Pollen Analysis of sediments at No. 1 Poultry

Site code: ONE94

21 June 2000

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NB: June 21st, 2000 update

1.) Introduction and aims of the pollen study

Palynological studies undertaken in London have in the past concentrated on the peat and mineral sediments deposited by the River Thames and its tributaries. This is of course due to the waterlogged character and stratigraphical build up of the sedimentary archive which has preserved pollen spectra dating back to the close of the last cold stage (the Devensian) some 12000 years ago. These earlier studies have produced a broad chronological framework of the changing vegetation and environment for the region into which additional data can be fitted. In contrast, however, there have been relatively few pollen studies of the non-floodplain, interfluve habitats on which the human occupation of London was established. Existing pollen data in London which span the later prehistoric period. This is due to a pollen preserving environments and existing vision development come only from floodplain peat and sediments deposits found along the River Thames. For example, in the lower Thames by Devoy (1979,1980); in Southwark (Thomas *et al.* 1986; Scaife 1988), the Jubilee Extension Scaife in (Sidell *et al.* in press) and Runnymede Bridge, west London (Scaife in Needham in press) and various individual sites (Sidell *et al.* 1998; Wilkinson *et al.* 2000 Scaife unpublished) There are however, few pollen data pertaining specifically to the Iron Age and Roman period, with only an earlier study of the Temple of Mithras (excavated by Prof. W.F. Grimes in 1957) nearby on the Wallbrook providing site specific pollen information (Scaife 1982). The development of Number One, Poultry has afforded the first real opportunity to examine a range of pollen preserving contexts dating to the period of early Roman occupation of London without the skewing effects of the dominant floodplain vegetation. The discovery of buried soils underlying buildings and roads, the damp or waterlogged natural build up of organic and mineral sediments and colluvial material on the valley side of the Walbrook tributary and human derived material has enabled the reconstruction of the landscape immediately prior to building occupation during the 1st Century AD.

An earlier assessment study of No.1 Poultry (Scaife 1998) demonstrated that pollen was well preserved and abundant in many contexts and offered potential for reconstructing the local land use and environment. A range of contexts particularly relating to Period 2 (1st Century) was selected to study the pre-Roman ecology/vegetation zonal differences of the higher (812 and 906) and lower ground (895, 900) and specifically to compare these zone, determine whether they were cleared of woodland and/or cultivated and if the latter, the type of agriculture practised. Excavation has shown that the valley side was subject to flooding and colluvial slope movements which required stabilisation for agriculture such as terracing and for subsequent building. It was anticipated that pollen stratigraphy coupled with stratigraphical and diatom analyses might provide data showing the effects of these activities on the local ecology and environment. These factors were considered relevant to the pre-Boudican ground consolidation and comparisons are sought between contexts 890, 895 and lower 898 with consolidated land for building at 906 and 898 and road construction at contexts 812, 890 and 900. A deep, low lying valley side sediment profile at Apex (995,1020,1027) was originally detailed as a potential pollen and stratigraphical control which would embrace all other profiles. Subsequent archaeological phasing has proven that this site may in fact of later date (period 6). This is not conclusive and a discussion of this profile is given in section 16.a. However, the sequence has produced a long pollen profile which provides evidence for the later environment which contrasts with data for the earlier periods.

2.) Pollen Method

Standard techniques were used for the extraction of the sub-fossil pollen and spores (Moore and Webb 1978; Moore *et al.* 1992) with the addition of micromesh sieving (10u) to aid with removal of the clay fraction in the more mineral sediments/alluvium. Absolute pollen frequencies were calculated using the addition of a known number of exotic markers (Stockmarr 1971; *Lycopodium* spores tablets) to a known volume of sample (2ml.). Pollen was successfully extracted from all of the samples and was identified and counted using an Olympus biological research microscope fitted with Leitz optics. The pollen sum was variable depending on preservation and where there was an extreme dominance of one taxon. Generally the pollen sum was in excess of 400 grains of dry land taxa (tdlp) for each sample level analysed. All extant pollen of marsh taxa (largely Cyperaceae), fern spores and miscellaneous pre-Quaternary palynomorphs were counted outside of this sum. *Alnus* was excluded from the pollen sum (Janssen 1959) and was regarded as an element of the wetland plant community. The total numbers of pollen grains counted per level was in many cases very substantial. Pollen diagrams have been plotted using Tilia and Tilia Graph. Percentages have been calculated as follows:

Sum **=**	% total dry land pollen (tdlp)
Marsh/aquatic =	% tdlp+sum of marsh/aquatics
Spores=	% tdlp+sum of spores
Misc.=	% tdlp+sum of misc. taxa.

