425

Ancient Monuments Laboratory
Report 11/92

AN IRON AGE HEDGEROW FLORA FROM ALCESTER, WARWICKSHIRE

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Summary

A ditch fill contained a flora rich in seeds of *cratagus* (hawthorn), *Prunus spinosa* (sloe), *Acer campestre* (field maple) and *Rhannus catharticus* (purging buckthorn) as well as plants typical of hedges. The remains can be confidently interpreted as the remains of a hedged and ditched boundary, and the radiocarbon date shows that it is of Iron Age date.

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An Iron Age hedgerow flora from Alcester, Warwickshire

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Introduction

Alcester is a small town in south Warwickshire, near Stratford-upon-Avon (Fig 1). There was a Roman town on the site, and a number of excavations over the years have revealed aspects of the town's history: Booth (1989), for example. The site at Gas House Lane (AL23) (map reference SP 093575) was excavated in 1989 by Steven Cracknell for Warwickshire County Council, in advance of some redevelopment of a former factory site. The excavations uncovered evidence of the Roman town defences, town houses and some late medieval features. There was also a pre-Roman watercourse, that is not clearly either a dug ditch or a natural stream, which contained woody organic material with shells which was sampled by the excavator. The material was thought to be similar to other organic deposits which have been found at sites in Alcester (Booth 1989, Greig 1988). The writer did not see the site.

Laboratory processing

There were seven samples, all thought to be similar of which four were examined. A litre of material was broken down in water and sieved on a mesh of 0.3 mm to remove fine debris and then sieved into size fractions of 4, 2, 1 and .3mm for easy sorted. sorting on sieves, and some of this was sorted. Material for radiocarbon dating, mainly pieces of wood, was also sorted out. A pollen spectrum was obtained from one sample, using the normal preparation methods followed by a small count and a scan of the rest of the slide.

Chronology

The radiocarbon date was done on good material, twigs, which were selected from the organic matrix. The determination gave a radiocarbon age of 2150 +/- 50 BP (GU-5137) with a 1 sigma range lies between 354 and 116 BC (Cal).

Results

The species list (Table 1) shows the plant remains. There were also aquatic snails such as *Limnaea* and *Discus*, and a range of beetle remains that have not been identified. The three macrofossil samples have floras which are almost identical, so they (and the pollen spectrum) are treated as essentially one context. Various plant communities can be recognised in this flora:

1) aquatic. The most characteristic aquatic plants are *Ranunculus* subg. *Batrachium* (water crowfoot), *Ceratophyllum* sp. (hornwort), cf. *Nasturtium officinale* (water cress), *Lemna* sp. (duckweed) and *Zannichellia palustris* (horned pondweed). This seems to represent the aquatic vegetation growing in the ditch itself. The water snails also indicate such a habitat.

2) marsh and bankside. There were also plants of damp streamsides and marshes, such as *Ranunculus sceleratus* (celery-leaved crowfoot), *R. flammula* (lesser spearwort), *Filipendula ulmaria* (meadowsweet), *Apium nodiflorum* (fool's watercress), *Hydrocotyle vulgaris* (pennywort), *Berula erecta* (water parsnip), *Alisma* sp. (water plantain) and probably some of the *Carex* spp. (sedges). *Montia fontana* (blinks) grows on damp stony ground, as by streamsides. This part of the flora is likely to have come from the vegetation which grew along the waterside, and the remains could then easily be preserved in the wet deposits.

3) weeds. Some weeds are present, showing signs of more open, cultivated land. *Stellaria media* (chickweed), *Chenopodium album* (fat hen), *Atriplex* (orache), *Polygonum aviculare* (knotgrass) and *Sonchus asper* (sow thistle) are ubiquitous garden weeds that may well have grown nearby, although they can be found in most places where human occupation has provided disturbed soil. *Ranunculus* subgenus *Ranunculus* (buttercup) probably also belongs in this

category.

Ranunculus parviflorus (small-flowered buttercup) has a western distribution and is found archaeobotanically, and was 'not uncommon' in certain places a century or so ago (Cadbury et al. 1971, Amphlett & Rea 1909) but is practically unknown today. The main habitat of dry sunny banks might suggest that there was a bank associated with the ditch.

