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CHAPTER ONE

A Brief History of Plant Foods in the City of York: What the Cesspits Tell us

Allan Hall

'It may just be the contents of a cesspit to you, but it's my bread and butter!'

With these words, I have frequently tried to laugh off the slight embarrassment I feel when explaining what I do for a living to those who ask. Within archaeology, the idea of sifting through the contents of a cesspit in search of evidence for past food rarely ranks as a curiosity any more, but in the wider world surprise is sometimes expressed that anyone should either want to undertake such work or be paid for doing it.

What I hope to do in this short contribution is to try to conjure up some of the flavour – if that is an appropriate metaphor – of archaeobotanical studies of ancient foods in York, drawing on a corpus of data collected over a period of more than two decades (though a large proportion of it still, sadly, unpublished, and likely to remain so) from deposits of almost all cultural periods from Roman to post-medieval, but with a very heavy emphasis on the second to third, ninth to eleventh, and thirteenth and fourteenth centuries.

My starting point must be to explain briefly the nature of the evidence and for that a short preamble about preservation is necessary. Essentially, macrofossil plant remains – whole or fragmentary seeds and fruits, wood, twigs and bark, mosses, leaves and so on – may survive in the ground under three principal sets of circumstances. Firstly, they may be 'charred', that is incompletely burnt, to form pure carbon or charcoal. Such material is almost indestructible except through physical wear and tear so, once deposited in the ground, charred plant remains are extremely durable. Clearly only that material which is burnt to just the right point survives, so charred plant fossils usually represent just a small fraction of all the material which came into contact with the fire which caused the burning.

The second main way in which plant remains may be 'fossilized' is by mineral-replacement (more usually just called mineralization). Here, the plant tissues become impregnated by mineral salts, typically calcium phosphate – a finding recently confirmed by new analyses, in this case of some Viking-Age apple pips from Coppergate, York (McCobb *et al.* in preparation). Such fossilization only appears to occur where there are high concentrations of the appropriate chemicals, but cesspit fills are just the place where such conditions obtain and so mineralized remains often largely comprise food plants.

'Waterlogging'[1] is the third means by which plant fossils are frequently found in archaeological deposits – indeed, it is the process by which remains in peat bogs and lake sediments also survive. Here, the plant structure undergoes relatively little chemical or physical change, since preservation takes place in saturated deposits where oxygen levels are low and the bacteria and other organisms responsible for rotting cannot function – the principle is easily seen in a compost heap which has not been adequately aerated, where plant tissues resolutely refuse to decay into sweet brown humus.

All three mechanisms for preservation are to be found at most archaeological sites in York – and, indeed, in many other urban centres throughout northern Europe where there have been many centuries of continuous occupation. Naturally not all the remains one finds in such occupation deposits are from plant foods – a bewildering array of plants representing habitats as diverse as woodland, heathland, wetlands of all kinds, as well as all the sorts of weeds one might expect to thrive in the vicinity of human habitation or in cultivated fields, may be encountered. But if one includes all the fragments of hazel nutshell and elderberry seeds recorded over the years, it can be argued that at least scraps of plants which might have served as food for people (or their animals) are present in nigh-on all deposits where there is any preservation of plant fossils.

It should be remembered, though, that preservation is usually differential, never complete and, as we shall see, we know much more about the use of foods like fruits with resilient pips and stones than we do about vegetables, of which almost nothing preservable survives cooking or digestion. There is a bias in preservation by charring in favour of remains which came in contact with heat – it is the mechanism whereby foods with a lot of starch such as cereals and pulses are particularly well represented in the fossil record, and tends to lead to preservation of remains during storage (catastrophic fires in granaries) and processing (including cooking – the most frequent modern source of charred food remains would probably be burnt toast). As mentioned earlier, mineralization tends to favour recovery of remains deposited in latrines, so it generally provides the end result of food consumption rather than remains representing the processing stage. Soft and delicate remains are not usually preserved in a recognizable form under these conditions of preservation, but hard parts such as pips and, perhaps strangely, the seed coats of legumes may well be present. By contrast, even where bacterial decay is halted, as in waterlogged preservation, all that remains of cereals and pulses may be a thin sheet of tissue ('bran'), in the case of the former, and the small scar (hilum) by which the seed is attached to the pod, in the case of legumes (Figure 7). However, it is only with waterlogged preservation that the most delicate plant tissues, such as the epidermis (outermost 'skin') of leaves or stems may survive – one very good example here is leek, records for the vegetative remains of which are wholly restricted to sites where there is good waterlogging (and where an archaeobotanist familiar with this kind of material has been working).

Before turning to the evidence itself, it may be worth offering a brief explanation of how the evidence is obtained. Naturally, the starting point is the excavation during which samples of raw sediment are taken from layers in the ground. In the laboratory, it is necessary to wash away the fine mineral and organic matter which encapsulates the fossil remains and makes it difficult to examine them under the microscope – this is achieved by means of no more complicated a method than breaking samples up in water in a bucket and washing the resultant slurry through a tower of sieves of different mesh sizes.[2] A variety of techniques has evolved over the years for the recovery of remains preserved by different mechanisms, but all sooner or later require disaggregation and sieving.

