Ancient Monuments Laboratory
Report 65/91

THE PLANT REMAINS IN THE ROMAN WELL FILL FROM DROITWICH, BAY'S MEADOW (WORCESTERSHIRE)

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Summary

The Roman well fill accumulated in the time after around 296 A.D. during an interruption in the occupation of the site, a Roman Villa. Some of the most numerous seeds were from weeds. Among these were some which require warm habitats, and are uncommon (except as casuals) in Britain now, notably henbane and cotton thistle. These finding have been compared with those from other Roman wells as an aid to understanding as much as possible of the Roman landscape.

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INTRODUCTION

plant remains from wells

Wells, being by nature at least partly waterlogged, can provide ideal conditions for the preservation of plant and other organic remains on archaeological sites, and even charred material is often very much better preserved than it is in surface features such as shallow pits and kilns. Roman wells have often been found and sometimes investigated for plant and animal remains. One of the first botanists studying these macrofossil floras was Clement Reid (1901) who analysed the plant remains in the 'vegetable mould' from Roman well fills at Silchester; for the interpretation he had the advantage that the landscape was then more the traditional one (before the development of many modern farming methods) which may have had more in common with the Roman one than ours today. Little more was done on this subject for some sixty years, but recently there have been a number of publications of archaeobotanical results from Roman wells. Results from wells have been considered as convenient sources of early or otherwise interesting plant records and particularly cultivated plants. The way in which the deposits formed ('taphonomy') has started to receive attention, particularly when there are a number of lines of evidence (Hall et al. 1980, Kenward et al. 1986, Robinson 1986), as has the interpretation of the surrounding landscape (Lambrick & Robinson 1978).

METHODS

Excavation of the Droitwich well

The Roman well was excavated in the summer of 1972 during the excavations on the site of the Roman villa at Bay's Meadow, Droitwich (Worcestershire) (map reference SO 899 637) which was then the training dig of the Department of Ancient History & Archaeology of Birmingham University, which was directed by Dr L.H. Barfield. Its contents were dated to around A.D. 298.

Environmental sampling

Sediment from the well was collected for environmental analyses by Paul Buckland, the late Maureen Girling, James Greig, Harry Kenward and Peter Osborne (see plate 1). The well was excavated to a depth of about 6 metres, at which depth the stone lining was still in place, the upper layers having been removed over the years. Towards the bottom of the well shaft the lining finished, and excavation was not possible much below this because of the danger of collapse. Fine sampling was not possible on account of the disturbed nature of the excavated surface, the water running in and the large objects incorporated into it which at times spanned many centimetres of deposition. Several different samples were taken, however, and their contents have been identified separately. The amount of material collected was about 50 kg, a plastic dustbin full, from two main batches of sediment about 15 cm thick. Other environmental material was collected from the sediment washed from the large animal bones. The matrix in the well consisted of grey clayey material with vast numbers of small animal bones, wood and pottery. The sediments of the well seemed to be fairly uniform, with no great changes.

Sample processing

After excavation, the plant and animal remains were extracted from this sediment. It was broken down in water and sieved on a 0.3 mm mesh to remove

