

Ancient Monuments Laboratory
Report 45/90

ACTON COURT AVON: PLANT AND ANIMAL
MACROFOSSILS FROM MID SIXTEENTH
CENTURY FILLS OF THE MOAT.

Eric Robinson & Vanessa Straker

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Summary

Plant macrofossils and ostracods were studied from two contexts. The ostracods provide evidence that the moat contained still water conditions more similar to an open pond than a weed choked ditch.

The plants include species of woods and hedges, disturbed and arable conditions, damp grassland, marsh and bankside situations and standing water. The presence of an intermitently flooded nitrophilous annual community suggests that the waterlevel was reduced somewhat in the summer months exposing nutrient rich mud.

Edible plants were limited and included a number of fennel seeds (*Foeniculum vulgare*). Despite the fact that garderobes did decant into the east arm of the moat, there is no positive evidence to suggest that the edible plants derive from sewage rather than other domestic waste.

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ACTON COURT, AVON: PLANT AND ANIMAL MACROFOSSILS FROM MID SIXTEENTH CENTURY
FILLS OF THE MOAT

by Eric Robinson and Vanessa Straker

Introduction

Two contexts were sampled from the basal layers of the moat at Acton Court. These layers are very precisely dated. Context 1064 was sealed beneath the infill at the north end of the west range and represents accumulation between c. 1535 and 1545. Context 2027 accumulated at the bottom of the east arm of the moat between about 1535 and 1555 when the moat was filled in (Bell, pers comm).

Ten litre samples were assessed by processing as follows. The float was collected on a 250 micron mesh and the residue on several meshes, the minimum of which was 500 microns. The sediments were wet, and as a result preservation of plant and animal macrofossils was good.

All the residues were completely sorted to extract the macrofossils. A small proportion of the float (c. 5%) was sorted as it contained mostly large numbers of seeds of the same few plant taxa (see Table 1).

The Table below lists the macrofossils present in the samples:

	1064	2027	
animal and bird bone	-	o	
molluscs (mostly aquatic)	-		m
fly puparia (occasional)	-		o
beetles and other arthropods	o	m	
cladoceran (water flea) ephyppia	-		f
ostracods	o	f	
moss	m	m	
buds	-	o	
seeds/fruits	m		m

Key: o - occasional; m - moderate; f - frequent

As time and resources were limited only the seeds and ostracods were examined and form the subject of this report. Seeds were studied from the whole of each sample and ostracods from a 500gm (c. 350 ml) subsample from context 2029.

Ostracods

The fauna is listed below:

11	<i>Cyclocypris laevis</i> (O.F. Müller) 3v A-I, 7v 7c
14	<i>Limnocythere inopinata</i> (Baird) 2v
17-8	<i>Cypria ophthalmica</i> (Jurine) 4v A-II, 4v A-I, 24v, 25c
22-24	<i>Candona candida</i> (O.F. Müller) 2v A-I, 17v 10c
25-29	<i>Candona neglecta</i> Sars 14v 20c A-IV, 6v AIII, 10v AII, 6v A-I, 12v 6c (male and female)

The fauna is made up of five different species, which is about average for a small pond. *Candona neglecta* (40%), a bottom burrower or crawler almost balances with *Cypria ophthalmica* (31%) which is an actively free-swimming species. *Cyclocypris laevis* (15%) is another free swimmer. *Limnocythere inopinata* (2%), although a minor element in the total fauna, nevertheless is a sure indication of a still-water environment; it is the usual indicator of lake conditions. On balance, the ostracods suggest that the moat was more of an open water pond than a weed-choked overgrown morass. There is a general absence of weed-climbing species such as *Herpetocypris* which often occurs in reed beds.

There is a higher than usual ratio of carapaces (c) to single valves (v) in the fauna. As valves separate easily after death with just the slightest current or water movement, this number of still-joined valves is a further testimony for quiet water conditions.

Plant macrofossils (excluding moss)

These are listed in detail in Table 1 and are classified according to Clapham *et al.* (1987). In the following section the taxa have been separated into various ecological groups for the purpose of discussion. However, these are based on the present-day understanding of the ecology of the plants which may have changed somewhat over the last few hundred years. Also, some plants which can grow in a range of habitats appear in more than one group.

Key: C - cultivated; * - taxa occurring in more than one ecological group.