The next stage in the process is 'sorting', in which small amounts of the material retained on each of the sieves are examined under a low-power binocular microscope and plant remains taken out for identification (or a record made of what is present if the species are familiar and there is no need to retain them). This, and the next stage, identification, naturally require considerable training – and for the latter it is necessary also to have access to suitable modern 'reference material'.[3] Given the variety of preservation mechanisms and the fact that fossil remains are often fragmentary or of distorted shape, a conventional reference collection will not always furnish all the material necessary to identify every fossil immediately, and a kind of detective work is often necessary, somewhat similar to that undertaken within forensic science, to isolate and identify tiny scraps of tissue, requiring parallel study of reference material that has been 'distressed' to make it appear similar to the ancient remains.

A last consideration, before launching into the evidence proper, concerns the interpretation of the remains. As I mentioned earlier, plant remains in archaeological occupation deposits usually represent a mixture of taxa which could not have lived or have been grown together in the past. Where there are large concentrations of remains of a particular type of plant, of course, it is relatively straightforward to interpret the assemblage of plant fossils and the matrix in which they were preserved as representing one particular kind of material or activity. Mixing of materials or the concurrence of a variety of activities during the formation of the sediment naturally lead to heterogeneity and it is the normal state of many deposits formed on occupation sites, especially complex urban ones like those encountered throughout York, to be mixed. So the first problem we are presented with by a dishful of plant remains from a sample of any one deposit is: 'how did this deposit form and what do the plant remains tell us, firstly about the processes that led to formation, and then from this about what people were doing (e.g. eating) in the past?' Moreover, whilst we can reconstruct some aspects of diet in terms of the range of plant foods which we can detect archaeobotanically and their changes in abundance in time and space, we really can do very little to reconstruct actual dishes – indeed, the limited precision with which we can date most archaeological deposits or the problem of taking a sample which represents more than one very short-lived event (like the voiding of an individual stool) mean that we are usually forced to consider the general rather than the particular.

The body of data I am going to draw on for the body of this contribution has, as mentioned earlier, been amassed over a period of more than twenty years, almost all of it since the inception of the Environmental Archaeology Unit in the Department of Biology at the University of York in 1975. The scale of excavation and of sampling has changed with time and from site to site, and the level of analysis undertaken has (for very good reasons) not been consistent, so these records are plucked from the database without too much attention to these complicating issues. For the purposes of a survey through time it is perhaps sufficient merely to comment in this way and pass on.

The data for plant foods from archaeological excavations in York are presented in Table 1. What is immediately obvious is, as mentioned above, how patchy the data are in their temporal distribution. Thus, whilst there are abundant data for the earlier Roman, Anglo-Scandinavian, 'early' and 'high' medieval and later medieval/earlier post-medieval periods, we have few data for the later Roman period, rather few for the Anglian period (and that from only two sites), and almost nothing for the period after the sixteenth century. This largely reflects conditions of preservation for the post-medieval period and, for the later Roman and Anglian periods, an archaeological problem of recognizing (and dating to a narrow period) deposits which are often featureless and rarely yield more than the most durable (and potentially reworked) remains. Those periods for which there is a relative abundance of data are those where there is usually good preservation by waterlogging – as for example in the earlier Roman levels at 24–30 Tanner Row and 12 Rougier Street (Hall and Kenward 1990) and the extraordinarily rich deposits of mid ninth- to late eleventh-century (Anglo-Scandinavian) date at 16–22 Coppergate (Kenward and Hall 1995).

It may be helpful to work systematically through Table 1, offering comments on the data presented. The cereals are listed first since they represent the presumed staple food at all periods. Wheat and barley are the most frequently recorded, overall, with rye making a substantial appearance first in the Anglo-Scandinavian period (but of not much importance thereafter) – perhaps something to be expected as reflecting the arrival of a new culture (and a new food) from northern Europe, though the food was not destined to remain a regular part of York people's diet. Having said that, the records for wheat/rye 'bran' (strictly the pericarp, the most indestructible part of the grain forming the bulk of the 'fibre'), which are more frequent in the medieval period, may include rye – no anatomical distinction between these two cereals can be made for the fragments of tissue concerned. On the other hand, we might expect the records for charred cereal grains to reflect more accurately the relative importance of the various cereal crops, and here rye is of little significance after the Norman Conquest.

Very noticeable is the change in importance of the two forms of wheat distinguished amongst the charred grain: in the Roman period, spelt predominates, whilst 'bread' wheat becomes the main form used in the Anglo-Scandinavian and later periods. Unfortunately, a large amount of the wheat grain recorded could not be identified more closely; this may have been because grains were poorly preserved, or, more likely, because of the absence of diagnostic chaff (there is a growing body of evidence from other parts of England for the importance of 'rivet' wheat, *Triticum turgidum*, a tetraploid free-threshing wheat, during the Middle Ages; the identification of this rests on the chaff from the ear rather than the grain, so there may be grain of this plant in medieval York that cannot be recognized in the absence of chaff remains). Besides differences in the baking qualities of spelt and bread wheat, a major difference with implications for processing is that spelt is a 'glume wheat' in which grains are held tightly in their ears until released by a preliminary milling or pounding, whilst bread wheat is 'free-threshing' and grain is easily recovered by normal threshing mechanisms.