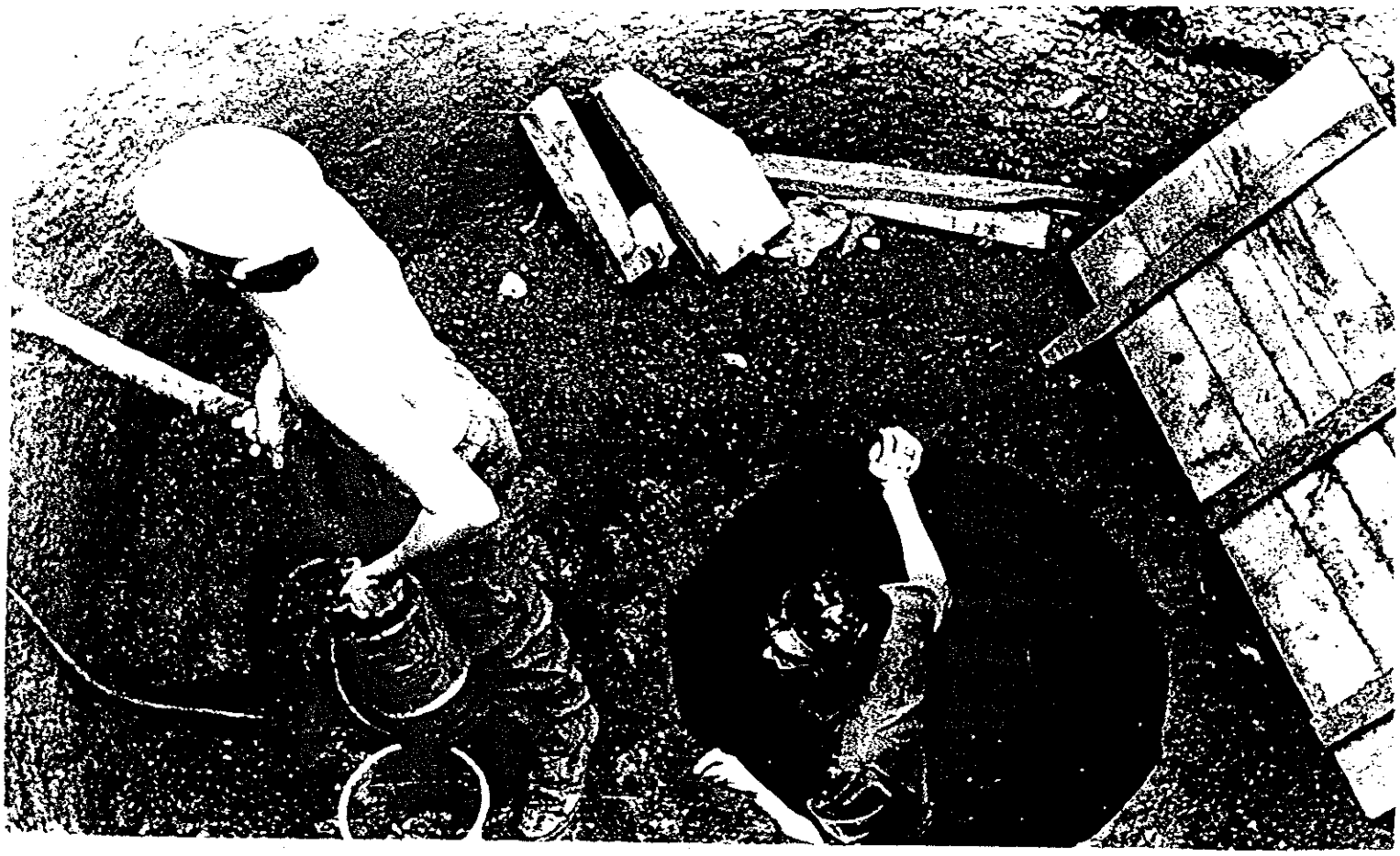

Plate 1. the excavation of the well in 1972. Paul Buckland (l.) holds the pump used to remove the constantly flowing water, and Harry Kenward (r.) stands in the stone lined well shaft.

fine silt and clay. Organic material was then floated off by washing over from one bowl into another. The plant macrofossils came from this organic fraction and the small animal bones were extracted from the residue. The insect remains in the organic fraction were concentrated by paraffin flotation. Much of the sample processing was done by Peter Osborne in the Geology Department at Birmingham University.

The plant remains from the Droitwich well were recovered from the material that had already been processed for the extraction of arthropods as described above. The organic material washed over into the sieve consisted of a mass of moss, wood chips and other material including seeds. This was re-sieved on meshes of 4mm, 1mm and 0.3mm for ease in sorting, and the plant remains were sorted, extracted, identified and stored in alcohol. Further material was looked through to record the presence of any more taxa beside those counted.

Waterlogged seeds were abundant in the sediment. There were a few charred cereal remains too (marked * in the seed list). Mosses were abundant, and there were small pieces of wood like chips, and fragments of wood charcoal although these have not been identified. Pollen analysis was not done because at the time of analysis (1972), the writer had not discovered the usefulness of pollen results from archaeological sediments. The plant list is given in taxonomic order (Clapham et al. 1962). One sample has been studied thoroughly. Further material has been looked through without counting the seeds, to find any additional taxa that might be present in very small numbers. The material appears uniform.

As well as this work on plant remains from the well, insects and animal remains were also studied. Botanical and zoological work was also done on material from the rest of the site, results which are only mentioned in passing in this report, but which will hopefully appear in an integrated form in the final report.