4) crop weeds, crops. *Raphanus raphanistrum* (runch), *Aphanes arvensis* (parsley piert), *Polygonum convolvulus* (black bindweed) and *Valerianella* sp. (lamb's lettuce) are more characteristic of traditional cornfields than garden weeds, and they might be associated with cereal products. There are only traces of crop plants: a charred *Triticum* sp. spikelet fork and a piece of glume (wheat chaff), and some cereal pollen. Other signs of human activity include black soot particles in the pollen preparation showing that there were fires nearby.

5) grasslands. There are also records from a few plants of managed grassland such as seeds of the old meadow characteristic *Rhinanthus* sp. (yellow rattle) and some *Plantago lanceolata* (ribwort plantain) pollen. This could either represent local vegetation or deposited material such as dung. The Gramineae pollen record could represent grasses in a range of different habitats including those already mentioned.

6) Scrub plants were unusually abundant; there were many seeds of woody plants including *Crataegus* sp. (hawthorn), *Prunus spinosa* (sloe), *Acer campestre* (field maple), *Alnus glutinosa* (alder), *Rhamnus catharticus* (purging buckthorn) *Bryonia dioica* (white bryony) and *Rosa* sp. (wild rose)(see Figs 2-3). Maple and buckthorn remains are not often found. There were also twigs and buds and hawthorn or sloe thorns. The pollen record confirms the macrofossil findings with abundant *Alnus*, *Rhamnus*, traces of *Prunus* and *Crataegus*, and adds *Ulmus* (elm), *Fraxinus* (ash), *Hedera* (ivy) and *Euonymus* (spindle) to the list (Fig 3). There was also macrofossil evidence of woodland and hedgerow herbs such as *Moehringia trinervia* (three-nerved sandwort) *Silene* sp. (campion) and *Geranium* sp. (cranesbill). The remains of some of these plants could possibly have been dispersed some distance, for maple seeds have a wind dispersal mechanism, and pollen likewise. However there are also heavier seeds and twigs which are unlikely to have been widely distributed, and the flora therefore probably represents rather local vegetation growing close to the watercourse, if not right beside it.

Discussion

At the time of excavation, this organic material was thought to be yet another exposure of the organic deposits from a large swamp which lay around the western edge of the town (map). Some profiles of this swamp deposit have been investigated, such as the one from the Coulter's Garage site (in Booth 1989). This was slightly older than the Gas House Lane sediment, starting at the level dated 24101 ? 110 bp, (HAR 4905) and the record probably goes up to the medieval period. The aquatic, wetland, weed and grassland parts of the flora were generally similar, but there was scarcely any trace of the distinctive hedgerow component found at Gas House Lane. This suggests that the scrub was not part of the general vegetation around Alcester during the Iron Age and Roman period, but something different in character.

Does this represent a hedge in Alcester?

The suite of "scrub" plants found in the Gas House Lane material is very similar to the flora of modern hedgerows: the most common plants in the (admittedly often artificial) hedgerows in Warwickshire are hawthorn, elder and sloe with field maple at seventh place. Buckthorn and spindle are also found in hedgerows and scrub, especially on calcicolous soils (Cadbury et al. 1971). Historical records show that ancient hedges also contained such taxa (Rackham 1986). This seems to suggest that the ditch might have been bordered by a hedge. However this is hard to prove, for all of the taxa occur in various kinds of natural vegetation as well as hedge.

what is a hedge?

Botanically speaking, hedgerow vegetation contains a range of trees (mainly small), shrubs, climbers and herbs, which is very similar to that of woodclearings, edges and scrub. Indeed, some hedgerows can be shown to be elongated relics of former woodlands, while others have arisen naturally along boundaries when protected from grazing. Yet others have been planted (Rackham 1986). Hedges are really a linear form of scrub. Hedgerow vegetation naturally favours plants which can easily reproduce and spread well there, which includes many bird sown and suckering plants.

