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"The investigation of a medieval barrel-latrine from Worcester"

by James Greig

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Worcester, medieval, botany, zoology, textiles, sewage, diet.

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The investigation of a medieval barrel-latrine from Worcester

by

James Greig

The Department of Plant Biology, University of Birmingham
P O Box 363, Birmingham B15 2TT, UK

Abstract

(on attached sheet)

Introduction

Latrine deposits have been studied from a scientific point of view from time to time, but usually only one aspect has been considered, such as the parasites (Pike and Biddle, 1966) or plant macrofossils (Dennell 1970). It is hoped that this article will show the potential for integrated studies of several kinds of plant and animal remains and artifacts to obtain a detailed account of the contents of a cesspit and its significance in a wider context. In December 1975, an area of central Worcester formerly occupied by Nos. 39-47, Sidbury, was cleared by contractors for the construction of the City Walls Road section of the Inner Relief Road scheme undertaken by Hereford and Worcester County Council. In the course of this clearance a number of features of archaeological interest were revealed and noted (Carver 1980), including the remains of a barrel filled with organic matter which was excavated by the writer. The results from the study of this organic material form the subject of this article.

The barrel

The lower part of the barrel alone had survived, the rest apparently having been destroyed by post-medieval disturbance which was evident over most of the area exposed by the road works. The surviving part (Figs 1-3), consisted of an incomplete circle of staves. At the barrel base the wooden chine hoops had survived, as had an inner hoop fastened with wooden dowels, but the end of the barrel had no cap.

Inside the barrel there were some pieces of stave and hoop among the organic contents. The barrel was sunk into a pit which had been dug through Roman layers into the archaeologically sterile river gravel beneath, and rested upon four large pieces of white building stone (including a finely cut corbel), and a piece of the local Triassic sandstone. Organic matter which somewhat resembled a well-humified peat filled the surviving part of the barrel. The preservation did not appear to be principally the result of waterlogging, for the barrel was above the present water table, and few other organic remains were evident in the cleared area. Such a large organic mass may have decayed initially, thus losing the more easily metabolised materials like proteins, starches and sugars, reaching a stage when further decay was very slow or non-existant because of the difficulty of breaking down the remaining material, a solid mass rich in celluloses and lignin.

Four layers of organic matter could be distinguished during excavation: Layer 1 covered most of the top of the surviving deposit, a soft black material with lacunae showing that it had probably been worked by insect larvae etc., containing visible bones and fruit stones. Layer 2 filled almost the whole of the remaining part of the barrel in a cohesive mass with some hard lumps, and contained cloth in addition to plant and animal remains. Layer 3 consisted of yellowish crusty material with grassy matter, and Layer 4 contained ash and merged with Layer 2 above and with the gravel below.

Samples were taken from the various layers, about 5-10 kg each, and processed in the laboratory. Sieving and paraffin flotation were used to separate the insect and some plant remains, and further plant material and bones were recovered from the non-floating residue. Pollen grains and parasite ova were studied in microscope preparations. The results are first discussed individually (i.e. insects, animal bones etc.) and then the whole body of data is discussed.

<u>Coloepterous fauna from Layer 1 (by P.J. Osborne)</u>

The material from this layer was found to break down readily in warm water and was washed over a 300 micron sieve to dispose of the fine fraction. The coarser residue was subjected to paraffin (kerosene) flotation to concentrate the insect remains and the flotant was sorted finally under a binocular microscope.

The beetle fragments were in particularly good condition, skeletal parts frequently being found still joined together as if they had not been disturbed since death, making the task of identification somewhat easier. More specimens could probably have been recovered by further sorting, but a point was reached when no new species were being added and further collection of beetle fragments seemed to be superfluous. It is felt that the proportions of the numbers of individuals are fairly nearly the correct ones for the entire deposit.

In all thirty eight beetle taxa were recorded, most of which were capable of being specifically identified, thanks largely to their good state of preservation. A list of the beetle fauna, arranged according to Kloet and Hincks (1977) is given as an appendix (Table 1). The numbers of individuals given are the lowest that must have been present to account for the skeletal parts collected.

At a first glance the most obvious thing about this fauna is its domination by two species, Tipnus unicolor and Mycetaea hirta. Between them the pieces recovered showed that at least two hundred individuals must have been present, more than all the remainder of the fauna together. Many associated skeletal parts of each were found, elytra joined together with abdominal segments, heads with pronota and occasionally almost entire beetles, lacking only their more fragile appendages. Occurring in such numbers and surviving in this particularly good state of preservation leaves little room for doubt that these two species were actually living and breeding in the contents of the barrel, whatever they may have been. Both species have been recorded as living amongst decaying organic refuse such as wood and straw, usually in "indoor" or at least synanthropic situations. Other beetles were also present which live amongst decomposing vegetable debris today, including Ptinus fur, Cryptophagus sp., Lathridius ?minutus and Aglenus brunneus all of which, though not approaching Tipnus and Mycetaea in abundance were still amongst the most numerous species present. Here again, Ptinus and Aglenus are mainly found within buildings at this latitude, while two other species recorded, Laemostenus terricola and Blaps lethifera are most often found indoors, frequently together.

A whole suite of predatory beetles was recorded comprising all the members of the family Staphylinidae recorded, the three carabid ground beetles Trechus micros, Pterostichus melanarius and Laemostenus terricola and the solitary Hister sp. Of these the larger staphylinids, particularly Creophilus maxillosus and Philonthus sp., the carabs Pterostichus and Laemostenus and the histerid were probably living on fly maggots whilst the smaller members of the carnivorous assemblage would have subsisted on small fry such as mites and Collembola.

The pabulum so far suggested seems to be highly organic, mainly vegetable material in an advanced state of decomposition. This could have been an accumulation of dung, possibly of cattle or horses but had this been the case a collection of dung beetles of the families Scarabaeidae and Geotrupida could reasonably have been expected to be present. As it was this group was represented only by a solitary individual of Geotrupes sp. Although this is admittedly negative evidence it is strongly suggestive that little or no graminivorous mammal dung was included in the barrel contents as these beetles, particularly of the genus Aphodius are highly mobile and are quick to colonise the droppings of horses, sheep and cattle after deposition. Some examples could surely have been expected here if the material was, in effect, a dung heap. An assemblage like this one, however, could well be living in the barrel if the contents were primarily human excrement, and indeed there is a fairly close similarity between this fauna and one derived from a modern cess pit (Osborne, in press). It has been noted that the most abundant beetle, Tipnus unicolor, is usually found in large numbers in medievel deposits which seem to have been cess pits and that today it is a comparitively rare insect. In fact in thirty years as a modern beetle collector the author has encountered the species once, that was in the contents of a cess pit! (Osborne, loc. cit.) It may be that the decline and virtual disappearance of this means of disposing of human sewage has contributed to the increasing scarcity of the beetle by removing one of its favourable habitats. Exactly the same things could be said of Mycetaea hirta, the runner up in abundance at Worcester, again found by the author for the first time in his cess pit

At a first glance the presence, in some numbers, of the stored grain pests Oryzaephilus surinamensis and Sitophilus granarius and of Bruchus rufimanus which infests broad beans, seemed to imply the incorporation of kitchen refuse into the barrel contents. Having proved experimentally, however, that at least the first two of these, and by analogy probably the third, can pass through the human digestive system and emerge in perfectly identifiable condition, this hypothesis is no longer necessary and the case in favour of the barrel having been a receptable for human excrement is strengthened. Almost the entire fauna would fit with this theory with the exceptions of the obviously adventitious phytophages, Phyllotreta vittula, Apion sp. and Sitona sp. and also of the furniture beetle, Anobium punctatum. If, however, the barrel did form the bottom half of a latrine it almost certainly had above it a plank with a hole in to act as a seat and this would probably have been riddled with woodworm (furniture beetle larvae) borings and was a likely source for those found. If these insects are left to breed unhindered by man's chemical deterrents, however, large populations can build up and it is probable that the insect was absolutely ubiquitous and prone to get into just about any deposit available. Certainly in the author's experience an archaeological site which contains beetles at all is almost certain to produce Anobium punctatum.

In summary, then, the beetle fauna of the barrel suggests a closed community, almost uncontaminated from the outside except for the odd accidental intruder and by the ubiquitous furniture beetle. The contents of the barrel were organic and decomposing and probably supported a large population of dipterous larvae (i.e. maggots but not apparently the suite of beetles normally found living in animal dung. The material could well have been human excrement, however, with, so far as the insect evidence goes, little admixture of any other commodity.