RESULTS

The plants identified are listed in Table 1 (at end of text). This fossil flora can best be discussed in terms of the different vegetational groups represented by the plants.

the main plant communities

Weeds are dominant both in numbers of taxa and the numbers of the weed seeds themselves. Perennial weeds such as *Urtica dioica* (common nettle) were the most abundant. *Conium maculatum* (hemlock) was also very abundant followed by *Arctium* sp. (burdock), and biennial weeds including many *Carduus* and *Cirsium* thistles, and *Sonchus asper* (sow thistle). *Taraxacum* sp. (dandelions) probably also grew in such weedy vegetation.

There were many spring-germinating annual weeds such as *Chenopodium* species (goosefoot), *Lamium purpureum* (red dead-nettle) and *Stellaria media* (chickweed). There was little sign of the mainly autumn-germinating group of weeds which are more typical of cornfields.

Rather warmth-demanding weeds include *Hyoscyamus niger* (henbane) and *Onopordum acanthium* (cotton thistle). The present-day community with henbane and cotton thistle needs warm conditions (Ellenberg 1982) and is mainly found in central rather than northern Europe, although these conditions might be provided by a south-facing wall, and probably

assisted by nutrient enrichment, as from dung. Records of these two plants are a sign of a possible difference between Roman and modern vegetation.

Various plant communities
Other kinds of vegetation were more sparsely represented. Wetland, for example was only indicated by three taxa, *Chara* (brittlewort), *Apium nodiflorum* (fool's watercress) and *Eleocharis* sp. (spike-rush). Damp and perhaps muddy ground was similarly little in evidence with records of *Isolepis setacea* (bristle scirpus) and *Ranunculus sceleratus* (celery-leaved water crowfoot). *Carex* spp. (sedges) which were also present could represent a range of damp or grassy habitats.

A few plants were present which are mainly found in grassland of various sorts, but there was little evidence of grassland, and few finds of grasses themselves. Spikelets of two grass taxa were found but it was not certain whether they were fossil or not. Single finds of a few other plants that usually grow in grassland were found, such as *Potentilla erecta* (tormentil). Grassland could still have been present, for it is not as well represented in seed floras as are weeds. Some hedgerow and scrub was also in evidence from some possible *Quercus* (oak) buds. The only crop plants found were some charred *Triticum* sp. (wheat). Seeds of *Plantago lanceolata* (ribwort plantain), *Rumex* sp. and *Galium* were also charred, so these could be connected with the processing of cereal crops and their weeds, although the plantain is normally regarded as a grassland plant.

DISCUSSION

Droitwich Bay's Meadow; probable source of the well flora
Weeds are likely to be especially well represented in suitable archaeological deposits because human activities often lead to disturbed and enriched ground and also because weed seed productivity and dispersal are good (Salisbury 1961). Production can vary greatly, as shown by Korsmo (1981): *Tripleurospermum inodorum* (mayweed) produces the most seeds, 34,000 - 250,000 per plant, followed by *Capsella bursa-pastoris* (shepherd's purse) and *Papaver rhoeas* (poppy) with 3,000 - 20,000, then *Atriplex* (orache) at 100 - 6,000, *Stellaria media* (chickweed) with around 5,000 seeds, *Rumex crispus* (curled dock) with 3,700 and *Urtica urens* (small nettle) with only 100 - 1300 seeds.

Dispersal of weed seeds is also fairly good, and small seeds such as those of *Urtica*, *Chenopodium* and *Stellaria* are easily blown about by the wind. So too would be the downy seeds of the thistles and dandelions. Heavier seeds such as those of *Conium* and *Malva* may, on the other hand, only be dispersed a few metres unless there is another means of transport such as by ants or mice etc.

The simplest explanation of the well flora is that weed vegetation grew nearby the wells, and the seeds fell in by natural dispersal alone (see Figure 1). Open ground is usually quickly colonised by annual weeds during the growing season, and these are followed by the perennial ones within a year or so. One can also imagine some of the grassland plants growing in such circumstances, and the scrub plants such as brambles also. There is little sign of human activity, except the few charred remains such as those of cereals and a few weeds. However the presence of a whole stag

Plate 2. A tall perennial weed community on the banks of the river Arrow, with much in common with the Droitwich Roman well flora. The dominant plant with white flower heads is *Conium maculatum* (hemlock), with *Carduus acanthoides* (welted thistle) and *Arctium* sp. (burdock) in the foreground. *Urtica dioica* (stinging nettle) was scattered throughout this growth.

skeleton in the well could be interpreted as the result of dumping, and some of the weed seed flora could equally have been deposited in backfill together with vegetation and topsoil.