Taxonomy in general follows that of Moore and Webb (1978) and Moore *et al.* (1992) modified according to Bennett *et al.* (1994) for pollen types and Stace (1992) for plant descriptions. These procedures were carried out in the Palaeoecology Laboratory of the Department of Geography, University of Southampton.

3.) The Sites

A wide range of on-site contexts were excavated producing much artifactual data which has been used to establish the age of the soils and sediments. The majority of depositional sequences fortuitously relate to period 1/2, that is, the pre- (late Iron Age) and early phase of Roman activity. There are also data relating to later periods including 6 and 12. Profiles chosen for more detailed analysis are spatially distributed across the site spanning the higher/upper valley sides where soils and a number of channels were located, down to the lower slopes of the valley side (tributary valley to the Wallbrook) where deeper sedimentary sequences were identified (especially the Apex sequence). Thus, a total of 10 profiles from periods 1/2, 6 and 12 have been analysed coming from a range of contexts including the tributary valley of the River Wallbrook, higher level channel fills and pre-Boudican soils levels underlying the Roman Road (Via Decumana) and buildings. These sections are itemised briefly as follows.

Period 2

900: Area 10. South of the Via Decumana. Close to valley bottom.
741: Area 10. South of Via Decumana. Soils/sediments associated with the road.
974: Area 11. Sediments below Boudican scorched Boudican horizon in the NW corner.
906: Area 10. A palaeosol below Via Decumana
898: Area 10. A palaeosol below floor of early building (G)
895: Area 10. A turf layer possibly an agricultural soil with ard marks. South of Walbrook tributary valley
890: Area **. A build up of waterlogged ? silts to south of road on Walbrook tributary.
812: Area SY. A palaeosol below earliest road gravel on the extreme west of the site.

Period 6

1020/1027: The Apex valley side sequence (NB. Possible earlier material; see section 6.a.)

?Period

429: A channel fill. Towards the east of site and away from other sites.

The palynological characteristics of these are described in more detail as follows.

4.a.) The Late-Prehistoric Environment

The general pattern of vegetation development of the London area from the late Devensian (the end of the last cold stage/glacial period) some 12 Ka BP and the Holocene (the present interglacial warm period) has now been established from the analysis of Thames floodplain intercalated organic peats and lithogenic sediments. As noted above, the principal aims of this study were to establish the palaeovegetation and environment immediately prior to and during the Roman occupation. Fortuitously, at Section 898; (3.d above) a non-truncated palaeosol underlying building G (Area 10) provides evidence and indeed, confirmation of the vegetation of the site during the late-Prehistoric Neolithic/Bronze Age period. Here, *Tilia* (lime/linden) with *Quercus* (oak) and *Corylus* (hazel) are the main tree pollen elements recorded. The former is, however, particularly diagnostic with the percentage values here demonstrates that lime was an extremely important element of the very local and/or on-site woodland vegetation. Its representation in pollen spectra is typically markedly under-represented due to its entomophily and flowering in summer when trees are in full leaf thus negating pollen dispersal further (Andersen 1970,1973). The regional importance of lime in southern and eastern England as a whole is now well established (Birks *et al.* 1975; Birks 1989; Baker *et al*., 1978: Moore 1977; Scaife 1980, 1987,1988; Greig 1982a; Waller 1993). The importance of lime in the late prehistoric vegetation of London has, however, now been established at a substantial number of sites; few of these, however, are published. Exceptions to this are Hampstead Heath (Greig 1989,1992), Runnymede Bridge (Greig 1991,1992) and Bryan Road, Rotherhithe (Scaife in Sidell *et al*. 1995). The fact that this woodland was not widely cleared until the middle-late Bronze Age period in this region one of the principal features which has come to light during analysis of London sites (e.g. the Jubilee Line Profiles; Scaife in Sidell *et al.* MOLAS in press). Recent redevelopment in the City (including Number One Poultry) and in the London suburbs has produced further importance evidence. Of note are sites at the Beckton sites (Nursery, Tollgate, Alps and Sewage Farm; Scaife 1995,1997), Barking (Scaife in Sidell 1994), Ferndale Street (Scaife 1995), Silvertown, East London (Scaife 1998; Wilkinson *et al.* forthcoming) and Rainham Marshes (Scaife 1992). Where lime pollen is consistently found in quantity it appears that this is usually *Tilia cordata* L. (small leaved lime).