Plant remains from Layers 1 and 2 (by James Greig)

The bulk of the organic matter in the barrel was finely comminuted, and included a large amount of bran in tiny fragments. This has not been identified to genus so far, but it would indicate that some of the remains are those of cereal foodstuffs such as bread or porage (Dickson and Dickson, 1979). The most numerous macrofossils found were seeds (Table 2), and some cereal rhachis fragments and nodes were also found. There were a few moss remains as well. The pollen spectrum (Table 3) adds some taxa to this flora, and confirms the presence of others.

Most of the macrofossils are from edible plants such as mustard, linseed, grape, bramble, strawberry, sloe, damson, cherry, apple, gooseberry, coriander, fennel, fig, hazelnut, bilberry and oat. Other macrofossils are from plants which might well have been eaten, even if they are not really regarded as being edible today.

Although some of these can be gathered from the wild, the fact that most of this group of plants is cultivated shows that these plant remains probably represent traces of human food. The smaller pips are usually swallowed whole with the fruit, such as those of strawberry, apple and grape, and so it seems likely that at least part of this organic material could have come from food which has passed the human digestive tract, being voided in excrement. The larger fruit stones such as those of cherries and plums would not normally be swallowed, and these would have been discarded at mealtimes, so these signs of food waste cannot all be associated with excrement. Latrine deposits often have such a characteristic "medieval fruit salad" group of plant remains (e.g. Wilson 1975, Dennell 1970), but gooseberry seeds do not seem to have been found before; it is thought that gooseberries were first cultivated in the fifteenth century, at least on the continent (Bertsch, 1947).
The presence of remains of damson and sloe is interesting. Prunus domestica (plum) remains have been found at several Roman and medieval sites in Britain (Godwin 1975, Willcox, 1977), representing the cultivated plant, yet here the semi-cultivated P. spinosa ssp. institia (damson) and the wild P. spinosa (sloe) remains were mainly found. The damson is too sour to eat except in the form of sweetened prepared food, likewise the sloe, which is not nowadays considered to be worth eating. Such a lack of domesticated plums is surprising in a place like Worcester which has such a long tradition of fruit growing still evident in place names (like Cherry Orchard) and in the city coat of arms (with pears). Some remains from medieval Chester also contained such a bullace/sloe mixture (Wilson 1975).

Finds of grape pips are very interesting because grapes are not widely grown in Britain now, and there are few vineyards in this area today. Viticulture may have been commoner in the past, as shown by place names in Herefordshire (Holmes 1973) and early works on gardening (Amherst 1898). On the other hand, Worcester has access to the sea via the river Severn, so that grapes or raisins could have been imported from the continent without much trouble. It is therefore not possible to tell from the evidence so far available whether the grape pips represent locally-grown or imported fruit. Figs are also interesting and, like grapes, could represent imports as suggested in the case of such finds from Hereford (Mitchell, 1971). Foeniculum vulgare (fennel) and Coriandrum sativum (coriander) seeds in the barrel probably represent plants that were cultivated for their seeds rather than having grown as casuals, for these seeds are used today for flavouring food such as curries. Umbelliferous seeds seem to have been appreciated in the past for their powers of preventing flatulence as well as their flavour, as discussed later. When they appear in such large numbers in a deposit there is every reason to believe that they represent the remains of food, especially as

the coriander remains were all fragmentary as if they had been pounded in food preparation or chewed. The few seeds of Daucus carota (carrot) could represent either wild or cultivated plants. The rose seeds may have come from the remains of food, although jellies and preserves are not often made from rose hips now.

Other plants which can be useful, the remains of which were present in small amounts, are hard to attribute with any certainty either to past use or to casual introduction. Atropa bella-donna (deadly nightshade) and Hyoscyamus niger (henbane) seeds contain alkaloids and would act as drugs, yet the plants also grow as weeds, so it is hard to tell whether these remains show that they were used for medicine or not. Documentary sources like herbals tend to be confusing in their information on past medical practise because most plants have been attributed with healing powers at some time in the past, and also because it is often hard to recognise the plant taxa or the diseases which they were supposed to have cured, from the herbals and leechbooks (Bonser, 1963). The finding in the barrel of the seeds of Reseda luteola, known as dyer's rocket or weld, shows the presence of a plant that would not have been abundant in and around Worcester since it is mainly found on chalkland, and one which was formerly cultivated for its yellow dye. Once again, it would be rash to attribute its presence to dyeing when the plants could have been brought in with flooring material, yet it is an interesting possibility.

Another distinct plant group consists of weeds of cultivated land, such as Anthemis cotula (stinking mayweed), Chrysanthemum segetum (corn marigold), Centaurea cyanus (cornflower) and Agrostemma githago (corn cockle). The last two are rare nowadays and are not the problem that they were in the past, before the introduction of herbicides. Gerard (1597) said that mayweed was "....... an unprofitable weed among corne, and raiseth blisters upon the hands of the reapers", and about corn cockle "....... what hurt it doth among corne, the spoil unto bread as well in colour, taste and unholsomness, is better known than desired". The remains of corn cockle in the barrel were all fragmentary which may be a further sign that it arrived with cereal food like bread. The presence in the barrel of the remains of such a range of weeds of arable land (together with other, less specific weeds) shows that its contents probably included some straw with associated weeds, even though the straw itself left very few macrofossil remains.

Many of the other plants whose remains are listed would today be described as wayside taxa, and would be found growing in such places as grassy road verges and rough meadows. This group includes Ranunculus species (buttercups), Lapsana communis (nipplewort), Leontodon autumnalis (hawkbit), and Torilis japonica (hedge parsley). Such a wayside flora occurs quite commonly in organic archaeological deposits as at medieval Hen Domen (Greig, et al, in press), and it appears to be an indication of the past presence of hay although the principle component, grass, does not show up as well in the macrofossil record as do the associated weeds. In the past, hay seems to have been much more floristically diverse than it is now. A small group of records from wetland plants, such as Carex (sedge) and Eleocharis (spike-rush), shows that there was probably sedge and associated vegetation, gathered in like hay and straw. The last group of plants consists of weeds which are so common in archaeological material that they defy interpretation. Such weeds, like Stellaria (chickweed), Chenopodium (goosefoot) and Sonchus (sow-thistle), which are today ubiquitous wherever there is disturbed ground, were probably equally so in the past, and since abundant seed production and dispersal is a feature of such weeds it is not surprising that they appear here.

The pollen results (Table 3) provide evidence of the past presence of plants not recorded from macrofossils, as well as confirming part of the macrofossil record. The differences between the results from pollen and those from seeds is the result of the great difference between the production and dispersal of pollen and that of seeds. Most of the pollen (47%) comes from Gramineae (grasses), proving further evidence of the presence of grass, probably in the form of hay. Likewise, the large amount (35%) of Cerealia (cereal) pollen helps to demonstrate that the material in the barrel included straw. This type of pollen spectrum, taking into account the presence of seeds as well as the pollen of cornfield and hayfield plants, and the insect fauna with two very abundant refuse-inhabiting beetles, has been termed "human-dispersed" (Greig, in press) because the pollen would have mainly have come adhering to plant products like hay and straw which would have been gathered from fields outside the city and brought in, rather than having arrived in the deposit by natural means from the atmosphere. Some pollen could also have come from food, as discussed later.

Parasite ova (Table 3)

Some of the pollen preparations also contained large numbers of the ova of the parasitic intestinal worms Trichuris sp. (whipworm) and Ascaris sp. (roundworm). In the sample from Layer 1, these appear to have survived the acetolysis process during the preparation of the slides. However, it is sometimes very difficult to ensure a thorough mixing of the sample and the acetolysis mixture, and in some cases lumps occur, so the ova could possibly owe their survival to incomplete acetolysis. It is a good idea to sub-sample the preparation before acetolysis in order to detect parasite ova. The presence of the ova provides good evidence that the barrel contained excrement, although not specifically of human origin, as it has not been possible to identify them to species level. Trichuris species infest most mammals, man included, while Ascaris is mainly known from pigs and man, but the presence of such a wide range of fruit remains in the barrel gives a clear indication that it had probably been used as a lavatory by humans, for there is scarcely any sign of animal dung in the beetle fauna. Human infestation from these parasites does not always cause serious symptons, and they are commonest in damp conditions where dirty hands and children spread the ova ----- "considerable Ascaris infection may occur in the riffraff living in crowded quarters on the edges of southern (US) cities where there are dense shade, abundant rain and children who are careless in their defae cation habits" (Chandler 1944).