The plant communities, mainly of weeds, that grew around this Roman settlement appear to have been similar to modern ones, apart from the warmth-requiring plants mentioned. The writer has seen such a tall weed community dominated by *Conium maculatum*, *Urtica dioica*, *Carduus acanthoides*, *Arctium* etc. on the banks of the river Arrow at Oversley near Alcester, (some 20 km from Droitwich), although this habitat was damper than one would imagine the Bay's Meadow site to have been in Roman times (see Plate 2). The ecological requirements of the plants, like the taxonomic groupings, have probably remained fairly stable over the centuries. The particular plant communities, however, must have depended upon the exact opportunities offered by human influence on the cultural landscape which was largely thus created (or the result of the destruction of the natural vegetation and soil cover). Compared with today there would have been more animal dung around, and open habitats provided by roadways and yards which would now be covered by tarmac, thus favouring weeds (Knörzer 1984). The processing of grain and other crops in settlements could have also brought in cornfield weed seeds, some of which were found on the rest of the site such as *Agrostemma githago* (corn cockle) among the charred material studied by Vanessa Straker, although these were not in evidence in the well deposits. On the other hand, weeds might have been much reduced by the presence of domestic fowl , bones of which were identified by D. Bramwell from this site, representing birds which would have eaten up most weeds and their seeds. The weed flora at the time was a little smaller, for some common weeds only became widespread later (Küster 1985).

Sometimes there has been discussion of possible uses of weeds known from folk history such as for food or medicine as a possible explanation for their abundance on archaeological sites such as Whitton (Wilson 1981) but unless there is any positive evidence of use, this possibility can be ignored.

This evidence of weed communities might give the impression that Roman settlements as at Droitwich were generally very overrun by weeds. However this evidence from the well flora may in fact represent something very local, and also short-lived: if there were separate properties divided by walls or hedges, disused land might have become overgrown like uncultivated gardens or abandoned ground around farm buildings now, but growing immediately round the well mouth (Figure 1). Such a flora could spring up in a year or so - there was extensive rough grassland on the land around the excavated area of Bay's Meadow. Knörzer (1984) interprets such a summer annual weed flora from a Roman well at Hambach as an indication of gardening nearby, and indeed at that small villa site it might have been so.

Discussion of other well floras

A number of well floras have been studied over the years, and most of them have turned out to be dominated by weed seeds, particularly *Urtica dioica* (nettle), followed by *Stellaria media* (chickweed), *Polygonum aviculare* (knotgrass), *Rumex* spp. (docks), *Chenopodium* spp. (goosefoot) and *Atriplex* (orache) species, and members of the Chenopodiaceae. The results are generally similar to those obtained from Droitwich, for example those from the well at Whitton (S. Glamorgan) (Wilson 1981)

(but no species list). In the wells at Carmarthen (Hillman 1978), 2nd / 3rd C Bunny (Notts.) (Wilson 1968), Denton (Conolly 1971), and Little Waltham (Essex) dated to about AD 300 (Wilson 1978) there were weed floras dominated mainly by the summer annual weeds listed above. At Rudston (E. Yorks), the lowest part of the 30m deep well contained fragments of buckets and chains that suggested that this bottom layer represented the time when the well was in use (Stead 1980), something that does not seem to have been detected at Droitwich or elsewhere. In addition to the ubiquitous weeds, a few wells have shown signs of some other material dumped there such as horse droppings with fodder remains in the late 2nd C well at Lancaster (Wilson 1979), or peat turves in the early Antonine Birrens well (Wilson 1975) and Skeldergate in York (Hall et al. 1980). In the case of one Silchester well the presence of *Carex riparia* indicated that the remains had been thatching material (Reid 1901), and perhaps the abundance of sedge seeds in the Alcester well (Colledge, quoted in Greig 1988) could also be interpreted in this way. The wells at Farmoor (Lambrick & Robinson 1979) provided interesting evidence of gardening from *Buxus* leaves, as well as a number of cultivated plants. None of these additions was evident in the Droitwich material.