Cereal pollen, albeit in small numbers and other herbs of cultivation and/or disturbance demonstrate that the palaeosol underlying building G is of Neolithic or Bronze Age date (i.e. post Neolithic elm decline and after introduction of arable subsistence). It would seem therefore that the late prehistoric vegetation of the Wallbrook valley was one of predominantly open lime woodland growing on the better drained soils with some oak and hazel present locally and/or regionally. Alder, also present, was likely to be growing in the lower lying wetter valley areas. This provides the environmental picture for the site prior to increasing human pressures in the Iron Age and the Roman occupation.

As with the majority of pollen analyses**,** spatial reconstruction of past vegetation is not possible from the analysis of one profile, only broad conclusions can be gained based on ecological knowledge. Thus, here, an environment of open lime woodland on better drained soils of the valley side with perhaps oak and hazel on lower slopes and alder in the wetter valley bottom is postulated. There is some evidence for local cereal cultivation.

4.b.) Periods 1 and 2; the pre-Roman and early Roman environment.

As noted above, the majority of the profiles examined come from period 1/2. Within these are clear comparisons in spite of the likelihood of complex taphonomic processes relating to pollen incorporation of pollen into naturally accumulating sediments, colluvial make-up and palaeosols. Essentially these pollen profiles demonstrate a two-fold sequence of events with some variations in profiles (429; 974; 898; 895; 890; 812 906 and possibly 900) due to the presence of slightly earlier deposits, and where there are differences in land-use after occupation. These broad sequences of change appear to be as follows.

(i) An earlier phase (period 1 ?) which has a greater percentage of trees although herb communities are dominant. Typically, *Quercus* (oak), *Corylus* (hazel)and *Alnus* (alder) are the main tree pollen elements with small but perhaps significant presence of *Ilex aquifolium* (holly) and *Fagus* (beech-presumed *F. sylvatica*). The latter are notably under represented in pollen spectra and may in reality have been of more importance than there sporadic pollen occurrences might suggest. Alder was most probably growing in the lower, wetter areas of the valley bottom (see section) while oak, hazel and the less well represented elements seem to have been growing locally on the drier valley sides. Given the percentages of these, the values are not high enough to be interpreted as dominant woodland but rather localised growth perhaps scatter on the interfluve/valley sides. The abundant herb taxa suggest a tall rather than short turf pasture; i.e. short grazed turf would not produce the range of tall herb pollen taxa which are present. Grasses (Poaceae) are dominant with percentages of 80-90% of the pollen sum but with other typical grassland/pasture types/taxa (e.g. *Trifolium* type, *Centaurea* spp. etc.). Also of note are the higher values of *Pteridium aquilinum* (bracken) in these sites. This again attests to open land and overall, it is suggested that the area of Poultry above the Walbrook had the appearance of a mostly open landscape of rough pasture with bracken colonisation and scattered trees, that is, of agriculturally abandoned appearance. There is little evidence of arable cultivation. The small numbers of cereal pollen may represent small patches of cultivation nearby or larger cultivated areas at distance. Cereal pollen (excepting *Secale cereale* L.) does not travel great distances and local activity is most probable. Alternatively, it is possible that this pollen came from secondary sources such as animal faeces (or human) or from domestic waste and crop processing activities; the latter with threshing and winnowing releasing pollen trapped in the husks of cereals (Robinson and Hubbard 1979).

(ii.) In all of the period 1/2 pollen profiles there is a reduction in tree/shrub pollen and the bracken noted in (1) above. There is a corresponding expansion of herb taxa within which Poaceae remain dominant and in most cases increased. The only tree pollen noted includes occasional occurrences of typically wind blown taxa (thus possibly from long distances) such as birch and pine. This change generally occurs half way through the profiles and is attributed to period 2. It is thought that this marks the first, early Roman impact prior to construction of the roads (*V. Decumana*) and buildings. Locally growing trees (the oak, alder and hazel) were removed perhaps for fuel, building or clearance for agriculture. Certainly, the local environment became more open grassland. There is also much increased diversity of herb types.

Superimposed on these two broad periods of environmental change are local/on-site variations. These comprise broadly,

(a.) An earlier phase in Section 429 prior to (1) above which may fall/date between the late-prehistoric environment of lime and oak woodland and the vegetation of (1) above - late Iron Age/very early Roman ?