Bones

The bones so far examined all belong to Gallus, the domestic fowl, identified by R.T. Jones, who comments that these individuals were fully grown, yet they were far smaller than present day chickens. The presence of larger bones such as sterna (breast-bone) and an articulated neck is a further sign of the presence of food waste in the barrel which could not possibly have been swallowed or passed through the human digestive tract. Egg shell and feather was also found, as were a few fish bones.

Fly puparia

P. Skidmore reports that the puparia examined belong to Sepsidae and Sphaeroceridae members of which are rather general scavengers in dung and decaying plant matter.

Fish remains

A.K.G. Jones has identified 14 vertebral centra and 1 opercular centrum of Anguilla anguilla (eel). 2 pharyngeal tooth plates and 2 vertebral centra were from a cyprinid (a group including carp and minnows), and 1 vertebral centrum was from Clupea harengus (herring); there were 4 indeterminate fragments. He comments that all the fragments might have passed through the human gut. The eels might have been caught in the river Severn, which flows through Worcester, but the herring, being a deep sea fish, would have been caught a considerable distance away.

Cloth (by E. Crowfoot and B. Raphael)

The cloth remains from the barrel were initially cleaned and studied by B. Raphael, and further reported upon by E. Crowfoot (Table 1). They note that the textiles appeared to be separate scraps rather than pieces of one continuous cloth, and many were folded or wadded up so as to appear as multiple layers embedded in the organic matrix. Although the weaves of the fragments were quite clear, some of the textiles were often extremely deteriorated, the fibres having almost no strength of substance, and inseparable from the muddy support. Other samples were surprisingly strong and could be lifted from the soil more or less intact. Examination under a microscope of fibres from several different fragments indicated that all were of wool. The colours were a rich dark brown, a medium brown, a reddish brown and blue with some whitish fibres. E. Crowfoot points out that none of these tabby cloths have selvedges, starting borders or any features such as returning or crossed wefts, and it is impossible to say which thread system is warp and which is weft in any of them. In Anglo Saxon and medieval material so far examined, fabrics with mixed spinning most commonly have Z warp and S weft, but the unevenness of the Z thread in one case here, Group II: 1a suggests that the S yarn may have been the warp, as was likely in some of the rather similar fragments from a 1290-1300 A.D. cesspit at Southampton (Crowfoot, 1975). The counts and qualities of these pieces from Worcester are very similar to examples from Southampton, to rather later fragments from Nottingham, a piece from a 12th century level at Baynards Castle, London, and many from the 14th century dock at the same site.

No.3 from Group II, and Group IIc seem to have been napped, and the solid felting along the edge of piece 1a and raised fibres on Group I pieces again suggest napping. As a general rule, medieval fabrics to be napped or fulled seem to be woven with one system Z spun and the other S, so that the fibres lie in the same direction and are easy to raise; it is unusual to have napping in a Z,Z spun tabby, as in the Group II pieces, though two fragments were found at Southampton (Crowfoot ibid, T.8: 1290-1300, T.16: 1340-1350.) and one at Baynards Castle.

Dating

The few artifacts associated with the barrel failed to provide conclusive evidence for the age of the barrel, and so radiocarbon was resorted to, an unusual means of dating for such a recent site. The date (WS3, 1440 ad ± 70, HAR3100) obtained from Layer 3 shows that the contents of the barrel date from the later medieval period.

Discussion

The evidence from the various remains in the barrel can be assembled to yield a far more detailed picture of what may have been going on than could have been deduced from the different data if considered each in isolation. The combined results from all the available evidence are summarised in two illustrations; Fig.4 is intended as a model showing some of the possible interpretations which can be made from the finds in the barrel (not as an undeservedly detailed reconstruction of what there might have been at the site). After the drawing was done, details of date, latrine position, roofing material etc. were found to be incorrect, but these do not affect the picture's intended use as a model.
Fig.5 shows some of the possible pathways of plant and animal products from source, through use, to final disposal in various kinds of rubbish, accumulating various parts of the beetle fauna at several stages. Some materials which have only been detected at other sites, but not in the Worcester barrel, have been included as a reminder of their importance in the study of such rubbish remains, such as honey, ale,heather, chaff and animal dung.

It is not clear from the remaining fragments whether the barrel was wet-coopered (for holding liquids) or more crudely dry-coopered for other goods, nor whether it may have been a particular type of size, locally made or imported. This barrel had evidently served a useful life before being sunk into a pit for use as a latrine, and the missing staves show that it may have been in a damaged state by this time. It might also have been cut in half. The latrine was carefully constructed with stones supporting the barrel, although why good quality building stone was employed for this purpose is hard to explain, unless it was surplus from work on the nearby Cathedral. Such good work may be a sign that the latrine was built with long use in mind, so the barrel may have been emptied from time to time, in which case the contents found would be the final filling. Latrines seem to occur quite often on medieval sites in Britain, and in Norwich Atkin and Smith (1979) found that lined cesspits occurred from 15th and 16th century levels, where they were either adjacent to or inside houses, and built from brick or stone. This barrel latrine from Worcester seems to correspond in approximate date, although the lining material is perhaps unusual. A medieval barrel latrine has been found in Denmark, however (Jørgensen, in press). There is no archaeological evidence to show where the barrel latrine was in relation to the buildings standing at the time of its use ---- in the drawing it is shown at some distance from a house, although the results from Norwich showed that this arrangement seems to date from the late 16th century. The writer has found that the outdoor privy or "outhouse" which still survives in the rural U.S. is convenient to use and surprisingly inoffensive to modern taste, even without the deodorising bunches of Myrica gale (sweet gale) which are used in Norway (Krzywinski, in pres Even so, the occupants of medieval towns in Britain seem to have problems with the disposal of the contents of privies (Keene, in press).

The remains of hay, straw and sedge in the barrel provides evidence of some of the products that were available from the surrounding countryside, and of the floras of fields and meadows. The presence of inedible food remains such as fruit stones and bones among this hay etc. shows that it was probably first used for domestic flooring in a place where food was prepared or eaten, for food waste seems to have been discarded on to the floor in medieval times. If this plant matter had been used for animal bedding, it would have contained dung beetles and perhaps horse shoe nails, as did the material at Hen Domen (Greig et al, in press). In the drawing (Fig 4) the upper parlour of a house is shown strewn with "swete herbes", and various domestic activities are illustrated, as appear to have been the case. Medieval descriptions of floors range from clean-sounding, where the plant material would have been fragrant like sweet compost, to those which were disgustingly foul and full of excrement (Buckland, 1974), but the balance of the evidence seems to favour fairly clean floors (Keene, in press). A number of the insects recorded could conceivably have been incorporated into the barrel's contents with floor sweepings or with strewn herbs which had been rejected when soiled. This may have been the primary source of the furniture beetles (Anobium punctatum) and the few phytophagous species could have been imported on cut herbage for floor covering. For the remainder of the fauna, though some species could have come in with floor refuse a cess pit is as likely for most and much more probable a source for some.

This flooring matter would have been discarded when it was considered to be in need of renewal, and probably dumped outside. There it would have decayed further, and accumulated more of a "compost heap" fauna, eventually being disposed of by some means or other (Fig 5, lower right). In the case of this material from Worcester, discarded flooring material has evidently found its way into a barrel latrine which seems a little strange ---- potentially offensive waste like excrement would surely warrant more care in its disposal, and hence the barrel latrine, than would used flooring material. Perhaps only small amounts of flooring were used to render the contents of the barrel less offensive, or some of the hay and straw could have been used in place of lavatory paper. It remains to be seen whether other such deposits show such a mixture of apparently different types of rubbish. Such flooring layers have been found more or less in situ in preserved deposits such as those at York (Buckland et al 1974). and they can now be interpreted in some detail when many lines of evidence are examined, even though their heterogeneous origins make them complex to study.

The food remains from the barrel are particularly interesting because they provide information on some aspects of the diet, and hence of the everyday life at the time. If the fruit was eaten fresh, it would have been available from July (strawberries) to about October (apples), so this part of the deposit could have accumulated in as little as a few months. On the other hand some fruit could have been preserved, especially figs and grapes, and could therefore have been consumed at any time of the year. Very careful work on latrine deposits at Bergen, Norway (Krzywinski 1979 and in press) has revealed an apparent seasonality in content, with layers containing seeds of fruit which might have been eaten fresh, alternating with ones containing fig seeds, perhaps from preserved fruit eaten in the winter time. The layers investigated from the Worcester barrel seem to be very homogeneous, and contain the remains of fruit which might be hard to preserve, so summer deposition seems to be more likely.