Wells in other parts of Europe have also produced similar floras, such as the three at Oss-Ijsselstraat in the Netherlands (Bakels 1980). In Germany, Knörzer (1973) found a seed flora mainly of weeds at Butzbach, together with a large range of cultivated and other plants some of which may have been dumped in with rubbish. The wells at Xanten (Knörzer 1981) also had especially noticeable floras of weeds and ruderal plants. At Welzheim, however, Körber-Grohne (1983) found *Rubus idaeus / fruticosus* and *Carex disticha* most abundant in one well, and in the other one there was mostly *Stellaria media* followed by various species of *Poa*, then *Abies* needles, together with a range of plants from various kinds of vegetation in the region of the site, so this is clearly one of the exceptions to the general rule of weedy well floras. Knörzer's (1984) work on the Hambach well includes a detailed study of modern weed communities in the Rhineland, a very worthwhile exercise.

CONCLUSIONS

There is enough evidence from archaeobotanical and other sources to show that most of the Roman well fills (including the one at Droitwich Bay's Meadow) consist of sediment deposited naturally, apparently during disuse, together with varying amounts of backfill and rubbish. The weedy and overgrown conditions round the disused wells which are indicated by the seeds, may have been very local and temporary rather than showing that the whole sites were abandoned, and the weeds are probably over-represented. This mechanism of filling is shown schematically in Figure 1. Wells sometimes also contain remains of grain and chaff together with cornfield weeds which seem to represent the processing, cleaning or storage of crops in the settlement. Pastureland in the surroundings is often shown by pollen, dung beetles and some plant feeding insects. There is great uniformity between Roman wells in general in spite of a great geographical and date range. However, other particular kinds of deposit within cultures and periods are also fairly uniform.

The deposits from the period of actual use of a well would be very interesting to study for a comparison, although they may be hard to detect.

Wells are very useful preservers of interesting things, if only they happen to get there in the first place. Cultivated plants tell us about the crops, dung about the grasslands and other plant materials about their collection and use. Most of our knowledge of cultivated plants, apart from those which get charred such as cereals, comes from deposits such as those in wells, or waterlogged rubbish pits. They repay very careful excavation, the integrated study of the whole range of identifiable remains, and careful interpretation. Modern comparative studies of the representation of a flora by the seeds from it are badly needed.

ACKNOWLEDGEMENTS

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DROITWICH BAY'S MEADOW ROMAN WELL: SEED FLORA

name	number	common name
Chara	1	brittlewort
Ranunculus acris/repens/bulbosus	2	buttercup
Ranunculus sceleratus L.	7	celery-leaved
crowfoot		
Papaver rhoes/dubium/lecoqii	2	poppy
Fumaria sp.	1	fumitory
Viola sp.	1	violet, pansy
Lychnis flos-cuculi L.	1	ragged robin
Stellaria media s.l.	23	chickweed
Stellaria graminea L.	1	lesser stitchwort
Chenopodium album L.	9	fat hen
Chenopodium ficifolium Sm.	1	fig-leaved goosefoot
Chenopodium rubrum/botryodes	3	red goosefoot
Atriplex sp.	3	orache
Malva sylvestris L.	2	mallow
Rubus fruticosus s.l.	3	bramble
Potentilla erecta L.	1	tormentil
Prunus spinosa L.	=3	sloe
Anthriscus caucalis Bieb.	1	bur chervil
Conium maculatum L.	610	hemlock
Apium nodiflorum (L.) Lag.	1	fool's watercress
Polygonum aviculare L.	1	redshank
Rumex sp.	1,1*	dock
Urtica urens L.	2	lesser nettle
Urtica dioica L.	224+	stinging nettle
cf. *Cannabis sativa* L.	+	hemp
Hyoscyamus niger L.	3	henbane
Lamium purpureum L.	39	red dead-nettle
Galeopsis sp.	1	hemp-nettle
Labiatae nfi	4	dead-nettle family
Plantago lanceolata L.	1*	ribwort plantain
Galium sp.	4,1*	sticky willy etc.
Arctium sp.	26	burdock
Carduus sp.	36	nodding thistle
Cirsium arvense/palustre	9	meadow/marsh thistle
Onopordum acanthium L.	1	cotton thistle
Sonchus asper (L.) Hill	48	spiny sow thistle
Taraxacum sp.	13	dandelion
Juncus sp.	+	rush
Eleocharis sp.	1	spike-rush
Isolepis setacea (L.) R.Br.	1	bristle scirpus
Carex spp.	17	sedges
Triticum grain	+	wheat
Triticum glume bases	+	wheat chaff
Festuca/Lolium florets	2	Fescue or ryegrass
Alopecurus pratensis L."	1	meadow foxtail
Tree buds	2	
TOTAL	1114 seeds	

Plant species list, in taxonomic order after Clapham et al. 1962. The seeds numbers are given, except in the case of *Urtica dioica* where the + shows tht there were some more that were not counted. The seeds were all waterlogged except those which were charred, marked *.