The vegetation of hedgerows is moulded by strong

ecological factors, particularly damage from both grazing animals and from cutting and laying - the traditional craft of hedge-laying involving part-cutting of stems and laying them horizontally to form a stock-proof barrier. Thorny scrub plants are favoured by their self-protection and also perhaps through being selected for being more stock-proof. This compares with managed woodland which is traditionally protected against grazing animals. Availability of light is not such a limiting factor as in the case of woodland.

The history of hedgerows has been studied, mainly within the historical period, (Pollard 1974, Rackham 1986) and the correlation between richness of species and age of the hedge established.

The archaeobotany of hedges

Hedgerow plants (in the broadest sense which includes wood glade, wood edge and scrub vegetation) have a long history associated with human settlement. Bandkeramik (earliest Neolithic) charcoal finds in Germany show that many of these plants were used as fuel (Kreuz 1988). The neolithic appearance of records of typical hedgerow shrubs such as *Prunus spinosa* has been discussed by Groenman-van Waateringe (1978)). Occasional seeds of typical hedgerow plants such as buckthorn, hawthorn and sloe and also pollen of maple have been found in Neolithic as well as Bronze Age levels at Runnymede (Berkshire) (Greig 1991). Similar scattered finds of hedgerow plants have been made by Peter Murphy from an Essex site (Murphy 1991). One other site where *Rhamnus catharticus* pollen was found was also dated to the Iron Age, Fiskerton near Lincoln (Greig 1986), and prehistoric hedges have long been suspected on the basis of finds of hawthorn and sloe at Farmoor, Oxfordshire (Robinson 1978). But these are rather scattered records and it would be hard to distinguish hedgerow from scrub and woodland edge vegetation. Almost certain proof of hedge has been found Roman Iron Age remains in Scotland of characteristically crooked hawthorn branches that appeared to have been layed (Boyd 1984). Although such conclusive evidence has not been found at Alcester, the concentration of typical hedgerow taxa at a boundary of some kind seems to show that there was a hedge here.

Representation

Representation of remains is a very problematic area when trying to interpret such material as this. The hedgerow plants have been discussed purely on the basis of presence (other taxa may well have been there, but have not been found). It would be desirable to study modern deposits from ditches bordered by hedges to compare the representation of seeds, pollen, and buds etc. so as to be able to make some kind of estimate of relative abundance of plants in past landscapes such as at this Alcester site.

Identification notes

The word "seed" is generally used here to minimise jargon. *Acer campestre* seeds are distinctive on the tree, growing in pairs, each seed with a wing. The subfossil specimens were single and did not have the wing, just the signs of where it had been attached. The better preserved ones were complete with their outer layers (fig 2a, b). The seeds were flat, 5-6mm from attachment scar to wing remains and the same across, x 2mm thick with a straight edge where the seed pairs had been joined together, an often with a prominent lump, making the seed about 3 mm thick there (2c). The outermost surface was mid to dark brown, smooth and undulating, with hairs still present in some cases, shown in the side view (2c). However this particular layer detached easily and many seeds had lost it. The layer underneath was pale brown, with a pattern of veins. Some of the seeds had split into two, so there were half seed coats present. There were also the shiny dark red-brown inner seeds about 4.5 x 3.5 x 1.5 mm, with an elongated cell pattern radiating from the hylum (2e), faintly reminiscent of *Rhinanthus*, although twice the size.

The seeds of *Acer pseudoplanatus* are much less flat, and the attachment point is not directly opposite the wing, but rather at a slight angle, so this identification is quite clear. *A. pseudoplatanus* was introduced in the 15th or 16th C, so it would not be expected in Iron Age deposits.

Crataegus monogyna fruits were occasionally preserved more or less whole, dark coloured, with calyx base (to which the flower was attached) and attachment point to stalk, approximately 5.5 x 3.5 x 3.5 mm (fig 3a). Others had lost these outer layers and exposed the pale underneath, with irregular ridges like those found in *Sparganium*. also seeds, about 4.8 x 3.2 x 3.2 mm (3b). Still further decay eroded the seed down to the fruitstone itself, actually rather spongy material with an undulating surface and a prominent hylum, roughly 4 x 3 x 3mm (3c).