The evidence for pulses is extremely limited (mainly a function of the vagaries of preservation), the bulk coming from Anglo-Scandinavian excavations and with field bean more frequent than pea. The exotic, lentil, appears briefly in the Roman period (the later record for this seems very likely to be a specimen reworked from Roman levels). As second-hand evidence for the crop, remains of pod fragments of field bean have been identified from Anglo-Scandinavian Coppergate – they were large enough to be reasonably certain of the identification, but microscopic examination by my former colleague Dr Philippa Tomlinson revealed the presence of characteristic short hairs which confirmed that they were *Vicia faba*. It is quite likely that small fragments of legume pod from many other sites will have been from pea, but these have not been identified more closely, so far.

Hazelnuts represent the most frequently recorded food remains, overall; this should not be too surprising, given the robust nature of the material – nutshell – and the assumed abundance of hazel in the woodland vegetation in the Vale of York (hazel rods were frequently recorded amongst the woven wattle and wickerwork recorded at 16–22 Coppergate although, interestingly, remains of the buds of hazel have rarely been encountered, whilst those of other trees such as willow, birch and oak have been regularly identified). Some hazel nutshell from Coppergate provided a rare insight into human interaction with a food source: some of the fragments recovered bore evidence of a knife cut across the top of the nut (Kenward and Hall 1995, fig. 191h) consistent with a method of opening in which, after nicking the top, the point of the knife would have been inserted into the cut area and twisted so as break the nut open.

Although included under 'oil seeds', linseeds, the seed of a form of flax, have not necessarily always been used for this purpose and the oil obtained is, in any case, perhaps more likely to have been used for non-culinary purposes. The presence of seeds and seed fragments in cesspit deposits, along with bran and other small seeds likely to have been used as flavourings or for decoration, rather suggests that linseeds were used in foods like bread, as has remained traditional in central and northern Europe (and which is becoming increasingly familiar to the British as 'fancy breads' occupy an ever larger part of the supermarket shelves). Opium poppy seed remains, similarly, may well simply have originated in this kind of way; certainly no case where a large concentration of crushed seed such as might result from oil extraction has been recorded from the city at any period. Gardeners will know, though, that this plant can quickly establish itself as a self-seeding weed and so not all the archaeological records need represent seeds used as food or food decoration.

In the category 'flavourings', most of the plants are ones where it is the seed itself that was probably used – except for the sweet gale, where it is the leaves which probably served. Remarkably, specimens of dill and celery seed from Anglo-Scandinavian Coppergate retain something of their original smell when the fossil is dried and rubbed between thumb and forefinger – a destructive form of analysis, but a useful way of confirming a determination otherwise made purely on morphological grounds, and a testament to the remarkable conditions of preservation! The regular occurrence of dill, celery seed, summer savory and coriander at Coppergate (the bulk of the records for the Anglo-Scandinavian period) certainly indicates the importance of these sources of flavouring to the Viking inhabitants of York – a striking contrast to the situation in the contemporaneous town of Hedeby (Haithabu) in North Germany, where extensive and detailed archaeobotanical studies failed to find any of these plants (Behre 1983), although hops and sweet gale were regularly recorded there. The frequency of hops in Anglo-Scandinavian deposits leads one to suppose that they must have been used in some way, though whether this was as a flavouring for drink is by no means certain. The female flowers, in which the characteristic bitter flavouring resides, and from which the fruits (the part recorded as fossils) fall when ripe, might have been used medicinally, and there are also documentary sources indicating the use of hops to produce a yellow dye (there was abundant evidence for the use of a variety of plants for dyeing at

Figures 9 and 10. Field bean pod epidermis. At the top is a modern example, showing hairs and cicatrices (scars). Below is a fossil epidermis from Anglo-Scandinavian Coppergate, preserved by waterlogging, showing hairs and a stoma.