The fruit flora provides information about the gardens, orchards and hedgerows from which it came, as well as the possibility that some may have been imported from abroad. The illustration (Fig 4) shows a late summer scene with a garden containing a range of fruit and vegetables, supported by documentary evidence of such city gardens as that from Chester, quoted by Wilson (1975). Other evidence of this type of garden comes from a mid-fifteenth century poem by Mayster Ion Gardener (Amherst 1898) which describes how "Graffyng of treys" and "cutting and setting of Vynys" should be done, which perhaps justifies the inclusion of fruit trees and a vine in the picture. There is a surprising degree of correspondence between plants named in the poem and the floral list from the barrel, such as "fynel" (fennel), henbane, "strowberys, rose ryde or wyzte, coryawnder and "bygull" (corn marigold.) Other named plants such as "ownyns" (onions), garlicke and spinage have not been identified from remains, but then it must be remembered that only those parts which are robust enough can be preserved, so many plants must have vanished without trace. The brassicaceous seeds which were found have no counterpart in the poem, which did not mention cabbage, cole or mustard, surprisingly enough. The record of pollen of ? Borago (borage) shows the presence of a plant that would not be expected in the wild, but which is still grown in gardens today, as well as being mentioned in the poem. The appreciation of Foeniculum vulgare (fennel) in the past is shown by another poem, in Harington's (1607) "The Englishman's Doctor" :

"In Fennel-seed, this vertue you shall finde,
Foorth of your lower parts to drive the winde,
Of Fennel vertues foure they do recite,
First it has powers some poysons to expell,
Next, burning Agues it will put to flight,
The stomack it doth cleanse, and comfort well,
And thus the seeds and hearbe doth both excell".

Cereal products were evidently an important part of the diet: the cereal pollen could have come from either straw or from grain products, but the presence of abundant bran, as here, has been shown (Dickson and Dickson, 1978) to prove the presence of grain or grain products, which in this case may have been adulterated with Agrostemma githago (corn cockle) seeds, fragments of which were found. The presence of grain weevils, although not proof in itself, could also represent the remains of infested food (Osborne, in prep.) as well as nearby storage of such material. Legumes, such as peas and beans, however are harder to detect as food remains than are cereals. The only evidence here comes from the brucheids in the beetle fauna. In Bergen, Vicia faba (broad bean) pollen has been detected in latrine deposits (Krzyinski 1979), and one pollen grain has been found in the Worcester material so far. This lack of evidence of legumes in the diet should not lead to an under-estimation of their importance as storable protein-rich food in the past, hence their inclusion in Fig.4 The presence of a few bilberry seeds shows that heathland may have been utilised, although there are no other signs like pieces of Calluna (ling) such as have been found at other sites like York (Buckland 1974) and Bristol (Greig, unpublished). The bone, from chickens (and perhaps also the egg an feather remains) and the fish remains, provide rather sparse evidence of a non-vegetarian component of the diet. If this deposit represents late summer, perhaps the abundant fruit and vegetables were eaten while they were available, saving other types of food for the rest of the year ---- meat would have been a problem in high summer because of rapid putrefaction. Other medieval sites have provided rich assemblages of bones of mammals, birds and fish (B. Noddle, D. Bramwell, and A. Wheeler 1977), which shows that a single deposit like that at Worcester may only throw light on certain aspects of diet rather than giving an overall picture.

The cloth in the latrine does not appear to be the result of casual rubbish dumping, but rather because it filled the role of lavatory paper or as Krywinski (in press) has suggested, had been used for feminine hygiene. He suggests that moss was used as lavatory paper, and this would certainly explain the presence of the ? Thuidium in the barrel, a woodland moss that would be among the most suitable taxa for this purpose. Apart from the final use of the cloth fragments, the presence of textiles provides more information about possible activities in the area: the observation that some of the scraps of cloth could have been tailors' waste has been included in the illustration (Fig.4), which shows a tailors' establishment, although like most of the other details, the actual location of this will never be known.

Conclusion

This piece of work shows some of the complexities of studying such a latrine deposit. The scientific analysis of these remains cannot be done by any one person, for each type of evidence needs to be dealt with by the appropriate specialist, and the various data brought together and discussed in order to obtain the maximum information. In the case of this barrel at Worcester it has been shown by this means that excrement was only one of the different kinds of rubbish deposited in the latrine. The study of this rubbish provides information on many aspects of past life and times. Hopefully, more cesspits and their contents will be studied in such a way, because they are potentially among the most informative of archaeological deposits with preserved organic material.

Acknowledgements

The author wishes to thank the named contributors to this paper for their help and co-operation, Julia Wakefield for drawing Figure 4, Dr H A Waldron for help with the identification of the parasite ova, many colleagues for useful discussions, and Mr and Mrs M H Heckscher for an opportunity to study outhouse construction.

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Table [illegible]: [illegible]

Carabidae	
Trechus micros (Hbst.)	4
Pterostichus melanarius (Ill.)	1
Laemostenus terricola (Hbst.)	1
Hydrophilidae	
Cercyon spp.	6
Cryptopleurum minutum (F.)	1
Histeridae	
Teretrius fabricii Mazar	1
Hister sp.	1
Leiodidae	
Catops sp.	8
Staphylinidae	
Omalium allardi Fairm. et Bris.	3
Xylodromus concinnus (Marsh.)	6
Coprophilus striatulus (F.)	2
Oxytelus sculptus Grav.	1
Stenus sp.	1
Gyrohypnus fracticornis (Mull.)	1
Philonthus spp.	4
Gabrius sp.	1
Creophilus maxillosus (L.)	1
Quedius sp.	2
Alaeocharinae	7
Geotrupidae	
Geotrupes sp.	1
Dermestidae	
Attagenus pellio (L.)	1
Anobiidae	
Anobium punctatum (Deg.)	20
Ptinidae	
Tipnus unicolor (Pill. & Mitt.)	131
Ptinus fur (L.)	13
Lyctidae	
Lyctus linearis (Goeze)	1
Sylvanidae	
Oryzaephilus surinamensis (L.)	4
Cryptophagidae	
Cryptophagus spp.	10
Atomaria spp	8

Table 1 (continued)

Endomychidae	
Mycetaea hirta (Marsh.)	70
Lathridiidae	
Lathridius minutus (L.)	13
Dienerella sp.	1
Colydiidae	
Aglenus brunneus (Gyll.)	4
Tenebrionidae	
Blaps lethifera Marsh.	1
Bruchidae	
Bruchus rufimanus Boh.	6
Chrysomelidae	
Phyllotreta vittula Redt.	1
Apionidae	
Apion sp.	1
Curculionidae	
Sitona sp.	1
Sitophilus granarius (L.)	10

Table 2

WORCESTER BARREL, Plant macrofossils (Taxonomic order) James Greig

	Layer 1	Layer 2	possible origin
Ranunculus acris/repens/bulbosus (buttercup)	5	26	meadows
Ranunculus flammula L. (lesser spearwort)	-	1	damp ground
Nuphar lutea (L.) Sm. (yellow water-lily)	-	1	lakes, ponds
Fumaria sp. (fumitory)	-	1	cultivated ground
Brassica cf. oleracea/napus (e.g. cabbage)	3	8	? cultivated
Brassica cf. nigra (black mustard)	8	26	? cultivated
Reseda luteola L. (weld)	1	7	? cultivated for dye
Lychnis flos-cuculi L. (ragged robin)	-	1	damp fields
Agrostemma githago L. (corn cockle)	=1	=1	cornfield weed
Stellaria media/neglecta (chickweed)	-	5	weed
Cerastium sp. (mouse-ear chickweed)	1	1	weed
Chenopodium album L. (fat hen)	1	2	weed
Linum cf. usitatissimum L. (linseed, flax)	1	-	cultivated
Vitis vinifera Gmel. (grape)	27	52	cultivated
Rubus fruticosus agg. (bramble)	19	120	hedges etc.
Fragaria cf. vesca L. (wild strawberry)	240	544	woods etc.
Rosa sp. (rose)	9	20	hedges etc.
Prunus spinosa L. cf. var microcarpa (sloe)	16	5	hedges etc.
Prunus spinosa L. cf. var macrocarpa (sloe)	7	8	hedges etc.?
Prunus domestica ssp. institia (L.) C.K. Schneid (damson)	-	1	cultivated
Prunus cf. cerasus L. (morello cherry)	4	=1	cultivated
cf. Sorbus sp. (? service tree)	-	1	? cultivated
cf. Pyrus communis L. (pear)	-	7	cultivated
cf. Malus sylvestris/domestica (apple)	33	86	cultivated
Ribes uva-crispa L. (gooseberry)	-	2	cultivated
cf. Chaerophyllum sp. (chervil)	-	1	hedge-banks etc.
Torilis japonica (Houtt.) DC. (upright hedge parsley)	5	7	hedge-banks etc.
Coriandrum sativum L. (coriander)	1	1	cultivated
Oenanthe crocata L. (hemlock water dropwort)	1	-	wet places
Foeniculum vulgare Mill. (fennel)	12	29	cultivated
Daucus carota L. (wild carrot)	-	1	grassy places
Umbelliferae indet.	-	1	
Polygonum aviculare agg. (knotgrass)	-	1	weed
Rumex conglomeratus Murr. (sharp dock)	-	2	damp fields
Rumex sp. (dock)	5	3	fields