Crataegus seeds can have three quite different appearances, according to which layer happens to be exposed.

Rhamnus catharticus seeds are shaped like an orange segment with two flat sides at an angle, and a rounded side and are 3.2 x 2 x 2mm (fig 2e). The thin seed coat often becomes misshapen. There is a hylum at the apex (the sharp end), and a furrow or groove running round the ventral surface. The seed surface is pale in colour, and the cell pattern on it with has cell rows running at rightangles to the furrow. It corresponds with modern reference material quite well. The other British member of the Rhamnaceae, *Frangula alnus* (alder buckthorn), has rather differently-shaped seeds.

The pollen (2k) was subangular in polar view (between triangular and circular), and tricolporate (three pores and three furrows), with distinct pores that were elongated equatorially. The surface pattern was a soft reticulum in which separate columellae could not be seen, even with phase contrast. A typical size was 22 ?m in glycerin jelly. This pollen could easily be confused with that of some Leguminosae when lying in certain positions.

Prunus spinosa (2f) a fruitstone. These were rounded, measuring around 5 mm which suggests that they are from *P. spinosa* var. *microcarpa*, the completely wild sloe rather than from one of the hybrids with *P. cerasifera*.

Euonymus europaeus pollen. This was tricolporate and with fairly coarse columellae giving a reticulate (network) pattern. The pollen measured 29 ?m. The sculpturing pattern and other features of the single grain were compared on two quite separate occasions, and were a fairly good match with the reference material, and the alternatives in the key such as *Viburnum* seemed clearly different. The columellae did not neem to be in double rows as per the key (Fægri & Iversen 1989), but rather in somewhat scatterd rows. It would obviously have been better to have found some more subfossil grains to compare, but a scan of the rest of the slide failed to reveal any more.

Acknowledgements

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sample	336/0/1	346/0/7	/8	/4
Ranunculus subgenus *Ranunculus* (buttercups)	-	+	+	-
Ranunculus parviflorus L. (small-flowered b'cup)	-	+	-	
Ranunculus flammula L. (lesser spearwort)	-	+	+	-
Ranunculus sceleratus L. (ivy-lvd water crowfoot)	+	-	+	-
Ranunculus subgenus *Batrachium* (buttercups)	+	+	+	-
RANUNCULUS TP (buttercups)	-	-	-	1
Ceratophyllum demersum L. (hornwort)	+	+	+	-
Fumaria sp. (fumitory)	-	-	+	-
Raphanus raphanistrum L. (runch)	+	-	-	-
Nasturtium officinale L. (watercress)	+	-	+	-
Viola sp. (violet or pansy)	+	+	+	-
Silene sp. (campion)	+	+	+	-
Lychnis flos-cuculi L. (ragged robin)	+	+	+	-
? *Myosoton aquaticum*L.(Moench) (water chickweed)	-	-	+	-
Stellaria media (L.) Vill. (chickweed)	+	+	+	-
Stellaria palustris/graminea (stitchwort)	-	-	+	-
Moehringia trinervia (L.) Clairv. (3-nerved sandwort)	-	-	+	-
CARYOPHYLLACEAE	-	-	-	+
Montia fontana ssp. *chondrosperma* (Fenzl) Walters (blinks)	+	-	+	-
Chenopodium album L. (fat hen) .	+	-	+	-
Atriplex sp. (orache)	+	+	+	-
Malva sp. (mallow)	-	+	-	-
Geranium sp. (cranesbill)	-	-	+	-
Acer campestre L. (maple)	+	-	++	-
Rhamnus catharticus L. (buckthorn)	+	-	+	38
EUONYMUS EUROPAEUS L. (spindle)	-	-	-	3
Trifolium sp. corolla (clover)	+	-	+	-
Filipendula ulmaria L. (meadowsweet)	+	+	+	-
Rubus fruticosus agg. (bramble)	+	+	+	-
Potentilla anserina L. (silverweed)	+	+	+	-
Potentilla sp. (cinquefoil)	-	-	+	1
Aphanes sp. (parsley piert)	+	-	+	-
Rosa sp. (wild rose)	+	+	+	-
Prunus spinosa L. (sloe)	+	-	+	+
Crataegus monogyna Jacq. (hawthorn)	+	-	+	1