Coppergate and some other contemporaneous sites in York, so this is not an unreasonable explanation for the presence of the hops). The use of sweet gale or bog myrtle is similarly ambiguous. The strongly flavoured leaves and fruits may certainly have been used for flavouring ale as they were in historic times in Britain and parts of continental northern Europe, but they have medicinal uses, too, and are also recorded as having been used in dyeing (again, giving a yellow colour).[4]

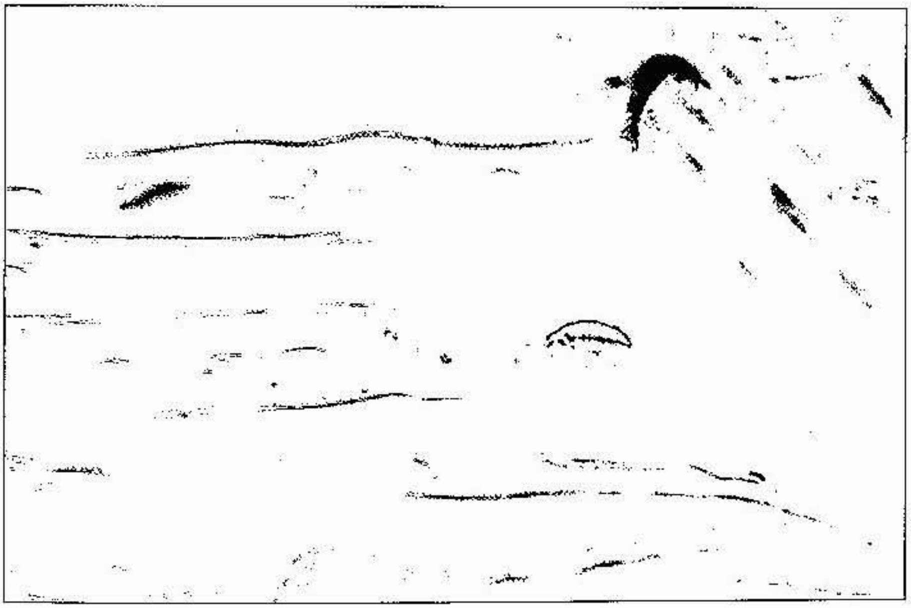
The distinction of fruits likely to have been collected from the wild from those likely to have been cultivated is difficult. In the lists in the table below (page 36), a simple division has been made into those which were probably wild-collected and those which must have been cultivated (and, since they are non-native plants, were also imported, at least initially – though in terms of preservability as dried fruit this seems less likely for mulberry than for grape and fig). Within the wild-collected category, it is possible that some of the records for apple and 'plum' are for cultivated plants. Apple pips appear not to have changed much in size during the breeding of cultivars and cannot be used to assist in defining the source of the food, whilst for the plums we still know too little about the history of cultivation and of changes in stone size and shape through time to provide a basis for interpreting material as coming from wild or 'domesticated' trees. In those few cases from Anglo-Scandinavian Coppergate where parts of whole apple fruits were preserved (by charring), their size was wholly consistent with wild (crab) apples. The records for *Vaccinium* – of which bilberry and cranberry are the most likely to have been eaten – are probably mainly bilberry since some samples from Coppergate have yielded the 'torus' of the fruit which is quite distinctive for this plant.[5]

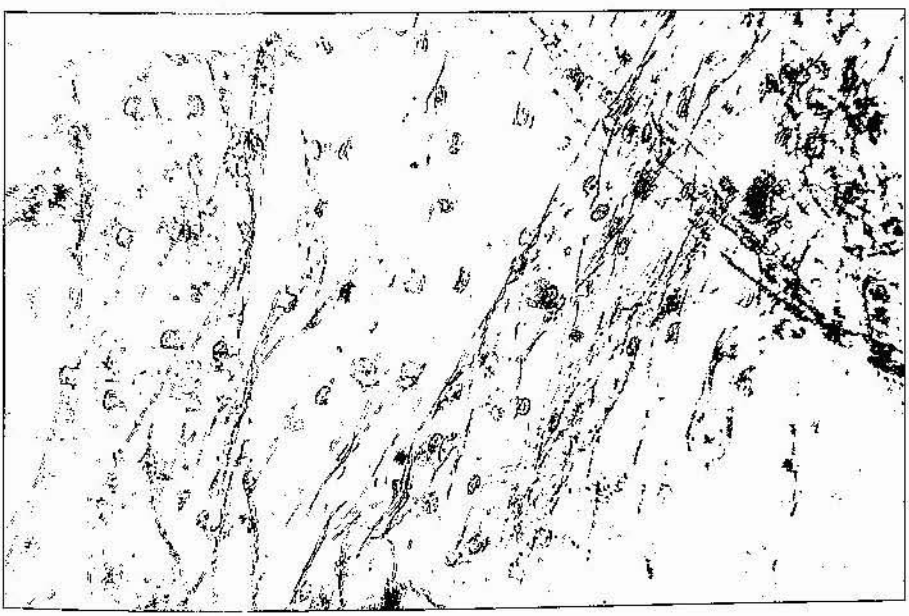
Surprise has often been expressed at the frequency with which sloes appear in the fossil record in contexts where it is clear they have been eaten. Sometimes the surprise relates to palatability (a wry face being made at the thought of eating such sour, astringent fruits), sometimes to ingestibility. ('How could people swallow all those stones?') With regard to sourness, it must be said that to people reared on a diet rich in sugar, sloes do indeed seem sour, but they are evidently much less so to someone whose sweet tooth has not been so much indulged (and after frost the sloe's astringency is certainly reduced to some extent). The question of swallowing versus spitting out is probably an even more personal matter; it is relevant also to the ingestion of apple cores[6] – on which the world seems to be divided between those who nibble round the core and those who chew and swallow the whole structure – and, for that matter, to the chewing and swallowing of small fish bones! It would be interesting to know if there were cultural differences with regard to these kinds of habits.