(b.) There are local variations in the quantity/percentages of cereal pollen and associated weeds of arable land (segetals). This variation may be due to localised patches of cultivation and/or secondary inputs-domestic waste, faecal material, crop processing. Sections 974 (l.p.a.z. 974: II), 895 (l.p.a.z. 895: II) have substantially greater numbers of cereal pollen than other profiles attributed to periods 1 and 2.

(c) There are local variations in the growth/importance of alder. Clearly the greatest contrast is between the higher and lower valley sides/valley bottoms. However, within the latter there are considerable variations. These are discussed in further detail in section 5.a. below).

5.) Reconstructing the palaeobiogeography of Periods 1 and 2

While there are clearly broad similarities in the pollen/zones in profiles attributed to period 1/2, the possibility of analysing a greater number of sections covering the same period in local but topographically differing areas, allows greater resolution of the vegetation communities present. This would not be possible from only a single profile, that is the general approach to most palynological analyses. Such local variations delimited in section 3 relate to the relative importance of arable cultivation and the importance of localised areas of woodland (esp. alder).

5.a.) *Alnus:* Profiles 974, the Apex Sequence and 812 flanking the lower slopes of the tributary valley and section 900 have the highest percentage and absolute values of Alder (*A. glutinosa*). These range from 39-45% (pollen sum+marsh taxa) with the latter (974) reaching 61%. This clearly shows the importance of alder in a lower valley marsh environment whilst the drier valley sides received lesser quantities being further away. *Salix* (willow) was also present in the community. Its pollen unlike alder is markedly under represented in pollen spectra and even small numbers of grains such as found here in profiles/section 898, 429, 900, 429 attest to such local growth. These trees were largely removed at he start of period 2 along with (oak and hazel) from drier zones. Subsequently, the tributary valley bottom became wet grass and sedge fen. There is some evidence for freshwater aquatics.

Section	***Alnus %***	
974	61	
Apex	45	Flanking Tributary Valley
812	40	
900	39	
906	31	
898	30	Valley Sides
890	28	
429	20	
895	19	?Highest point/furthest away
741	2	Late Profile

Table 1: Percentages of *Alnus* recorded in pollen profiles.

5.b.) Cereal cultivation
A number of the pollen sections/profiles contain proportionally greater numbers of cereal pollen grains than the majority of the other pollen profiles. Notable in this respect are profiles 429, (429: 1), 744 (974:2), 895 (895:2), 890 and 898 usually increasing to the top of the period 2 profiles.

With the possible exception of 429 (429: 1), these cereal maxima relate to the later phase of period 2, prior to the construction of the road and houses. The exception to this is 429 where there are greater numbers in the lowest zone which may be of Iron Age or very early RB date. Here, values of up to 6% tdlp are substantial given the dominance of wild grasses. The presence, albeit in small numbers of *Ascaris* in 429 and the paucity of weeds of arable cultivation poses the problem of taphonomy of the cereal pollen. It is widely accepted that much cereal pollen (and possibly weed) pollen on archaeological sites may derive from secondary sources such as crop processing liberating pollen from trapped in the hulls of cereals (Robinson and Hubbard 1979; Greig 1982b) or the presence of human and animal faeces containing pollen ingested in foodstuffs (Greig 1981 Greig 1982; Scaife 1986, 1995) or from general domestic waste. Here, *Ascaris* suggest that some faecal material may be present. This does not, however, preclude the possibility that cereal cultivation was also taking place.

Local cultivation seems more likely in the case of section 895 (period 2; area 10) where possible/putative ard marks were identified in the palaeosol, turf layer. Here there is an expansion of cereal pollen to some 15% at the top of the profile. It is likely that this area supported a small, local patch of arable cultivation taking place after the earlier period when local scrub woodland was removed. Section 974 similarly shows expansion of cereal pollen but with lower percentage values than in 895. This is similarly a palaeosol (area 11) underlying Boudican horizons of period 2. Other profiles examined do, however, also show some increases in the later period 2 esp. in those palaeosols profiles (890 at 5%; 898 at 10%). In the late Roman context/periods of the Via Decumana and the top of the Apex sequence, there is a more consistent record of cereal pollen and associated segetals which are typical of pollen inputs from a range of sources in the urban area.