sample	*336/0/1*	*346/0/7*	*/8*	*/4*
Prunus/Crataegus thorns (sloe or hawthorn)	+	+	+	-
Epilobium sp. (willowherb)	+	-	+	-
Hydrocotyle vulgaris L. (pennywort)	-	-	+	-
Berula erecta (Hudson) Coville (water parsnip)	-	+	-	-
Aethusa cynapium L. (fool's parsley)	+	-	+	-
Conium maculatum L. (hemlock)	+	+	+	-
Apium nodiflorum (L.) Lag. (fool's watercress)	+	-	+	-
Heracleum sphondylium L. (cow parsley)	-	-	+	-
UMBELLIFERAE (umbellifers)	-	-	-	1
Bryonia dioica Jacq. (white bryony)	+	-	-	-
HEDERA (ivy)	-	-	-	1
Polygonum aviculare agg. (knotgrass)	+	-	+	-
Polygonum persicaria L. (persicaria)	-	-	+	-
Polygonum lapathifolium L.(pale persicaria)	+	-	+	-
Polygonum convolvulus L. (black bindweed)	+	-	+	-
Rumex acetosella agg. (sorrel)	+	-	+	-
Rumex spp. (docks)	+	+	+	1
Urtica urens L. (small nettle)	+	+	+	-
Urtica dioica L. (stinging nettle)	+	+	+	-
ULMUS (elm)	-	-	-	7
BETULA (birch)	-	-	-	+
Alnus glutinosa (L.) Gaertner (alder)	++	+	++	33
CORYLUS (hazel)	-	-	-	1
QUERCUS (oak)	-	-	-	1
FRAXINUS (ash)	-	-	-	2
ERICACEAE (heathers)	-	-	-	+
Solanum nigrum L. (black nightshade)	+	+	+	-
Linaria vulgaris Miller (yellow toadflax)	+	-	-	-
Rhinanthus sp. (yellow rattle)	+	-	+	-
Mentha sp. (mint)	-	-	+	-
Lycopus europaeus L. (gypsywort)	+	+	+	-
Prunella vulgaris L. (self-heal)	+	+	+	-
? *Ballota nigra* L. (black horehound)	+	-	-	-
Galeopsis sp. (hemp-nettle)	-	+	-	-
Plantago media L. (hoary plantain)	+	-	+	-
PLANTAGO LANCEOLATA L. (ribwort)	-	-	-	4

sample	*336/0/1*	*346/0/7*	*/8*	*/4*
Galium sp. (bedstraw)	-	-	+	-
GALIUM TP (bedstraws etc.)	-	-	-	1
Sambucus nigra L. (elder)	+	+	+	4
Valerianella sp. (lamb's lettuce)	+	+	+	-
? *Senecio* sp. ragwort)	-	-	+	-
Arctium sp. (burdock)	+	-	-	-
Carduus sp. (thistle)	+	+	+	-
Cirsium sp. (thistle)	+	+	+	-
CARDUUS / CIRSIUM TP. (thistles)	-	-	-	+
Sonchus oleraceus L. (sow thistle)	+	-	-	-
Sonchus asper (L.) Hill (sow thistle)	+	+	+	-
Lapsana communis L. (nipplewort)	+	+	+	-
Taraxacum sp. (dandelion)	-	+	-	-
COMPOSITAE *(LIGULIFLORAE)*	-	-	-	5
Alisma sp. (water plantain)	+	+	+	-
POTAMOGETONACEAE TP. (pondweeds)	-	-	-	1
Zannichellia palustris L. (horned pondweed)	+	+	+	-
Lemna sp. (duckweed)	+	-	-	-
Sparganium sp. (bur-reed)	+	-	-	-
SPARGANIUM/TYPHA ANG. TP (reedmace etc.)	-	-	-	3
Eleocharis sp. (spike-rush)	+	+	+	-
Scirpus/Schoenoplectus (bulrush)	+	+	+	-
Carex spp. (sedges)	+	+	+	-
CYPERACEAE (sedges etc.)	-	-	-	6
GRAMINEAE <40µm (grasses)	-	-	-	20
Triticum sp. charred rhachis (wheaten chaff)	+	-	-	-
Triticum sp. charred grain (wheat)	+	-	-	-
CEREALIA TP. >40µm (cereals)	-	-	-	6