A last comment about the fruits concerns the very large numbers of records for several of these taxa. They should perhaps not all be regarded as certain evidence for use as human food, since isolated seeds in archaeological deposits may as easily represent specimens passed by birds or even, in the case of elderberry, seeds from plants growing in the vicinity, but not necessarily utilized by the inhabitants of the town. Some stumps of elder trees were recorded *in situ* at Coppergate, for example, showing that they certainly grew in the town and may well have contributed seeds directly to the archaeological record rather than via the alimentary canals of the people living there. The very decay-resistant seeds are also quite likely to be reworked, at least on a short timescale.

A word is needed here about the records of fig and grape from the Anglo-Scandinavian period. These are mostly records for single seeds, but there are enough of them to suggest that both fruits at least occasionally found their way into the town at this period. On the other hand, a fig carries so many seeds that one might expect to find concentrations of fig seeds rather than isolated ones – as is the case, typically, for Roman and medieval sites, where fig rarely occurs except in moderate or large numbers. Analysis of material from other sites of the Anglo-Scandinavian period should shed light on this question.

Under 'vegetables' I have included all records for leek and ?leek – they are probably all this plant, in fact. No doubt overlooked or under-recorded in the past, remains of *Allium* leaf epidermis are now being found on a regular basis. Leek can be distinguished from other alliums by the presence of a row of small rounded teeth on the leaf margin, but of course this represents only a small part of the whole plant and is only rarely recorded in fossil material. Moreover, since it is the margin of the green leaf which bears these teeth, it is the part perhaps least likely to have been eaten! The records for carrot should probably not have been included. They are for the seeds and these probably bear no relation to the use of carrots as root vegetable. Indeed, most if not all the records of carrot seeds are likely to indicate importation of cut grassland vegetation (e.g. hay) or the presence of herbivore dung (most likely that of horses) containing plants grazed in the field or consumed in hay.





Figures 11 and 12. Allium *epidermis. Above is the modern* Allium porrum *L. (leek), and below a fossil* Allium *sp., showing characteristic sunken stomata and cuticle sculpture pattern, from Anglo-Scandinavian Coppergate.*

Further analysis of the whole dataset for plant remains is required to establish if these records for carrot are statistically more strongly linked with those for grassland plants than, say, with plants likely to have been used for human food, though the possibility remains that these strongly flavoured seeds may have been used in a similar way to those of dill, celery or fennel.

I hope it is clear from the data I have presented, and these ancillary comments, that the study of fossil plant remains from archaeological occupation deposits in York offer a singular opportunity to glimpse aspects of the diet of its past inhabitants, albeit a somewhat distorted and incomplete one, and with an emphasis on ingredients not finished dishes. For the future, the pursuit of evidence for a wider range of leaf vegetables is certainly a priority, and no opportunity to examine material from periods for which data are currently sparse should be overlooked.

Notes

I am grateful to my colleagues at the Environmental Archaeology Unit, University of York, for discussions, and to the many people who, over the years, have carried out practical work on the samples whose content of food plants forms the basis for this chapter. English Heritage funded the bulk of the work.

1. 'Waterlogged' preservation is sometimes qualified as 'anoxic' and, wrongly, as 'anaerobic'.
2. The finest material is usually collected on a sieve with a mesh of 0.25 or 0.3 mm, but under some circumstances a coarser mesh may be used if the effort in recovering the smallest fossils outweighs the return in information.
3. Named specimens of known provenance with which the ancient remains can be compared.
4. The history of the use of hops in flavouring beer in England is a somewhat complicated matter and requires too much explanation to be dealt with here; Wilson (1975) has discussed many aspects of the subject, prompted by the find of large numbers of hops in a boat of tenth century date at Graveney, Kent.
5. The torus is the flat disc with a slightly lobed margin at the opposite end of the fruit to the stalk and from which the pistil arises.
6. The entry for apple 'endocarp' in the table on page 38 is for the remains of the horny layer of tissue enclosing the seed and called by some people 'core' – though I prefer to use that term for the whole central column of the fruit discarded by the 'nibblers'; unless we are finding remains of whole uningested core regularly in cess pits, the frequency with which endocarp occurs must indicate that the whole-core chewers probably outnumbered the nibblers!