Table 1

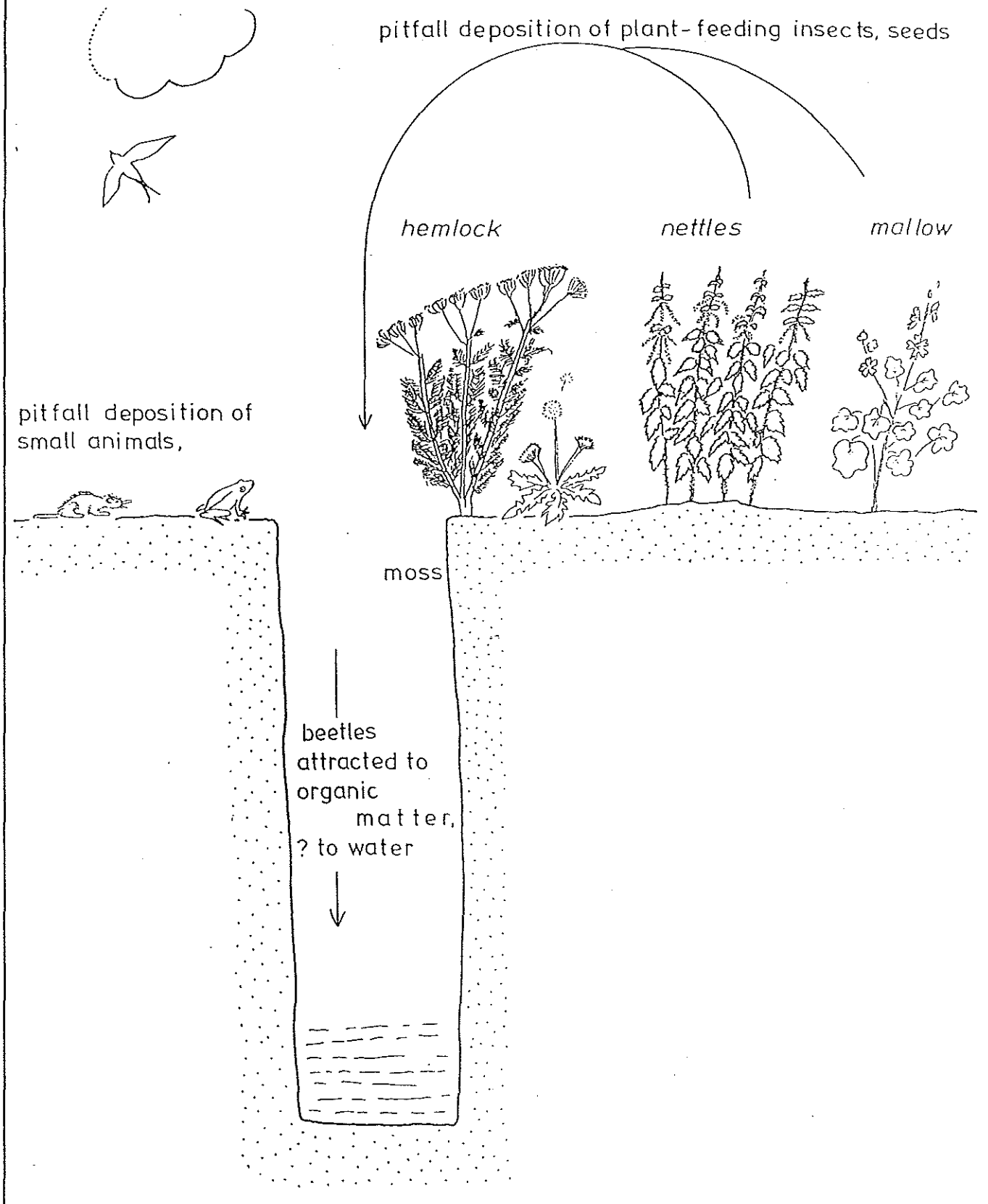
pitfall deposition of plant-feeding insects, seeds
hemlock
nettles
mallow
pitfall deposition of small animals,
moss
beetles attracted to organic matter, ? to water
Origins of the Droitwich well fill
JS

Fig 1