It appears, therefore, that some areas of land in period 2 supported small cultivated patches-possibly associated with individual houses. This followed the removal of the trees for building, fuel or extension of pasture. Prior to this there are indication of Neolithic or Bronze Age cultivation in the palaeosol of section 898 and from the lower levels of section 429 possibly attributed to the (late ?) Iron Age. In the later periods (post period 2) consistent arable pollen may be attributed to a number of taphonomic factors (see above).

6.) The Later periods (period 6 and 12)

Two pollen profiles are attributed to later periods; The upper levels (zone 4) of the deep Apex sequence to period 6 and Column 3/Section 741 to period 12.

6.a.) The Apex Sequence

In the early stages of this project, analysis of the deep sediments of the Apex was expected to provide a ‘key’ section within which other profiles examined could be placed and compared. Thus, the 2.6m of this profile was analysed in substantial detail. Subsequent archaeological phasing of the profile has, however, suggested that the profile is in fact largely of later date than most of the profiles examined (i.e. period 1 and 2) and is period 6. this is based on the artefacts obtained. Given the evidence outlined from period 1 and 2 showing local scrub woodland which was cleared, the data from the Apex appears at odds with the archaeological suggestions/dating. Whilst pollen zone Apex: 4 is of treeless, open character the lower zones (Apex:1-3) show varying degrees of tree and shrub pollen assemblages which bear a marked similarity to the period 1/2 profiles discussed.

Oak (*Quercus*) and hazel (*Corylus*) are most prominent in zone Apex:2 but are also present in zones Apex:1 and:3. Alder (*Alnus*) and bracken (*Pteridium aquilinum*) are also of substantial importance. The former attains 45% of tdlp+spores suggesting on-site growth of alder. All of these taxa noted become substantially reduced from the base of zone 4. Poaceae are dominant in the lower zones with other pasture elements including Lactucae (dandelion types), Ribwort plantain (*Plantago lanceolata*) and other lesser elements such as docks (*Rumex*) etc. suggesting predominance of pasture habitats. Cereal pollen and segetal types (note *Polygonum aviculare* at 80-70cm) are present throughout but become increasingly important towards the top of the profile in zone 3 and 4. This is, however, enigmatic. The closest correlation of the Apex sequence is with section 429 which shows similar variations in woodland/shrub taxa in the lowest two zones becoming open in uppermost zone 3. This has been attributed to period 1/2 . The most straightforward explanation is that the Apex profile is in fact a detailed and earlier sequence representing the late Iron Age into period 2. As noted, this appears to be in conflict with the archaeology. The strong representation of trees and shrubs seems inexplicable since this suggests re-expansion of woodland during period 6. If the Apex profile as seems likely, is of largely period 1/2 age, then an explanation for this conflict must be sought. Possible suggestions may be the progressive build up of colluvial material i.e. soil eroded from the valley sides which contains the earlier zone 1/2 pollen. This might explain the zones/blocks of material in the pollen profile. Whilst it is not envisaged that the pollen zones are single rapid units of sedimentation, they may have been progressive downslope sedimentation through time. A further possibility may relate to the revetting of the river protecting natural earlier material. The similarity of the Apex sequence with other profiles does, however, suggest an earlier age of the zones 1-3 (i.e. period 1/2) whilst the upper levels (zone 4 and above) may well relate to later period 6 or later.

6.b.) Period 12

Column 3/Via Decumana has remarkably little pollen of trees and shrubs, corresponding with the open herbaceous habitat which has been noted for the start of period 2 after local tree clearance. There are only sporadic/individual occurrences of trees and all of which are likely to be of non local origin (even the occasional occurrence of beech). In contrast, there is a marked dominance and diversity of herbs and herb communities. Overall, these are dominated by the Poaceae (grasses) but with a range of other taxa which may be attributable to pastoral and arable habitats and also to waste/disturbed ground. This is not unexpected given the local Roman inhabitation by this time and the local Via Decumana. Similar diversity/characteristics have been discussed by Greig (1982) including the preponderance of grasses in Roman contexts- contrasting with medieval material. The time-span represented by Column 3 is not known (?). However, there are apparent changes in the importance of the varying land-use elements noted above. This has given the tentative zonation applied to this column (section 3 above). All three zones show the dominance of grassland/pasture but the three zones recognised, the top shows an increased importance of *Plantago lanceolata, Centaurea scabiosa* type and *Potentilla* type. This and the occurrence of a wide range of flowering herbs suggests a tall meadow habitat. However, the pollen taphonomy of such archaeologically related situations is complex and care needs to be taken in interpreting such information. It is also conceivable that on-site dominated of grassland and associated herbs from the road ditch and bank may have had a swamping effect on the pollen spectra from further away. However, given the increasing openness illustrated from period 2 onwards, it seems plausible that we are here seeing a true picture of an open grassland/pasture habitat in and around the occupation.