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Period	1	2	3	4	5	6	7
(See explanation of period numbers – in bold – on pages 40–41.)							
Number of sites	11	6	4	6	3	2	19
Number of contexts containing food taxa	155	15	12	27	15	43	569
Cereals (all material charred grains unless otherwise indicated)							
OATS							
Avena sativa L.	8	-	-	-	-	-	37
BARLEY							
Hordeum. vulgare L. (6-row barley)	24	-	1	1	-	1	5
Hordeum sp(p).	10	3	1	5	-	21	163
cf. *Hordeum* sp(p).	3	1	1	-	1	5	16
Hordeum sp(p). (uncharred)	-	-	-	-	-	-	5
RYE							
Secale cereale L.	2	-	-	-	-	-	53
cf. *S. cereale*	-	-	-	-	-	1	27
S. cereale (uncharred)	-	-	-	-	-	-	1
WHEAT							
Spelt wheat							
Triticum spelta L.	21	-	-	-	1	-	-
T. spelta (uncharred)	2	-	-	-	-	-	-
Bread/club wheat							
Triticum 'aestivo-compactum'	8	1	1	2	-	1	192
T. cf. *'aestivo-compactum'*	1	-	-	-	1	2	5
Triticum sp(p).	14	3	5	4	-	3	24
WHEAT/RYE							
Triticum/Secale ('bran' fragments)	20	3	1	-	-	1	105
Triticum/Secale (uncharred grains)	4	-	-	-	-	-	20
Pulses (all charred seeds unless otherwise indicated)							
Lens culinaris Medicus (lentil)	1	1	-	-	-	-	1
Pisum sativum L. (pea)	-	-	-	-	-	-	10
cf. *P. sativum*	-	-	-	-	-	-	7
P. sativum (hila)	-	-	-	-	-	-	6
cf. *P. sativum* (hila)	-	-	-	-	-	-	-
P. sativum (mineralized hila)	-	-	-	-	-	1	-
Pisum sp(p). (mineralized seeds)	-	-	-	-	-	1	1
Vicia faba L. (field/horse bean)	-	-	-	-	-	-	30
V. faba (hila)	-	-	-	-	-	-	4
V. faba (mineralized hila)	-	-	-	-	-	1	2
V. faba (uncharred testa fragments)	-	-	-	-	-	-	7
V. faba (mineralized testa fragments)	-	-	-	-	-	1	1
V. faba (pod fragments)	-	-	-	-	-	-	1

Table 1. Records for plant fossils probably serving as food through York's history. The numbers in the body of the table are numbers of contexts (distinct archaeological layers) in which each taxon was recorded (with the maximum possible number given at the top and bottom of the table, together with the numbers of excavations (sites) yielding the material.

8	9	10	11	12	13	14	15	16	17	18	19	20
3	11	1	20	5	3	14	3	2	2	1	2	3
4	126	1	289	30	14	53	9	6	5	1	4	9
2	7	-	3	-	2	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-
2	18	-	17	1	3	6	1	-	-	-	-	-
-	2	-	5	-	1	-	-	1	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	1	-	1	-	-	-	-	-	-	-
1	2	-	4	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	11	-	5	4	2	5	2	-	-	-	1	-
-	1	-	-	-	-	-	-	-	-	-	-	-
2	8	1	11	2	1	2	-	-	-	-	-	-
1	11	-	19	5	3	9	1	1	-	-	-	-
-	-	-	2	-	-	1	-	-	-	-	-	-
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-	-	-	-	1	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

Note that a certain amount of judicious pruning has been undertaken to keep the table within manageable proportions. Records for tentatively identified taxa recorded in only one or a very few periods have generally been excluded except where they are for taxa which are otherwise very rare

Period	1	2	3	4	5	6	7
(See explanation of period numbers – in bold – on pages 40–41.)							
Nuts (all uncharred nutshell unless otherwise indicated)							
Corylus avellana L. (hazel nut)	115	5	7	8	5	3	389
C. avellana (charred nutshell)	10	4	1	-	-	15	15
Juglans regia L. (walnut)	32	-	3	2	-	-	14
Pinus pinea L. (stone pine, pine nut)	1	-	-	-	-	-	-
Oilseeds (all uncharred seeds)							
Linum usitatissimum L. (linseed)	51	3	1	2	-	1	234
Olea europaea L. (olive)	20	-	2	-	-	-	-
Papaver somniferum L. (opium poppy)	23	1	1	4	-	-	40
Flavourings (all material uncharred seeds unless otherwise indicated)							
Anethum graveolens L. (dill seed)	9	2	-	-	-	-	89
cf. *A. graveolens*	13	2	-	2	-	-	21
Apium graveolens L. (celery seed)	35	4	1	5	4	-	154
cf. *A. graveolens*	1	-	-	1	-	-	2
Coriandrum sativum L. (coriander seed)	41	3	2	4	-	-	16
Foeniculum vulgare L. (fennel seed)	-	-	-	-	-	-	-
F. vulgare (mineralised seed)	-	-	-	-	-	-	-
cf. *F. vulgare*	1	-	-	-	-	-	1
cf. *F. vulgare* (mineralised seed)	-	-	1	-	-	-	-
Humulus lupulus L. (hops)	-	-	-	-	-	-	219
Satureja hortensis L. (summer savory)	31	2	1	-	-	-	112
cf. *S. hortensis*	7	1	-	-	1	-	4
Myrica gale L. (sweet gale fruits)	1	-	-	-	-	-	3
M. gale (leaf fragments)	1	-	-	-	-	-	4
Fruit (all uncharred 'seeds' unless otherwise indicated)							
Probably wild-collected (some perhaps cultivated later in period)							
Crataegus monogyna Jacq. (hawthorn)	1	-	-	-	-	-	48
Fragaria cf. *vesca* L. (strawberry)	2	-	-	1	-	-	1
Malus sylvestris Miller (apple pips)	9	-	1	2	-	-	196
M. sylvestris (endocarp)	11	-	-	-	-	-	162
Prunus domestica L. ('plum')	-	1	-	-	-	-	96
P. domestica ssp. *domestica* (plum)	1	-	1	1	-	-	1
P. domestica ssp. *insititia* (bullace)	28	-	3	1	-	-	16
P. Section *Cerasus* (cherry)	18	1	1	4	-	-	22
P. spinosa L. (sloe)	39	-	3	1	-	1	254
Rosa sp(p). (rose)	-	-	-	3	-	-	24
Rubus caesius L. (dewberry)	2	-	-	-	-	-	10
R. cf. *caesius*	-	-	-	-	-	-	6
Rubus fruticosus agg. (blackberry)	60	3	4	7	-	1	211
Rubus idaeus L. (raspberry)	18	2	1	2	-	-	50
R. cf. *idaeus*	3	2	-	-	1	-	5