Table 2 (continued)

Urtica dioica L. (common nettle)	-	1	waste places
Ficus carica L. (fig)	317	2018	? imported fruit
Corylus avellana L. (hazel)	-	1	woodland
Vaccinium myrtillus L. (bilberry)	1	1	heathland
Atropa bella-donna L. (deadly nightshade	-	2	hedges; ? drug
Hyoscyamus niger L. (henbane)	1	2	waste places
Solanum nigrum L. (black nightshade)	-	2	weed
Prunella vulgaris L. (self-heal)	1	2	grassy places
Galium cf. spurium L. (false cleavers)	-	1	weed
Sambucus nigra L. (elder)	1	-	waste places
Senecio cf. jacobea L. (groundsel)	3	1	weed
Anthemis cotula L. (stinking mayweed)	5	51	cornfield weed
Chrysanthemum segetum L. (corn marigold)	5	13	cornfield weed
C. leucanthemum L. (ox-eye daisy)	-	4	grassland
Cirsium cf. vulgare (Savi) Ten. (common thistle)	-	1	grassland
Centaurea cyanus L. (cornflower)	2	1	cornfield weed
Centaurea cf. nigra L. (knapweed)	2	-	grassland
Lapsana communis L. (nipplewort)	12	8	grassland, weed
Leontodon sp. (hawkbit)	4	9	grassland
Picris hieracioides L. (hawkweed ox-tongue)	-	7	grassland
Sonchus oleraceus L. (sow-thistle)	3	6	weed
Sonchus asper (L.) Hill (sow-thistle)	4	2	weed
Eleocharis palustris/uniglumis (spike-rush)	2	9	wet places
Carex cf. rostrata Stokes (bottle sedge)	-	1	swamps
Carex riparia/hirta (pond/hairy sedge)	-	3	various
Carex cf. nigra Reichard (common sedge)	-	4	mires
Carex cf. elata All. (tufted sedge)	-	3	fens
Carex sp. (sedge)	5	9	various
Bromus sp. (brome grass)	-	1	various
Gramineae (grasses)	-	1	various
Avena cf. sativa L. (oat) (charred remain)	-	1	cultivated
Gramineae sect. Cerealia (cereals, rhachis frag)	-	1	cultivated

MOSSES

cf. Thuidium sp.	fragments
indet.	fragments

Table 3: WORCESTER BARREL LAYERS 1 & 3, pollen and parasite ova

James Greig

Pollen type		Layer 1	3	3*	macrofossils
Ranunculaceae	(buttercups)	3	+	3	m
Cruciferae	(crucifers)	+	6	-	m
Caryophyllaceae	(campions etc.)	+	-	-	m
Chenopodiaceae	(goosefoot)	-	+	-	m
Leguminosae	(legumes)	2	1	-	-
cf. *Trifolium* type	(clover)	-	-	1	-
Vicia faba type	(e.g. broad bean)	-	+	-	-
Filipendula ulmaria	(meadowsweet)	+	-	1	-
Polygonum viviparum type	(bistort)	+	1	-	-
Rumex	(dock)	+	1	-	m
Urtica	(nettle)	1	-	-	m
Cannabiaceae	(hemp, hops)	-	1	-	-
Ulmus	(elm)	+	-	-	-
Betula	(birch)	+	-	-	-
Corylus	(hazel)	+	-	-	-
Quercus	(oak)	-	-	1	-
Convolvulus arvensis	(bindweed)	-	1	-	-
cf. *Borago*	(borage)	+	+	-	-
Rhinanthus type	(e.g. yellow rattle)	-	+	-	-
cf. *Stachys* type	(woundwort)	-	1	-	-
Plantago lanceolata	(ribwort plantain)	2	+	-	-
Rubiaceae	(bedstraws)	1	-	1	m
Bidens type	(e.g. bur marigold)	-	1	-	-
Anthemis type	(e.g. marigold)	-	6	-	m
Compositae (T) undifferentiated		2	-	-	m

Table 3 continued

Pollen type		Layer 1	3	3*	macrofossils
Centaurea cyanus	(cornflower)	+	1	1	m
Centaurea nigra type	(e.g. knapweed)	1	1	-	?m
Compositae (L)	(e.g. sow thistle)	3	6	6	m
Cyperaceae	(sedges)	+	+	-	m
Gramineae	(grasses)	47	26	49	m
Gramineae sect. Cerealia	(cereals)	35	59	34	m
Cereal bran remains		-	-	+	
	pollen sum:	244	252	68	

Parasite ova			
Ascaris sp. (roundworm)	108	-	38
Trichuris sp. (whipworm)	342	1	140

Notes: the sample of Layer 1 was acetolysed, but perhaps not very thoroughly, and that of layer 3 was thoroughly acetolysed. 3* was subsampled and was not acetolysed, although it went through all the other stages of the pollen preparation process.

Group I.

Medium brown wool, circa 6.0 x 5.5 cm, 6.5 x 4.0 cm, 5.0 x 4.0 cm and 4.3 x 3.0 cm. All these pieces were ragged and there were some smaller fragments as well. Both yarns were similar, having been well spun in Z pattern. The weave was tabby and regular, giving counts of 9/9 and 8/10 per cm in different areas, but there were no details to show which were warp and which were weft. One side of all the pieces had slightly raised surface fibres which were possibly napping but otherwise matting from having been waterlogged.

Group II: small woollen fragments possibly from 3 or 4 different fabrics:

1 (a) Most pieces were a rich dark brown but with a good deal of dark staining. The best pieces were ca. 2.5 x 2.7 cm, 4.0 x 3.5 cm and ca. 2.0 x 2.0 cm. The wool was soft and was Z spun one system with noticeably uneven spinning, S spun the other. There was no selvedge and the weave was tabby, giving counts of 10-11 (Z) / 12-14 (S) per cm. One fragment had solid felting along a cut edge suggesting the inside of a seam from a well-worn napped fabric, though the pieces do not show the general matting of those in Group I.

1 (b) This consisted of several pieces of a more reddish brown colour than the previous sub-group, the best being ca. 3.0 x 1.5 cm. The wool was softer than that of 1 (a), spun Z,S with no noticeable difference in the quality of the yarns. There was no selvedge and the tabby weave was rather open, giving counts of 10 (Z) /13-14 (S) per cm.

2. Two scraps of blue dyed cloth, of different qualities:

2(a) Medium blue wool with brown staining, ca. 2.0 x 1.0 cm. The yarns were both Z spun, loose, with a very open and deteriorated tabby weave giving a count of 12/11 per cm.

2 (b) Pale blue wool with some whitish fibres, ca. 2.0 x 1.0 cm. The yarns were both evenly spun Z with a fairly close tabby weave, count 10/10 per cm. There were two other tiny scraps among the untreated fragments.

3. Three fragments, two rich dark brown of which the largest was 2.5 x 1.5 cm (see II c.), the other being more reddish brown and triangular, 3.0 x 0.8 cm at the widest part. The wool in all yarns was Z spun and tabby weave, with a count of about 15/14 per cm in all pieces, which were without selvedges and all well napped on one side. The triangular piece had bias cut edges, and was probably tailor's waste.

Group II c.

One piece of rich dark brown wool, ca. 8.5 x 8.5 cm at the widest place, very similar to other pieces in Group II. The yarns were both Z and spun tightly but a little unevenly. The weave was tabby and close, with 15-16 / 11 threads per cm, and no selvedge. One side had been napped and cut edges again suggested tailor's waste.