Table 1: Plant species list from ditch at Alcester, Gas House Lane (site AL23). Samples 336/0/1, 346/0/7, 346/0/8 macrofossils recorded as present (+) or abundant (++), and 346/0/4 pollen in numbers of grains or presence, pollen types in capitals. Names from Clapham et al. (1987), pollen types after Fægri & Iversen 1989).

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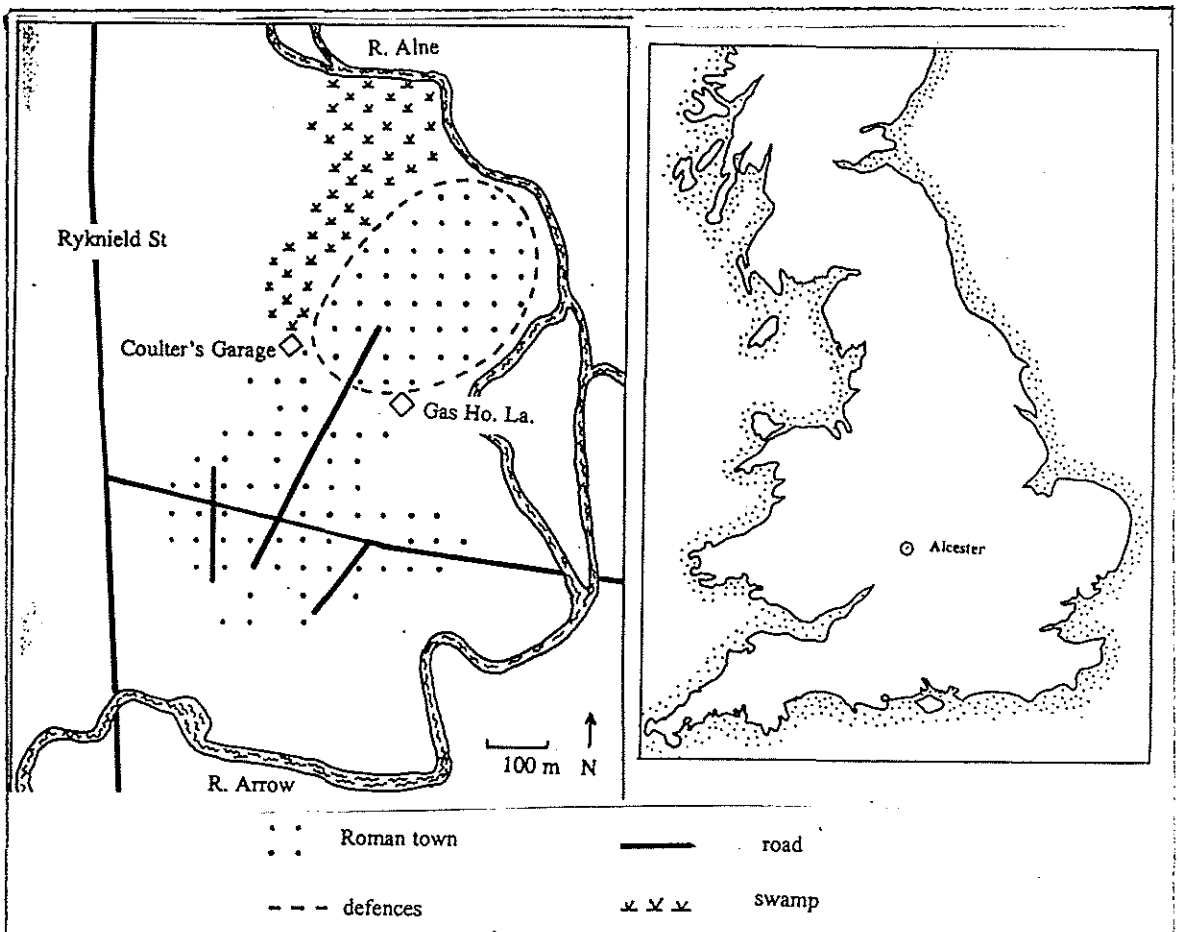
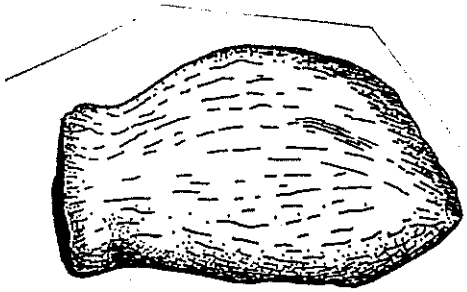
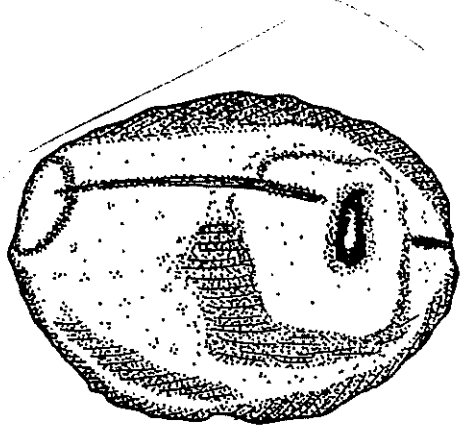