Table 1 continued. Records for plant fossils probably serving as food through York's history.

8	9	10	11	12	13	14	15	16	17	18	19	20
1	32	-	42	8	3	12	3	2	-	-	-	-
1	12	1	21	2	-	12	-	-	-	-	-	-
-	1	-	-	-	-	-	1	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
1	8	-	10	-	1	1	-	-	-	-	1	3
-	-	-	-	-	-	-	-	-	-	-	-	-
-	5	-	4	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	2	-	-	-	-	-	-	-	-	-
1	3	-	3	-	2	2	-	-	-	-	-	-
-	1	-	1	-	-	1	-	-	-	-	-	-
-	-	-	-	2	-	2	-	-	-	-	-	-
-	-	-	3	1	-	3	-	-	-	-	-	-
-	-	-	-	2	-	1	-	-	-	-	-	-
-	-	-	3	-	-	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	2
-	-	-	2	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-
-	2	-	14	2	1	5	1	-	-	-	-	-
-	6	-	15	1	1	2	-	-	-	-	-	-
-	6	-	18	1	2	4	2	-	-	-	-	-
-	-	-	3	-	-	1	-	-	-	-	-	-
-	2	-	2	-	-	-	1	-	-	-	-	-
-	7	-	9	-	1	-	2	-	-	-	-	-
-	5	-	6	-	-	1	-	-	-	-	-	-
-	14	-	15	3	-	1	2	-	-	-	-	-
-	-	-	-	-	-	-	-	1	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-
-	17	-	26	3	2	7	1	-	1	-	1	-
-	3	-	2	1	-	6	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-	-	-	-	-

Note that a certain amount of judicious pruning has been undertaken to keep the table within manageable proportions. Records for tentatively identified taxa recorded in only one or a very few periods have generally been excluded except where they are for taxa which are otherwise very rare

Period	1	2	3	4	5	6	7
Fruit contd.							
Sambucus nigra L. (elderberry)	64	6	3	19	13	3	431
Sorbus aucuparia L. (rowan)	-	-	-	-	-	-	13
Vaccinium sp(p). (bilberry, etc.)	2	1	-	2	-	-	34
Vaccinium sp(p). ('tori')	-	-	-	-	-	-	2
Certainly cultivated, perhaps imported							
Ficus carica L. (fig)	64	6	3	5	-	-	5
Morus nigra L. (black mulberry)	2	-	-	-	-	-	-
cf. *M. nigra*	3	-	-	-	-	-	-
Vitis vinifera L. (grape)	24	1	2	1	-	-	8
Vegetables							
Allium porrum (leek, leaf epidermis)	-	-	-	-	-	-	3
A. cf. *porrum* (leaf epidermis)	-	-	-	-	-	-	9
cf. *A. porrum* (leaf epidermis)	1	-	-	-	-	-	9
Allium sp(p). (onion/leek leaf epidermis)	-	-	-	-	-	-	4
Daucus carota L. (carrot seed)	19	2	2	4	-	-	30
Number of sites	11	6	4	6	3	2	19
Number of contexts containing food taxa	155	15	12	27	15	43	569

Key to periods: 1 earlier Roman (1st-2nd century); 2 middle Roman (2nd-3rd century); 3 later Roman (4th century); 4 material not dated more closely than 'Roman'; 5 material broadly dated to the period after the end of the 4th century to the early 9th century, i.e. latest Roman to Anglian; 6 Anglian (7th-mid 9th century); 7 Anglo-Scandinavian ('Viking', mid 9th to late 11th century); 8 Anglo-Scandinavian to early medieval (material dated across the 'Conquest'); 9 'early' medieval (Norman to mid 13th century).