"The investigation of a medieval barrel-latrine from Worcester"

by James Greig

LIST OF ILLUSTRATIONS

Figure 1. The barrel after excavation

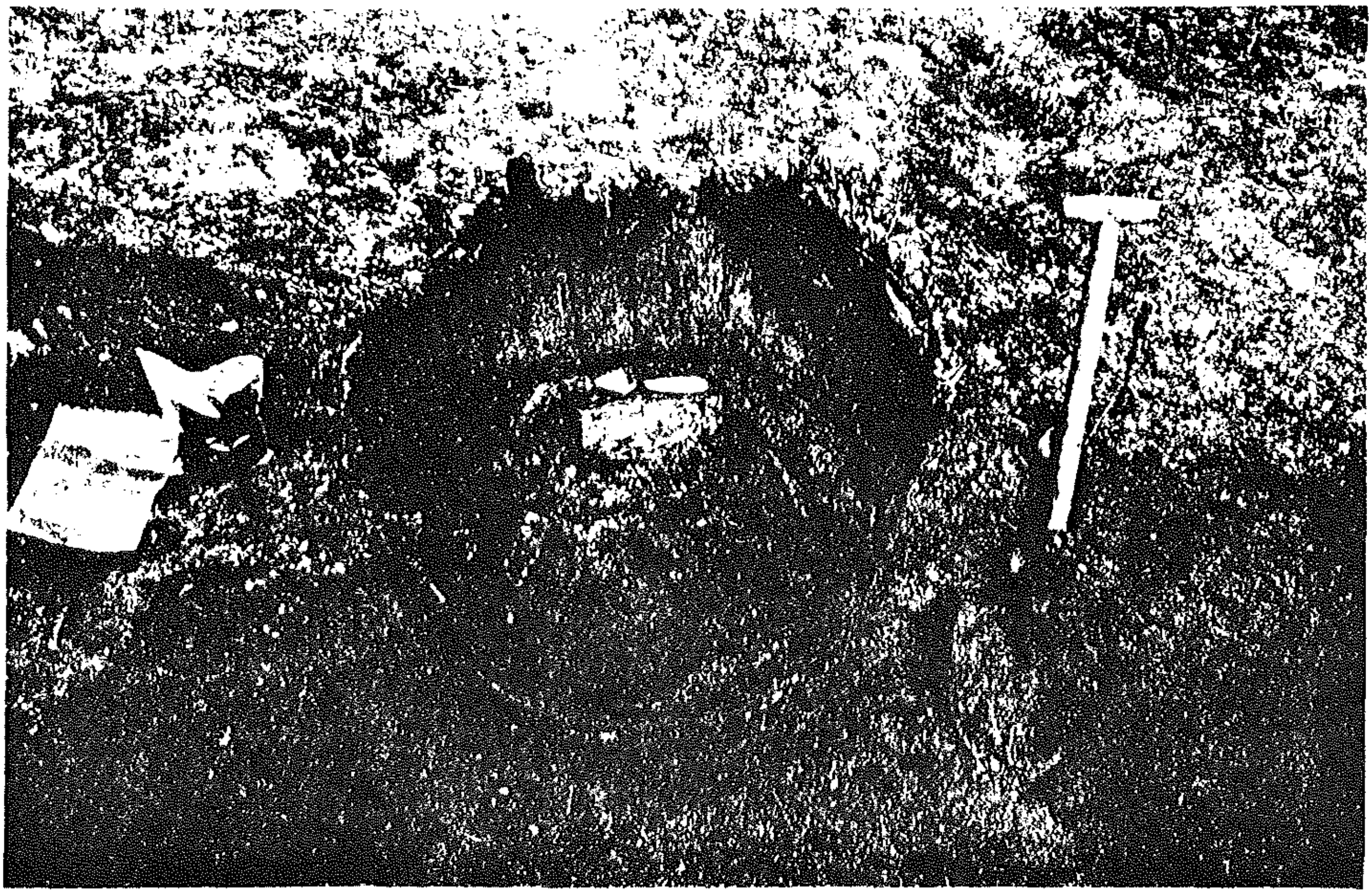


Figure 2. The barrel, a close-up view.

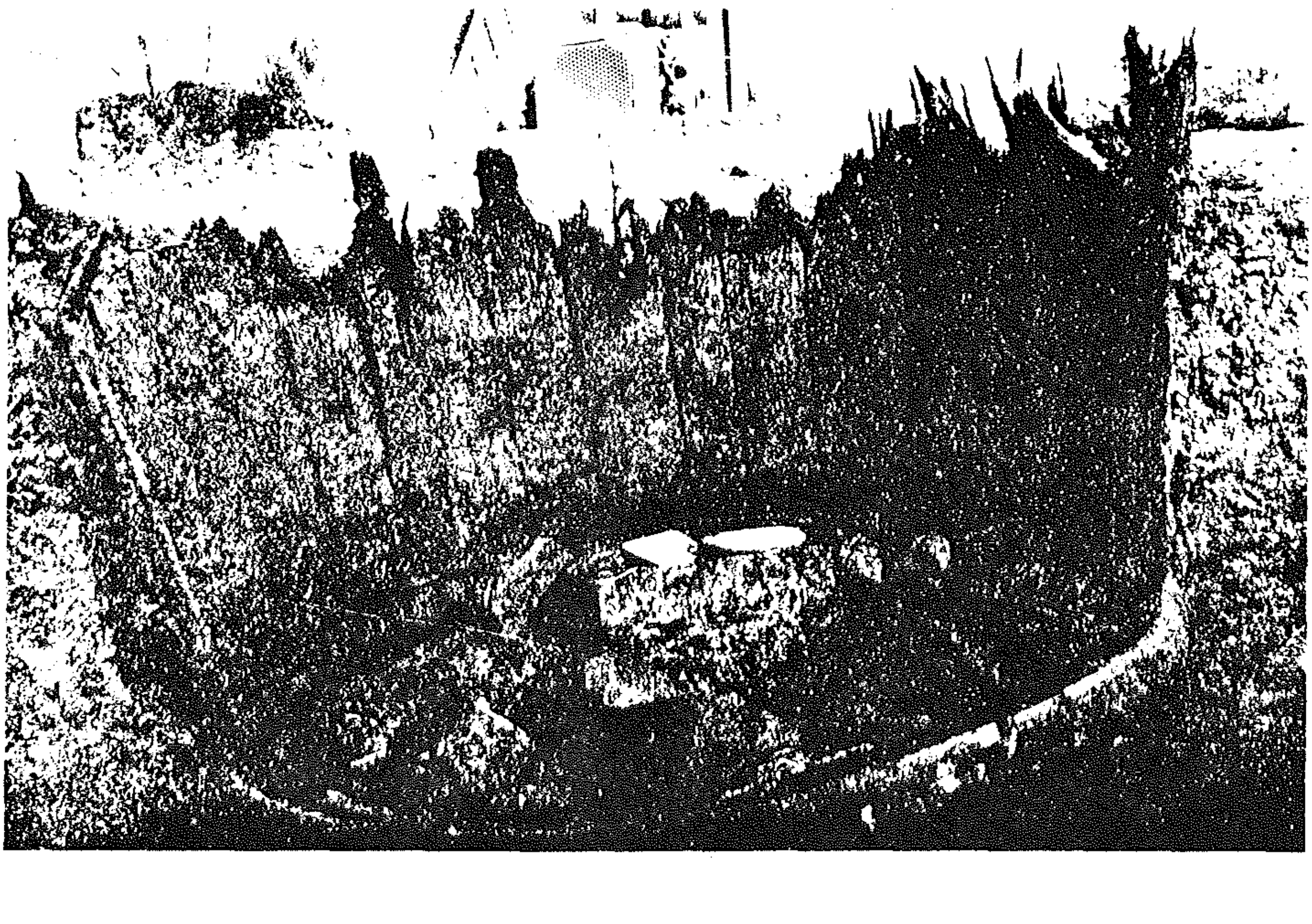
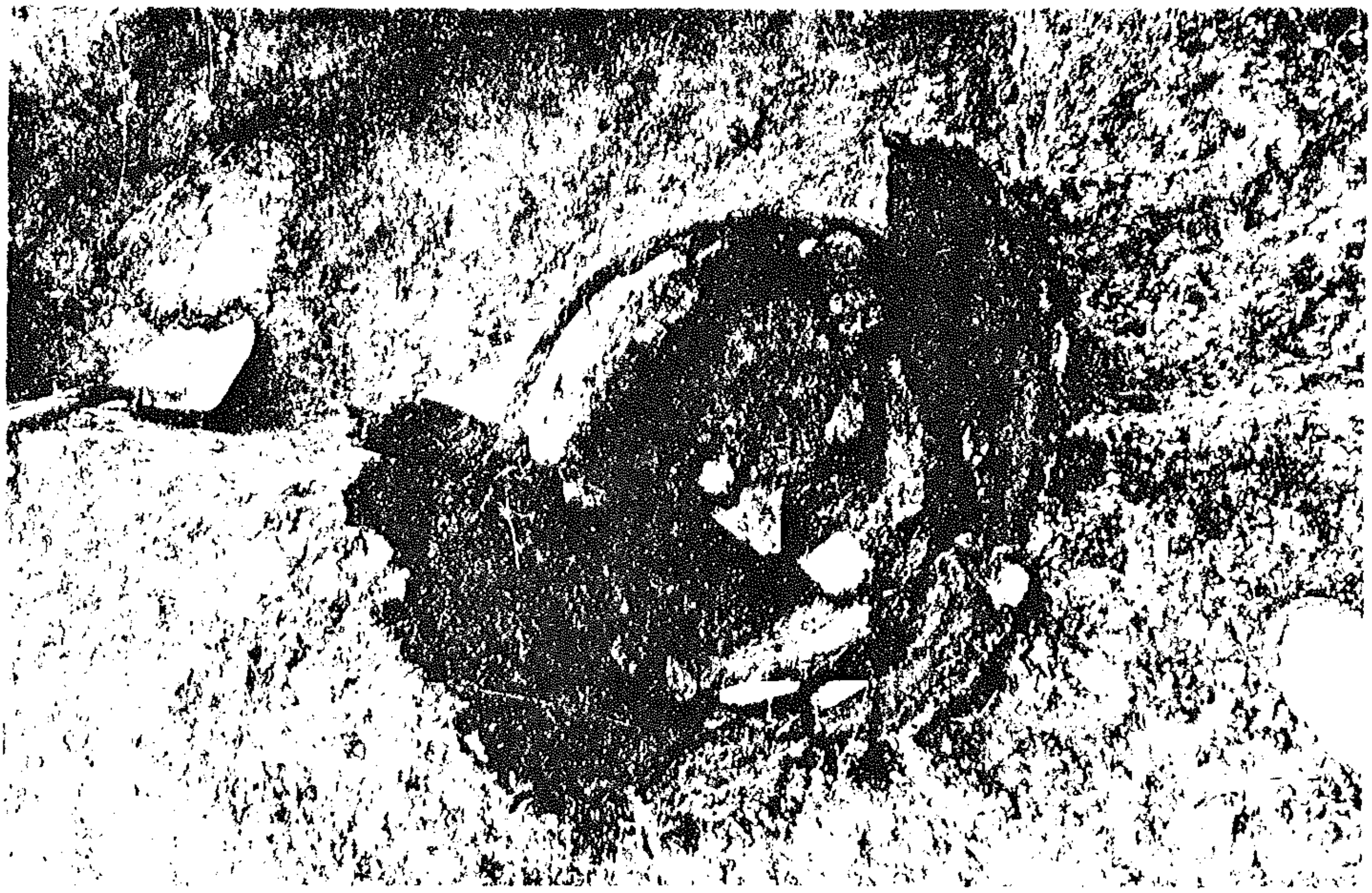