(7.) Some Notes on Specific, Unusual Pollen Records

Whilst there were not a great many times exotic which were directly attributable to Roman introduction, there are a number of taxa which are worthy of note.

7.a.) *Juglans regia* L (walnut): Here, pollen of Walnut has been found in section 974 (l.p.a.z. 974:1) and 995, the latter in the pollen assessment (Scaife 1997). Pollen has also been found consistently in other London Roman sites such as the Temple of Mithras (Scaife 1982) and more recently in the upper levels of Storeys Gate and especially at St. Stephens East along the Jubilee Line extension. At the latter it is an important continuous record of this introduced tree into the historic period. Although there are now occasional records in pre-Roman sediments it is generally regarded as a Roman introduction into Western Europe as a whole (Godwin 1975a). Most occurrences are from Roman and post Roman sequences such as an early Roman record from the Temple of Mithras (Scaife 1982) and later periods, including post-Medieval, Tudor sediments at Broad Sanctuary, Westminster (Scaife 1982), Saxon at Cromwell Green (Greig 1992) and in the upper most recent levels of Hampstead Heath (Greig 1992). Overall, this suggest that once introduced into London (apparently very early on) by the Romans, it continued to grow or be grown locally presumably for its nuts (*Juglans regia* L.) which have been found in a number of London site Willcox 1977), or as garden ornamental trees.

7.b.) *Abies* (fir): A single record of *Abies* in section l.p.a.z. 429:2 may be of interest. Although only a single the grain it had the appearance of being contemporary with the bulk of the other pollen. It should also be considered that rather than being pre-Quaternary it may have derived from Pleistocene (terrace) deposits. However, there are an increasing number of records (Scaife in Sidell et al in press) of both *Abies* and *Picea* dating to the Roman (and later) period which as with *Juglans* suggest Roman exotic garden introduction since they are not native.

7.c.) *Vitis vinifera* L. (grape): *Vitis vinifera* (grape) has been recorded in two of the Poultry profiles (429 l.p.a.z. 429: 2 and The Apex l.p.a.z. Apex:2) and are somewhat unusual and important. There are frequent seed records of grape especially from the Roman and later periods and these are largely attributed to imports. Records of pollen are, however, rare and may derive from local viticulture or from secondary sources such as domestic refuse, faeces etc. where imported/non-local grape products may have been dumped (wine, raisins etc. may have *Vitis* pollen adhering and become incorporated into foodstuffs. Greig 1982 describes grape pollen derived from 'rich tea' biscuits which contain currants!. There is an increasing number of records of vine cultivation in England during the later prehistoric and historic periods. Iron Age *Vitis* pollen has been found by F. Chambers (pers. com.) at Minghies Ditch, Oxfordshire and possible Romano-British bedding trenches in Northamptonshire (Tony Brown/Ian Meadows 1996-1997) have been attributed to vine cultivation and are associated with pollen and it should be considered that viticulture may have been practised locally on the valley side of the Wallbrook.

7.d.) Notes on crops and some other specific pollen occurrences. Cereal pollen has been identified from all of the profiles in varying quantities. With the exception of *Secale cereale* L. (rye), this has not been identifiable to genus/species level and comprises wheat, oats and barley type. *Secale cereale* is, however, readily discernible and is especially characteristic of the Roman period. A single record only in context 898 was, however, found. Rye has generally been regarded as a Roman introduction but however, there is an increasing number of records from the late prehistoric (Chambers 1989). Since it is anemophilous and produces substantial quantities of pollen it seems that rye was not of any local significance. *Fagopyrum esculentum* L. (buckwheat) is an interesting occurrence in section 974 (at 40cm). This is usually regarded of medieval and later significance. *Cannabis* type (Apex

Zone 1) is most probably referable to *Humulus lupulus* (hop) which is only rarely differentiable from *Cannabis.* Hop would, however, be a natural vegetation component of the wetter valley bottom associated with alder woodland. *Buxus sempervirens* (box) is perhaps the only evidence of an introduced/cultivated garden plant (excepting walnut and vine noted above). It has been found in Column 3 (Via Decumana, zone 2) and it may be postulated that it was associated with the edge of the road or from a local house garden.

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