Table 1 continued. Records for plant fossils probably serving as food through York's history.

8	9	10	11	12	13	14	15	16	17	18	19	20
3	45	-	71	20	4	29	4	4	4	-	2	5
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	4	-	30	14	2	14	2	1	-	-	2	2
-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	2	-	8	2	1	3	1	-	-	-	-	-
-	1	-	1	-	-	-	-	-	-	-	-	-
-	-	-	2	-	-	1	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-
3	11	1	20	5	3	14	3	2	2	1	2	3
4	126	1	289	30	14	53	9	6	5	1	4	9

10 *material dated broadly across the early/high medieval periods;* 11 *'high' medieval (mid 13th-end of 14th century);* 12 *material dated across the high/late medieval period;* 13 *'late' medieval (15th century);* 14 *material dated broadly across the later medieval/post-medieval boundary (mostly 15th-16th century);* 15 *earlier post-medieval (16th century);* 16 *material dated 16th-17th century;* 17 *material dated 17th-18th century;* 18 *material dated 18th-19th century;* 19 *material dated broadly mid 17th century-modern;* 20 *material dated to the 19th-20th century.*

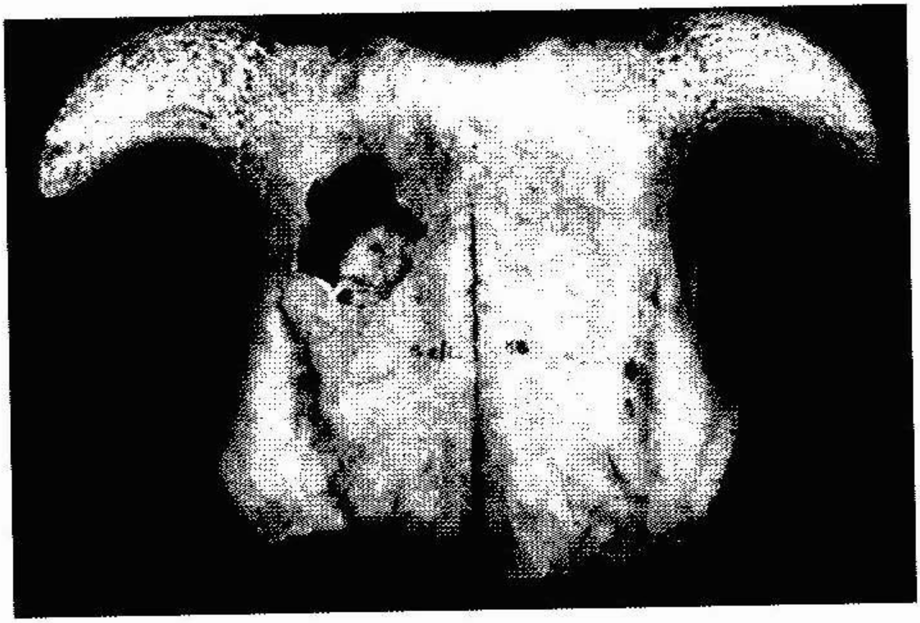

Figure 13. A pole-axed cattle skull.

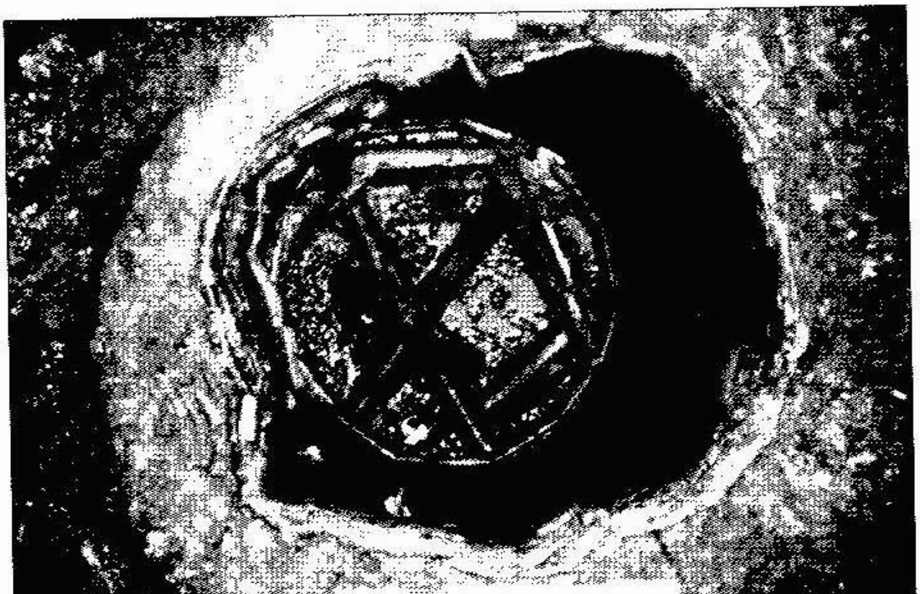

Figure 14. A medieval well at the ABC Cinema site, 1983.