Figure 3. The barrel, viewed from above



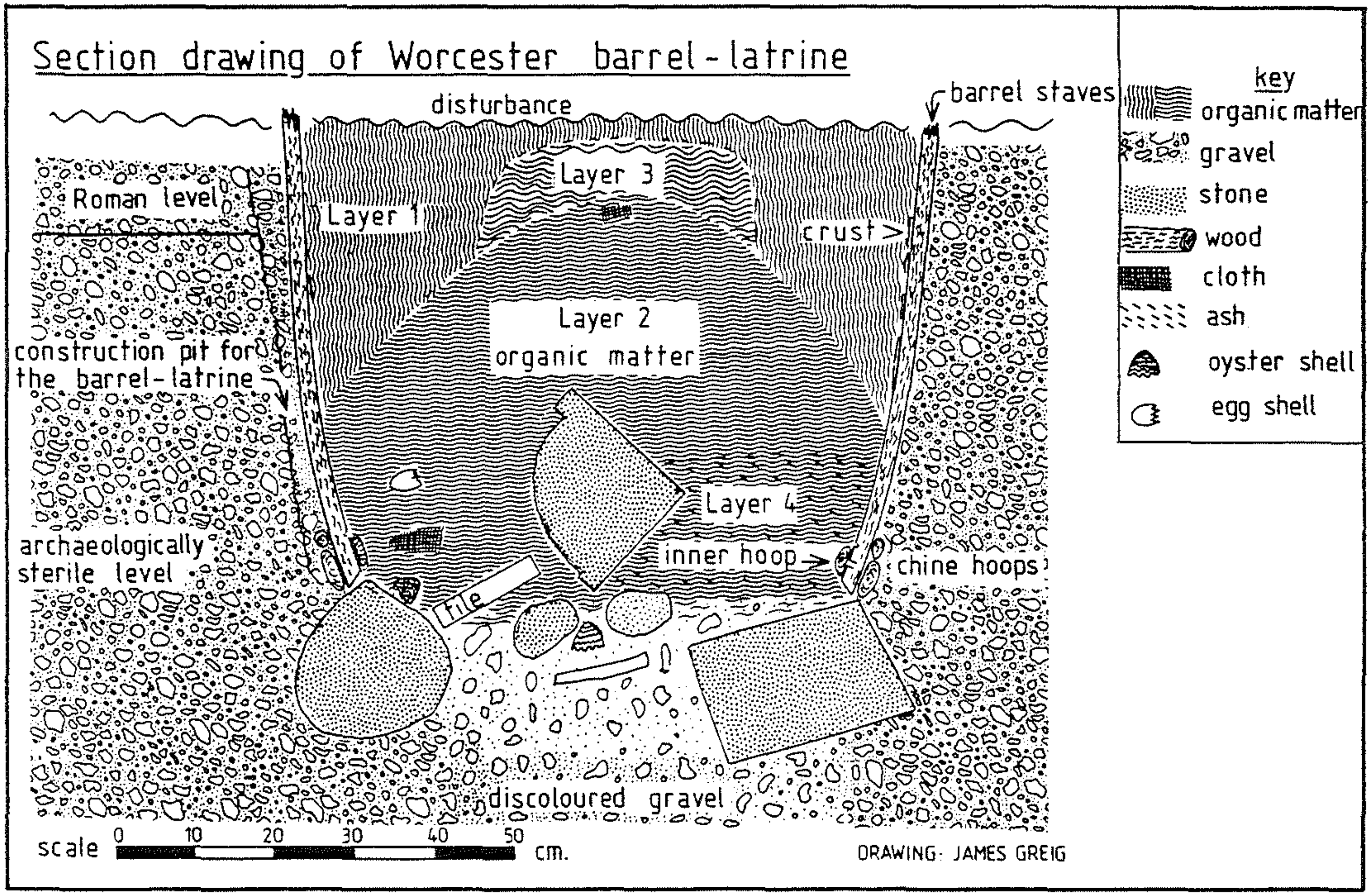
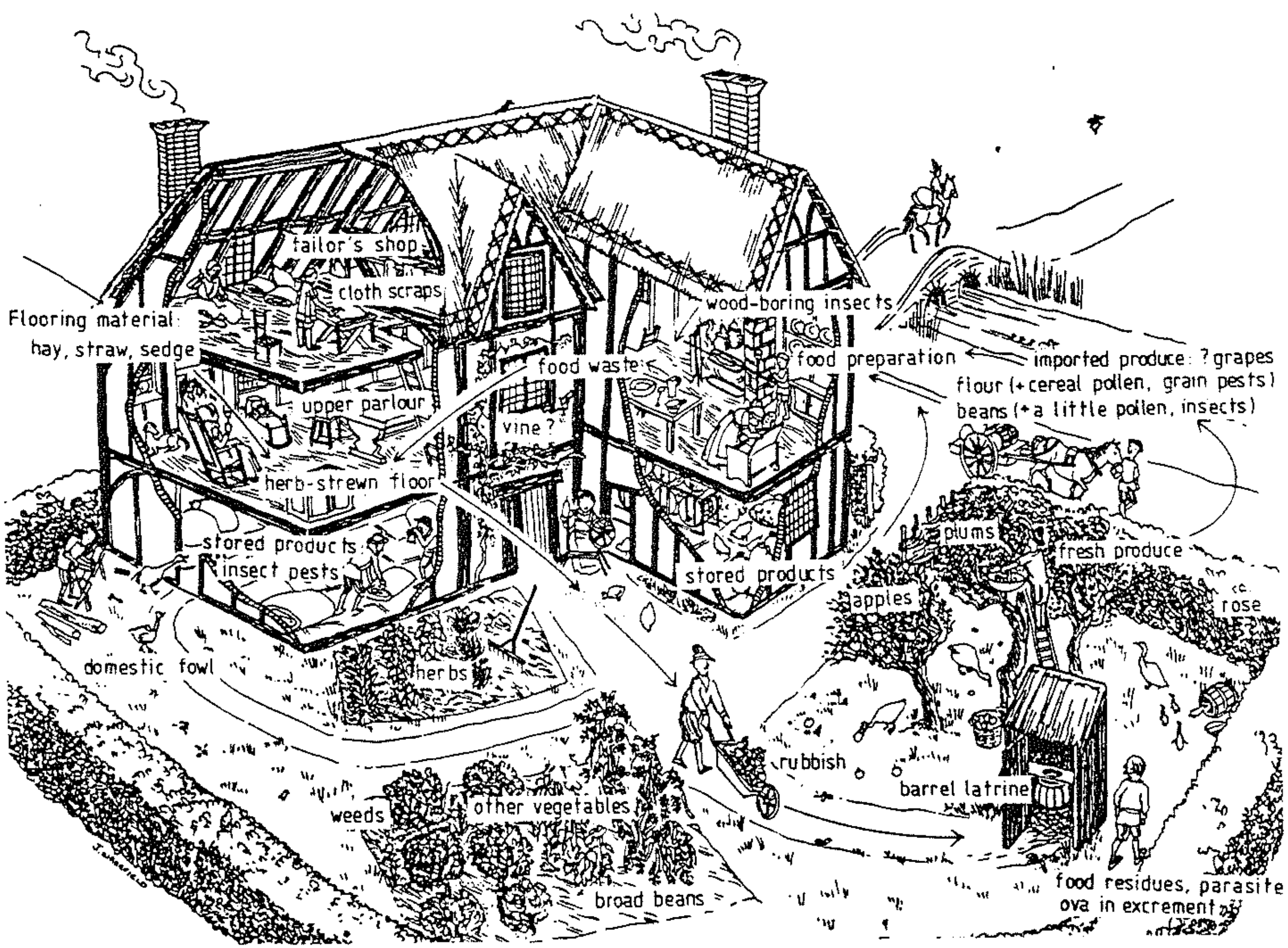