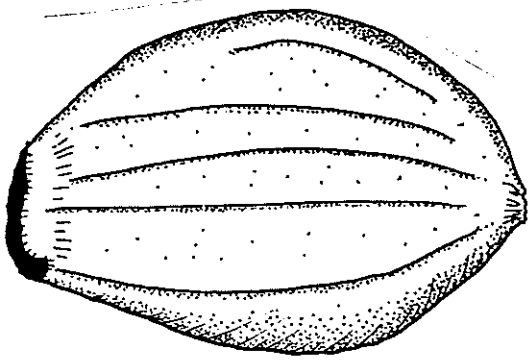
Fig 1 Alcester site map



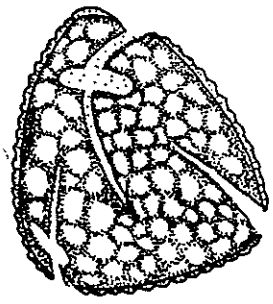
2e *Crataegus monogyna* whole fruit



2g *Crataegus monogyna* fruitstone

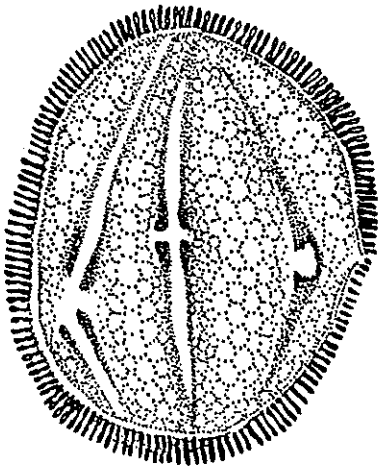


2f *Crataegus monogyna* inner fruit



30um

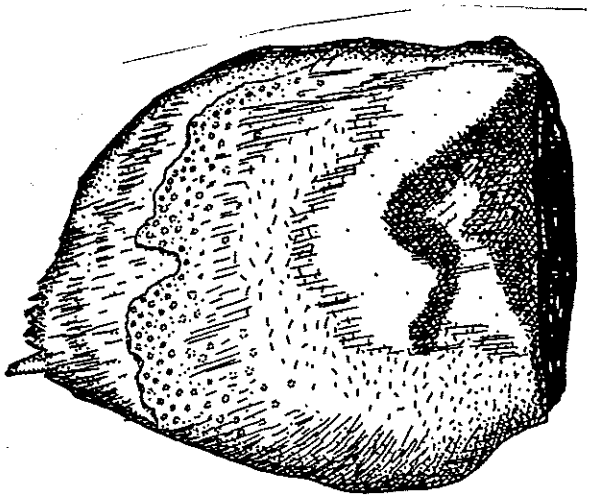
2j *Rhamnus catharticus* pollen

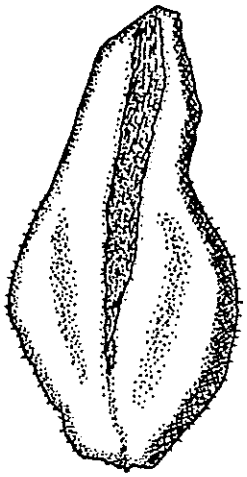


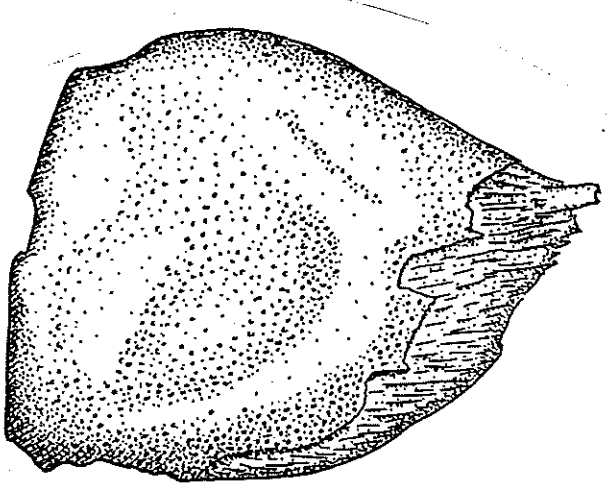
2k *Euonymus europaeus* pollen

Fig 3

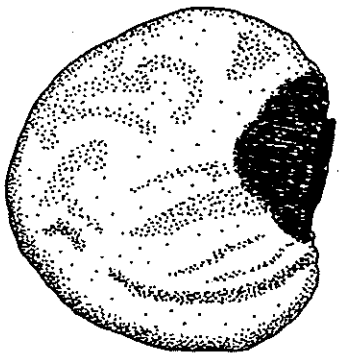
2a, 2b, 2c *Acer campestre* seed with outer layer.



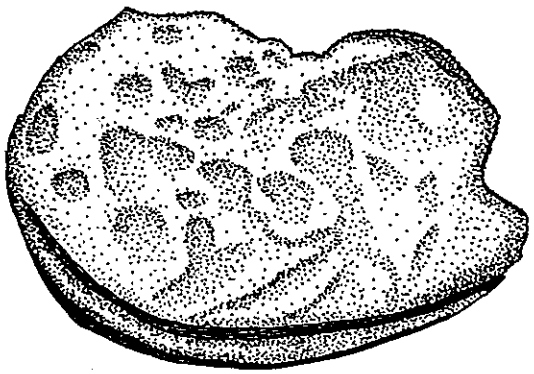




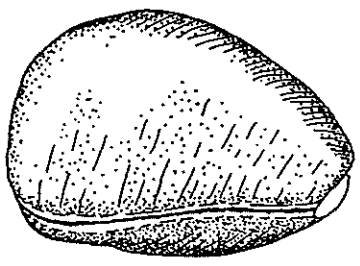
2d *Acer campestre* inner seed



2i *Prunus spinosa* fruitstone



2h *Rhamnus catharticus* seed



1mm

Fig 2 Iron Age plant remains from Alcester, Gas House Lane

Summary

A ditch fill contained a flora rich in seeds of *Crataegus* (hawthorn), *Prunus spinosa* (sloe), *Acer campestre* (field maple) and *Rhamnus catharticus* (purging buckthorn) as well as other plants typical of hedges. The remains can be confidently interpreted as the remains of a hedged and ditched boundary, and the radiocarbon date shows that it is of Iron Age date.