-	Indeterminate seeds
Capsule (small indet.)		-	6	-	Capsules
Culm base/small tuber		1	-	-	Grass
Uncharred plants					
Sambucus nigra L. (uncharred)		-	8	2	Elder
Rubus fruticosus agg. (uncharred)		-	1	-	Bramble
Lamiaceae (uncharred)		-	7	2	Deadnettle family
	Total	2	213	6	items
	Volume sample	10	10	10	litres
	Flot + reflot volume	19	65	30	mls
	% remains in flot	-	53%	16%	recovery by flotation

Key: Remains are seeds in the broad sense unless stated.

Appendix 1: Assessment of charred plant remains from medieval pits at Chesterfield, Derbyshire (LS-98E) from the excavation by Foundations Archaeology.

Angela Monckton 29.3.99 (ULAS Report 1999-44)

Introduction

Excavations were carried out by Foundations Archaeology and samples were taken for the recovery of charred plant remains because they can give evidence of diet, agriculture or activities in the past. Recovery of charred plant remains from this area of Derbyshire would be useful as most of the archaeological information from the county is from the prehistoric sites of the Peak District and the Trent Valley. The features sampled were pits of medieval date, a period for which there is little published about charred plant remains in the area. Although this site produced only a small group of remains the attempt to recover such remains is a priority for this area to add to information from the region as a whole. For location see Derbyshire Museum SMR.

Provenance, Dating and Quantity

A total of five samples from pits of medieval date were processed amounting to 56 litres of soil.

Methods

Features were sampled at the discretion of the excavators.

Processing: Samples were wet sieved in a York tank using a 1mm mesh with flotation into a 0.5mm mesh sieve, a small subsample of each was reserved unprocessed. The residues were air dried and the fraction over 4mm was sorted for all finds and the remaining residue discarded. The fraction below 4mm was reserved and assessed. The flotation fractions (flots) were air dried and packed carefully in self-seal polythene bags and then assessed.

Assessment: The flots were examined with a x10 stereo microscope and the plant remains were removed to glass specimen tubes stored with the flot. The plant remains were rapidly identified without comparison with modern reference material so the identifications should be regarded as provisional. The remains were noted with an estimate of quantity and tabulated below (Table E1). Residues were also examined to determine if the plant remains had been recovered by flotation and to assess for the presence of other remains.

Results

The coarse residue (over 4mm) of the samples produced fragments of pottery in all except sample 4, bone fragments were found in sample 1, an iron nail in sample 2 and coal was present in samples 1, 2 and 5. Examination of the fine residues (below 4mm) produced no small bones or mineralised remains and sorting a fraction at x10 magnification did not recover any charred plant remains and little charcoal was present showing that recovery by flotation was efficient for these deposits. The flots produced some charred cereal grains and seeds although not in large numbers (Table E1).

Range and Variety of Material

The charred plant remains included grains of free threshing wheat, hulled barley, rye and oats. Chaff was not recovered so the cereals could not be identified further and it was not possible to say if the wheat was bread wheat or rivet wheat, both of which are free-threshing wheats which have been found on sites south of Derbyshire to date. The consumption of peas or beans is suggested only by

fragments of charred legumes and gathered food was represented by very few hazel nut shell fragments. The seeds found were mainly those of plants of arable or disturbed ground, the large grasses (Poaceae) were most numerous and these included brome grass (*Bromus hordeaceus* or *secalinus*) which was a weeds of the cereal fields. Other plants included stinking mayweed (*Anthemis cotula*) which was also an arable weed and an incomplete seed possibly of groundsel type (*Senecio* sp) which is a weed of disturbed ground were found. Plants of grassy vegetation were represented by ribwort plantain (*Plantago lanceolata*), this may have grown in field margins or have been brought to the site with plant material for other purposes such as fodder, flooring material or grass used as kindling.

Statement of Potential

The plant remains showed that all the main cereals of the medieval period were in use in this area in common with other areas of the country where more information is available. A small range of arable weeds was present with the grain suggesting that the remains were possibly domestic waste from the final hand cleaning of cereals for consumption because whole grains were used in pottages and some baked products. The weed seeds were probably burnt together with spoiled or accidentally spilled grain during food preparation. Domestic waste is also suggested by the presence of charred fragments of legumes, nut shell and a fish scale fragment. The fairly low concentration of remains found compares with that found in the majority of contexts from other medieval sites including urban deposits, for example from Leicester, as well as many of those from medieval village sites. Hence nearby domestic activity is suggested by the plant remains and some evidence of the diet of the inhabitants has been found.

The recovery of these charred plant remains does show their presence and survival in this area which, if suitable sites are excavated and sampled should have the potential to produce more detailed information for comparison with other parts of the region. Questions about the distribution of rivet wheat and comparison of differences of weed floras require investigation and further work in this area is required to provide answers.

Further work

No further analysis of the samples is required although it is suggested that if the site is published a table and summary of the charred plant remains recovered is included in the report.
Should further excavation be carried out in this area it is strongly recommended that bulk sampling for plant remains is carried out.

Table E1: Assessment of flots for charred plant remains (LS-98E)

Samp No.	Cont No.	Feat type	Samp Vol. litres	Flot Vol. mls	Gr ch	Cf ch	Se ch	Se un	Leg ch	Oth ch	Char	Comments
1	1011	Pit	12	70	9	-	12	-	+	-	+	Wheat (free-threshing), hulled barley and oat present, a frag of pea or bean, seeds of large grass and mayweed (*Anthemis* sp.), a small bone, a fish scale and coal present.
2	1009	Pit	11	45	19	-	38	-	-	-	++	Grains of wheat and rye with seeds of large grasses most numerous and including brome grass (*Bromus* sp), mayweed and a seed possibly of groundsel (*Senecio* sp). Coal.
3	1102	Pit	10	12	5	-	4	-	-	-	+	Wheat (free-threshing) with seeds of large grass, plantain (*Plantago lanceolata*) and mayweed (*Anthemis* sp).
4	1105	Pit	11	15	1	-	7	-	+	1	+	Mainly large grass seeds, an oat grain, fragments of larger legume and a cereal stem frag (culm node).
5	1072	Pit	12	90	28	-	5	-	-	2	++	Rye grains, an oat grain and a wheat grain, a seed of stinking mayweed (*Anthemis cotula*) and two small frags of hazel nutshell (*Corylus avellana*). Coal.

Key: Gr = cereal grain, Cf = chaff, Se = seed, ch = charred, un = uncharred, Leg = legume, Nut = nutshell, Char = charcoal, Oth = other charred item, fl = flecks, fr = fragments, + = present, ++ = moderate amount, +++ = abundant. # = further work required.