Section drawing of Worcester barrel-latrine
disturbance
barrel staves
Roman level
Layer 1
Layer 3
crust
Layer 2
organic matter
construction pit for the barrel-latrine
Layer 4
archaeologically sterile level
inner hoop
chine hoops
file
discoloured gravel
scale
0
10
20
30
40
50
cm.
DRAWING: JAMES GREIG
key
organic matter
gravel
stone
wood
cloth
ash
oyster shell
egg shell

Fig 4



An illustration showing possible sources of the finds from the barrel (not a reconstruction).

Fig 5

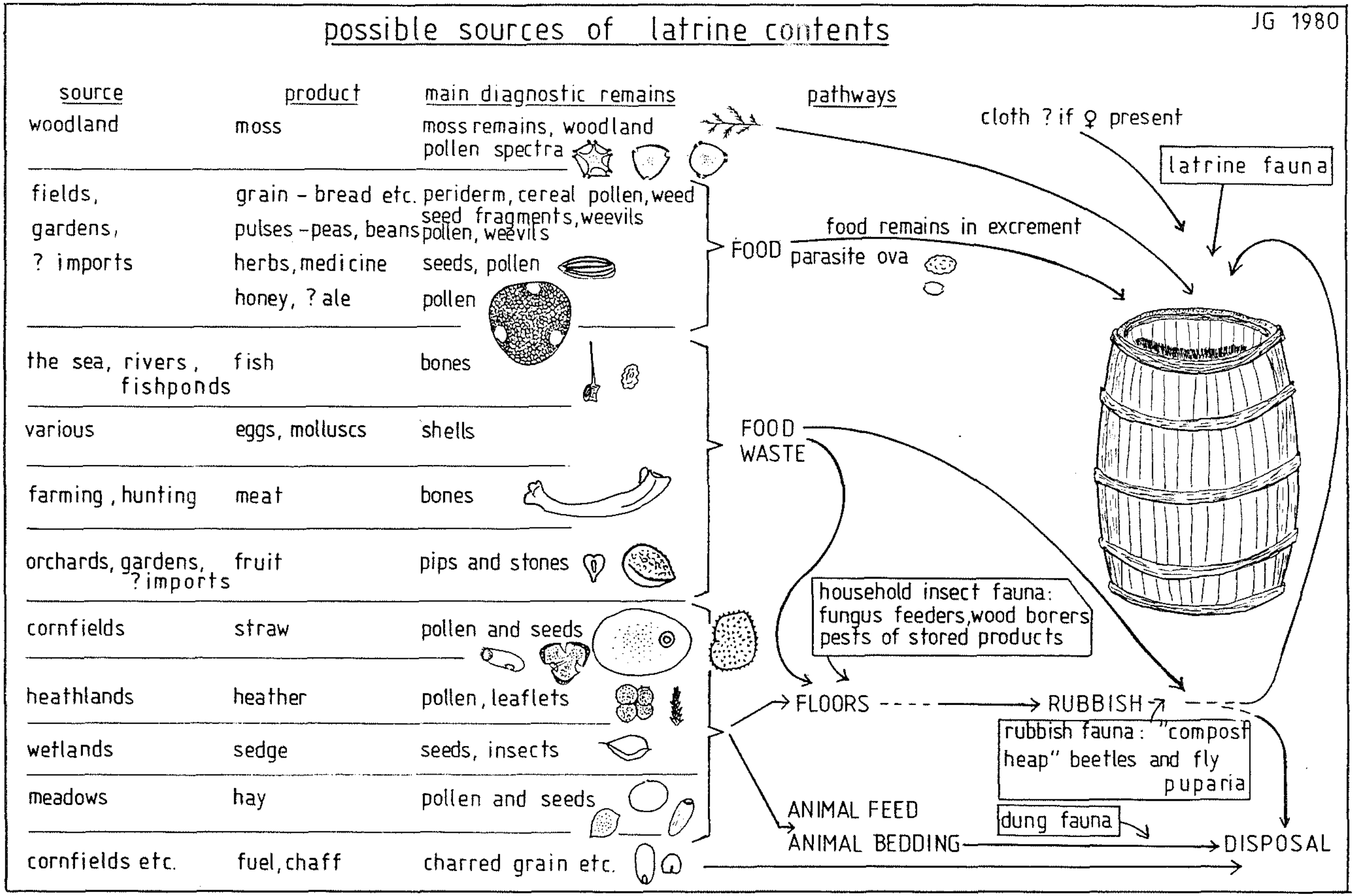


Figure 6: A diagram showing some of the pathways of plant and animal products from the sea and countryside through use(s) to eventual disposal as various types of rubbish, accumulating various kinds of insect fauna in the process.

Abstract

The contents of a fifteenth century barrel latrine from Worcester (UK) have been investigated. Twenty edible plant taxa were identified, mainly fruit including gooseberry, an unusual find, while fig and grape may be exotics. Weld (used for dyeing) and linseed were also found. Seeds from cornfield weeds, wayside, and wetland plants show the past presence of straw, hay and sedge, and the pollen spectra also show this. Broad bean, hemp/hop and borage pollen may represent food or drink, and abundant bran demonstrates the remains of cereal food like bread. Intestinal parasite ova give evidence of faeces, and the beetle remains are comparable with those from modern cesspits, the remains of grain and legume pests possibly coming from beetles consumed with infested food. The herring and eel bones may also have been eaten, but the chicken bones and larger fruit stones represent rubbish which would not have been swallowed. Some cloth remains were found. This study shows something of latrines, rubbish disposal, diet, living conditions and the general surroundings at the time.