Edible plants (C - cultivated)

Brassica nigra (black mustard) ?C
Corylus avellana (hazel)
Ficus carica (fig) C
Foeniculum vulgare (fennel) C
Fragaria vesca (strawberry) ?C
Malus sylvestris/domestica (crab/cultivated apple)
Prunus domestica ssp. *insititia* (bullace)
Prunus spinosa (sloe)
Rubus fruticosus (blackberry)
Rubus idaeus (raspberry)
 cf. *Tanacetum parthenicum* (feverfew) ?C
Triticum sp. (wheat) C
Triticum cf. *aestivum* (breadwheat) C
Vitis vinifera (vine) C

The list of edible plants from Acton Court is surprisingly small and includes taxa which have been identified in many medieval contexts (Greig 1988) including the fifteenth century barrel latrine at Worcester and the moat at Cowick (Greig 1981; 1986). The fruits and nuts at Acton Court include fig, grape, apple, sloe, bullace, strawberry, blackberry and raspberry and hazel. The fig was probably imported. Grapes were home-produced at the time, but were also imported and it is not possible to tell from the seeds which is represented. Most of the fruits could have been collected from hedgerows or woodland edges. Sloe, bullace, raspberry, blackberry and hazel would have been easy to obtain. Strawberries could have been collected wild from woodland or, at this period, been

deliberately cultivated. Likewise the apple could have been an orchard crop or collected from hedgerows or woodland. Greig (1981) draws attention to the facts that only the sour damson and sloe were found in the Worcester barrel latrine although by this time cultivated form of plum were available. The same can be said for Acton Court. By 1912, bullace was rare in the Bristol area (White, 1972).

The only spices present were fennel and black mustard. Fennel is commonly found in sites of medieval and later date and was probably cultivated for its seeds although its fleshy stems can also be eaten. As well as its use as a food flavouring it also had medicinal properties (Greig 1981, 280). Black mustard seeds could have been used to flavour food or for the extraction of oil. White (1972, 152) noted that black mustard is found on river banks and borders of cultivated fields in the Bristol area and so it is possible in the present situation that the plant was not used as a spice at all.

Feverfew has been tentatively identified. It has several close relatives with which confusion is possible. Nevertheless this is a common garden herb and disturbed ground plant today and well known for its medicinal properties.

The only cereals that were present were two charred grains of wheat, one of which is probably of breadwheat, the free threshing form most common on post Roman sites. It was noticeable that there were no waterlogged remains of cereal bran and that all the seeds of food plants were in a good condition. Although seeds such as fig and blackberry are common in cess pits, the condition of the seeds and the lack of bran suggests that the food plants represent domestic waste thrown into the moat rather than sewage flushed into it. However, there were three garderobes in the Period 4.1 east range which decanted into the east arm of the moat, which was open when they were constructed. The presence of sewage despite the apparent evidence to the contrary cannot be ruled out. It was positively identified as contributing to the fill of the moat at Cowick (Greig, 1986).

Woods, hedges, scrub

Corylus avellana (hazel)
Fragaria vesca (strawberry)
Malus sylvestris/domestica (crab/cultivated apple)
Prunus domestica ssp. *insititia* (bullace)
Prunus spinosa (sloe)
Rubus fruticosus (blackberry)
Rubus idaeus (raspberry)
Solanum dulcamara (bittersweet)
Stellaria holostea (greater stitchwort)

With the exception of bittersweet and greater stitchwort, all the plants in this group are edible and have been discussed above. The fact that there are so few plants that would not have been collected deliberately suggests that woodland edge/ hedgerow habitats were not present in the vicinity of the moat.

Disturbed, waste ground and arable

Anthemis cotula (stinking mayweed), especially heavy soils
Cerastium fontanum (common mouse-eared chickweed)
 **Chenopodium rubrum/botryodes* (red goosefoot)
Cirsium arvense (creeping thistle)
Galeopsis tetrahit (common hemp nettle)
Myosotis arvensis (field forget-me-not)
Polygonum aviculare gp. (knotgrass)
Polygonum persicaria (redshank) (especially damp ground and beside ponds)
Ranunculus sardous (hairy buttercup) (damp ground)
Sonchus asper (spiny milk- or sow-thistle)
Sonchus oleraceus (Milk- or sow-thistle)
Stellaria media (Chickweed)
 cf *Tanacetum parthenicum* (also ?C) (feverfew)

Many of the species listed above could have grown as arable weeds, but could equally have thrived on disturbed or waste ground. None were preserved in a carbonised form in contrast to the two grains of wheat, the only evidence for arable crops.

The hairy buttercup is recorded in the Bristol Flora published in 1912 (White 1972) as being found on damp waste ground, pasture and cultivated land but as being very rare. Redshank also is characteristic of damp ground. The Bristol Flora (1972) records stinking mayweed as 'frequent' (in 1912) which is interesting as today it is extremely rare and was probably one of the casualties of the widespread use of herbicides.

