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WHITEFRIARS, NORWICH. 42I N.

Samples for pollen analysis were obtained from the Saxon waterfront site on the south bank of the River Wensum, which flows through Norwich. The location of the site falls within the vicinity of Palace Plain (NGR. TG 234309I2), an area possibly used for the unloading of waterborne goods.

The natural riverine sands and gravels were overlain by deposits attributable to four main phases of activity. These date from the Middle to Late-Saxon period onwards.

The site was excavated by the Norfolk Archaeologiacal Unit under the supervision of Mr. B.S. Ayers (Field Officer) in I979.

Samples from context numbers 90 (sample I, II4 cm.) , 74 (sample 2, II0 cm. and 3, I06 cm.) and 30 (sample 4 cm.), have been analysed for pollen. Samples I-3 are from the relatively more organic basal deposits, whilst sample 4 is from the 'dark earth'.

Standard pollen extraction procedures were used to concentrate the sub-fossil pollen and spores present. Pollen taxonomy follows that given in the pollen key of Moore and Webb (I978). The pollen sum varied between I00 and 350 depending upon the absolute pollen frquencies present. These results are given in Table I, where pollen has been calculated as a percentage of total pollen , and spores as a percentage of total pollen plus spores,

The pollen spectra are dominated throughout by herbaceous types. Tree and shrub pollen percentages in contrast are much lower, being dominated by Quercus and Corylus type pollen. This may be suggestive of a regional input of pollen from oak-hazel woodland outside of the town.Other arboreal taxa may similarly result from a regional/ more long distance element rather than localised pollen input. The herbaceous pollen assemblages are possibly representative of three main groups of plant communities and/or mode of origin and deposition. These are:

i) Ruderal pollen from many of those plants which typically grow on waste ground in urban areas. Although recognition to species level is not possible with many types, this category appears to be dominant. The following might be included in this group: Ranunculus type, Chenopodium type, Papilionaceae, Rosaceae , Rumex, Urtica type, Solanum nigrum, Plantago lanceolata , Galium type and Compositae types.

ii) Pollen from marginal aquatic plants might be expected from such a riverine/estuarine situation. These were present but, however, not in abundance. Taxa recorded include Alnus,Salix , Hydrocotyle, Typha angustifolia type (which includes Sparganium) and Cyperaceae. As in category (i), pollen from such genera as Mentha may have been produced by plants from this niche.

iii) Cereal type, Sinapis type, Centaurea cyanus and possibly other types are indicative of arable agricultural environments. This raises

the problem of interpreting pollen spectra obtained from urban archaeological contexts. The presence of arable pollen types does not necessarily indicate cereal cultivation in proximity to the site sampled for pollen analysis. It is more likely that the presence of these pollen types is due to secondary anthropogenic causes. These may be varied and include the possibility of human faecal material being present in the sediments sampled. The transport of cereal pollen in bracts has been shown (Robinson and Hubbard I977)and results in the presence of pollen in cess pits and river sewage channels indicating that wholemeal bread has been consumed (Greig I978, Scaife I980a, I980b). The presence of the intestinal parasite/nematode eggs , Trichuris to some extent substantiates this view. Alternatively cereals may have been used in animal feed. Animal dung may have been incorporated into floor sweepings which were later dumped at the site. The unloading of grain crops from boats at this point on the river bank is a further plausible explanation. The interpretation is therefore problematical in that one or more factors other than normally associated with natural pollen transfer and deposition are involved.

It is apparent from Table I that Gramineae pollen is dominant . This similarly may be interpreted as regional pollen incoming from extensive pastoral areas outside of the urban area. Conversely, and equally likely, the use of grasses in thatching, animal fodder and as floor covering may be the contributory factors.

Pollen sample 4 is taken from the 'dark earth' deposits at this site. Pollen analytical investigations have been carried out on other such materials (Scaife in MacPhail forthcoming). Low absolute pollen frquencies, poor preservation and the relatively high totals of pollen having thicker exines (Taraxacum type and Sinapis type) indicate that differential preservation may have occurred in this sample. It seems likely therefore that less robust pollen taxa may have been destroyed, suggesting that sample 4 is similar to the lower more organic samples I-3.

It is unfortunate that a more detailed regional environmental picture cannot be obtained from this series of pollen samples. The diverse herb pollen assemblage is one which is largely

associated with plants growing in urban waste ground areas and from the useage of plant materials brought into the urban area for use by man.

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Sample	I	2	3	4
Betula	0.3		I.3	
Pinus			I.0	I.0
Quercus	9.4	I2.5	7.0	2.0
Tilia	0.3			
Alnus	2.3	I.3	2.7	
Fraxinus		0.7		
Fagus	0.6	0.7		
Corylus type	8.5	7.2	7.7	
Salix	I.7	3.3	3.3	
Ranunculus type	0.3	0.7	0.7	
Sinapis type	I.4	2.6	3.3	7.0
Hornungia type	0.6		I.0	
Caryophyllaceae undiff.				I.0
Dianthus type			0.7	
Chenopodium type	0.3		0.7	I.0
Papilionaceae undiff.	0.9	0.7	I.3	I.0
Ononis type	0.6			
Medicago type	I.I			
Trifolium type	I.7	0.7	0.3	
Lotus type		0.7		
Lathyrus type			0.7	
Rosaceae Undiff.	I.7		0.3	I.0
Filipendula	3.4	2.0	0.7	
Potentilla type	0.3		0.3	
Umbelliferae	0.9	0.7	I.3	
Hydrocotyle			0.7	
Cannabis type	0.3	0.7		
Rumex	I.I	I.3	3.7	
Urtica type	0.6	0.7		
Erica	0.3			
Calluna	I.I	2.0		I.0

TABLE I Pollen counts from Whitefriars calculated as a percentage of total pollen.

Table I continued

	1	2	3	4
Solanum nigrum	0.6			
cf. Digitalis type			0.7	
Melampyrum		0.7	0.7	
Mentha type	I.4		I.3	
Lamium type	0.6			
Plantago lanceolata	4.6	4.6	5.3	3.0
Campanula type	I.I	0.7		
Galium type		I.3	0.7	
Bidens type	I.I		0.7	
Aster type			0.7	
Anthemis type	0.3			
Centaurea nigra type	0.6	0.7		I.0
C. scabiosa type			0.7	
C. cyanus				4.0
Taraxacum type	6.8	3.9	7.7	30.0
Gramineae	38.2	42.I	32.3	3I.0
Cereal type	6.8	3.9	6.7	I.0
Typha angustifolia type		0.7		
Cyperaceae	3.I	3.3	7.7	I0.0
Unidentified	0.3			3.0
Pteridium	2.4		4.3	4.7
Dryopteris type	I.9	I0.6	I.6	I.9
Polypodium	0.3		0.3	
Trichuris eggs		I	6	6
Pollen Sum	35I	I52	300	I00
Spore total	I7	I8	20	7