Damp meadow and pasture

**Carex* sp. (sedge)
 **Chenopodium rubrum/botryodes* (red goosefoot)
 **Eleocharis palustris/uniglumis* (spike-rush)
 **Juncus bufonius* (toad rush)
 **Juncus inflexus/effusus* (hard/soft rush)
Ranunculus cf *acris* (meadow buttercup)
Ranunculus cf *repens* (creeping buttercup)
Rumex conglomeratus (sharp dock)

This group of plants is somewhat problematic as many of its members can also be found in other situations. Nevertheless, it is very probable that damp grassland, perhaps in the form of meadow or pasture was present in the vicinity of the moat.

Marshes, fens, bankside

Bidens tripartita (tripartite bur-marigold)
 **Carex* sp. (sedge)
Conium maculatum (hemlock) or damp open woods
 **Eleocharis palustris/uniglumis* (spike-rush)
 **Juncus bufonius* (toad rush)
 **Juncus inflexus/effusus* (hard/soft rush)
Lycopus europaeus (gypsywort)
Lysimachia vulgaris (yellow loosestrife)

Polygonum hydropiper (water pepper)
 **Polygonum persicaria* (especially damp ground and beside ponds)
Ranunculus sceleratus (celery-leaved crowfoot)
Rorippa palustris (common marsh yellow-cress)
Typha sp. (bulrush)

Aquatics

Ceratophyllum demersum (rigid hornwort)
Lemna sp. (duckweed)
Menyanthes trifoliata (bogbean)
Potamogeton sp. (pondweed)
Ranunculus Subgenus *Batrachium* (water crowfoot)

These two groups give the most useful information about conditions in the moat itself and will be discussed together. Some elements can be discussed best with reference to the European ecological communities described by Ellenberg (1988). This is based upon the vegetation of central Europe of the present day and recent past. It can also be applied to Britain though it should be accepted that problems such as the maritime aspect of the British climate and the fact that plant communities in the past were not necessarily the same as those of today, affect its application. Unfortunately there is no published British alternative.

Ellenberg (1988, 612) describes a Class termed the Bidentetea which includes intermittently flooded nitrophilous annual communities. The tripartite bur-marigold (*Bidens tripartita*) is characteristic of the class and water pepper (*Polygonum hydropiper*) and celery-leaved crowfoot (*Ranunculus sceleratus*) of its alliance Bidention tripartite. This may also have included the marsh yellow-cress. *Chenopodium rubrum* is one of the characteristic species of the alliance Chenopodion rubri which is very similar but regarded by Ellenberg as a near natural rather than ruderal community. Plants in these communities require water, abundant nutrients, bare ground and light in order to enable them to get a good start before there is competition from perennials. The nutrient rich mud of ponds and pools drying out in the summer is ideal with the nutrients supplied from effluent, waste or animals.

There are a small number of taxa which are aquatic. Hornwort is not rooted and is free floating. Water crowfoot has floating and submerged leaves and most of the members of this large group of plants are perennial in habit, which is the case with the other aquatics in the moat. Pondweed (*Potamogeton*) is rooted but has submerged leaves and duckweed (*Lemna*) is also free floating with submerged leaves. Bogbean is also aquatic but is not free floating and has leaves and flowers above the water. Natural plant succession would result in the eventual development of 'reedswamp' communities and the almost total lack of the tall emergent vegetation typical of this (a single bulrush seed) suggests that the natural succession has been stopped, perhaps by clearing out of the moat before the communities became established. The spike-rush, other rushes (*Juncus* spp) and sedge could have grown on the damp margins of the moat or, as suggested above, in wet meadow or pasture and hemlock is common beside ponds or on river banks.

Exactly how the moat was fed has not been established. The most likely option is that it was fed by a stone lined conduit bringing water across

the north field. This would allow the water level to drop in the summer, without the moat becoming completely dry (Bell pers. comm.).

Various

Potentilla sp. (tormentil)

Rumex sp. (sorrel)

Urtica dioica (stinging nettle), nitrogen enriched, often damp ground. This could have grown on the nutrient rich mud above the water level.

Discussion

Both the plant remains and the ostracods testify to the fact that the moat contained still water. Although there were aquatic plants in the moat they were not plentiful enough to choke it and the water level dropped in the summer to expose nutrient rich mud which supported a range of annual plants. The lack of tall reeds and bulrushes is suggested by the ostracods and supported by the almost complete absence of the seeds or stems of these plants. Plants of disturbed, often nutrient rich ground are present as well as an element of damp grassland flora. There is no substantial evidence for garden or orchard plants as many of the food plants could have been collected from hedges or woodlands, but the possibility exists that there was garden cultivation of fennel and black mustard and some of the fruits could have been orchard grown. The food plants are probably discarded kitchen waste rather than the contents of garderobes.

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Table 1 ACTON COURT, AVON: WATERLOGGED PLANT REMAINS FROM THE MOAT

FAMILY	TAXON	COMMON NAME	CONTEXTS	
			1064	2029
RANUNCULACEAE	Ranunculus cf. acris L. subsp. acris	Meadow buttercup	1	0
	R. cf. repens L.	Creeping buttercup	4	0
	R. sardous Crantz	Hairy buttercup	8	0
	R. sceleratus L.	Celery-leaved crowfoot	34+	88+
	R. subgenus Ranunculus		5	2
	R. subgenus Batrachium	Water crowfoot	0	15
CERATOPHYLLACEAE	Ceratophyllum demersum L.	Rigid hornwort	3	5
CRUCIFERAE	Brassica nigra L.	Black mustard	0	8
	Rorippa palustris (L.) Besser	Common marsh yellow-cress	0	3
CARYOPHYLLACEAE	Cerastium fontanum Baumg.	Common mouse-eared chickweed	0	1
	Stellaria media (L.) Vill.	Chickweed	0	4
	S. holostea L.	Greater stitchwort	1	0
CHENOPODIACEAE	Chenopodium rubrum L. or botryodes Sa.	Red goosefoot	0	16
VITACEAE	Vitis vinifera L.	Vine	2	1.5
ROSACEAE	Rubus idaeus L.	Raspberry	0	1
	Rubus fruticosus sens. lat.	Blackberry	22	1
	Potentilla sp.	Tormentil	1	0
	Fragaria vesca L.	Wild strawberry	1	0
	Prunus spinosa L.	Blackthorn	3	0
	P. domestica subsp. insititia (L.) C.K. Schneider	Bullace	0	1
	Malus sylvestris/doestica	Crab/cultivated apple	0	1
	Foeniculum vulgare Miller	Fennel	0	38
UMBELLIFERAE	Conium maculatum L.	Henlock	0	1
	Polygonum aviculare group	Knotgrass	3	2
POLYGONACEAE	P. persicaria L.	Redshank	2	24
	P. hydropiper L.	Water-pepper	25	8
	Rumex conglomeratus Murray (with perianth)	Sharp dock	6	1
	Rumex sp. (nutlet with perianth segments)	Sorrel	6	1
	Rumex sp. (nutlet only)	Sorrel	1	5
	Rumex sp. (tubercle)	Sorrel	0	1
	Urtica dioica L.	Stinging nettle	14	24+
URTICACEAE				
FICACEAE	Ficus carica L.	Fig	2	0
CORYLACEAE	Corylus avellana L.	Hazel (nut fragments)	0	1
PRINULACEAE	Lysimachia vulgaris L.	Yellow loosestrife	0	1
MENYANTHACEAE	Menyanthes trifoliata L.	Bogbean	0	14
BORAGINACEAE	Myosotis arvensis (L.) Hill	Field forget-me-not	1	0
SOLANACEAE	Solanum dulcamara L.	Bittersweet	0	0
LABIATAE	Lycopus europaeus L.	Gypsomort	1	1
	Galeopsis tetrahit L.	Common heap nettle	1	1
CAPRIFOLIACEAE	Sambucus nigra L.	Elder	3	4
COMPOSITAE	Bidens tripartita L.	Tripartite bur-marigold	0	1
	Anthemis cotula L.	Stinking mayweed	0	1
	cf. Tanacetum parthenicum (L.) Schultz Bip.	Feverfew	3	0
	Cirsium cf. arvense L.	Creeping thistle	1	0
	Sonchus oleraceus L.	Milk-or sow-thistle	1	4
	Sonchus asper (L.) Hill	Spiny milk-or sow-thistle	0	2
	Potamogeton sp.	Pondweed	0	1
	Juncus cf. inflexus L./effusus L.	Hard/soft rush	13	0
J. cf. bufonius group	Toad rush	5	0	
LEMNACEAE	Lemna sp.	Duckweed	3	14+
TYPHACEAE	Typha sp.	Bulrush	0	1
CYPERACEAE	Eleocharis palustris/uniglumis	Spike-rush	2	0
	Carex sp.	Sedge	1	0
GRAMINEAE	Triticum sp. (charred grain)	Wheat	1	0
	T. cf. aestivum s.l. (charred grain)	Bread wheat	1	0
FAGACEAE	cf. Quercus sp. (leaf buds)	Oak	0	5
		totals	147+	177.5+