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An assessment of pollen from waterlogged sediments at Parsonage Farm, Westwell, Kent (ARC PFM 98)

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1 INTRODUCTION

Three of seven monoliths from Parsonage Farm have been examined for their sub-fossil pollen and spore content. The principal aims as detailed (URS 2003) were to examine for preservation of microfossil remains and to establish their potential for reconstructing any environmental changes associated with the medieval manor house. These are the only samples of medieval age obtained from along the route and furthermore, would be one of only a few Kentish medieval manor complexes studied.

2 POLLEN METHOD

Pollen sub-samples have been examined from columns <38>, <39> and <43>, Samples of 2ml were prepared using standard procedures for the extraction of sub-fossil pollen and spores outlined in Moore and Webb (1978) and Moore *et al.* (1991). Pollen counts of 100 grains per level of dry land taxa (the pollen sum) were made for those samples in which pollen was present. Absolute pollen frequencies were calculated using added exotics (*Lycopodium* spores) to known volumes of sample (Stockmarr 1971). Data obtained from column <43> are presented in a preliminary pollen diagram. Percentages were 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) modified according to Bennett *et al.* (1994) for pollen types and Stace (1992) for plant descriptions.

3 THE POLLEN DATA

Samples from three columns have been examined. These include <38>, <39> and <43>. Holocene (recent) pollen was absent in column <39> and the lower half of overlying column <38>. These, however, contained substantial numbers of derived palynomorphs including spores and coniferales from the local Lower Cretaceous. Pollen of medieval age was, however, extracted from column <44> and the upper 21cm of column <38> and the characteristics of the pollen assemblages are as follows. Table 1 is located at the end of the report.

3.1 Column <38>

Samples were examined at 9, 21, 33 and 45cm. Only the upper two samples contained sufficient. recent (medieval) pollen to enable counts to be made. Here, pollen preservation is

excellent and absolute pollen frequencies are high. The pollen assemblages (Table 1) are dominated by trees and shrubs but with some herbs including cereal and weeds of arable cultivation.

Trees and shrubs: *Alnus* (alder) is most important especially in the lower sample at 21cm. *Quercus* (oak) and Corylus avellana type (hazel) are the most important non-wetland trees and are in greater numbers in the upper sample (9cm). It is also noted that there is a greater diversity of trees in this sample including sporadic occurrences of *Ulmus* (elm), *Fraxinus* (ash), *Tilia* (lime/lindens) and *Carpinus* (hornbeam). *Betula* (birch) and *Pinus* (pine) have very small occurrences and are probably not significant.

Herbs: Poaceae (grasses) are most important (15-20%) with some cereal pollen (esp. at 9 cm). *Fallopia convolvulus* (black bindweed), *Sinapis* type (charlocks), *Rumex* (docks) and *Artemisia* (mugwort) may be associated with cultivation.

Marsh and aquatic: There are small numbers of these which is perhaps surprising for the fills of a moat. *Potamogeton* type (pond weed), *Typha angustifolia*/*Sparganium* type (bur red and reed mace) and *Myriophyllum* spicatum (spiked water-millfoil) are present.

Spores: These comprise largely monolete forms (*Dryopteris* type) especially in the lowest level and *Pteridium aquilinum* (bracken) and occasional *Sphagnum* (bog moss).

Miscellaneous: From 33cm downwards, there are very substantial numbers of geological (Lower Cretaceous) palynomorphs derived from the local geology. In addition to trilete spores are well preserved Abies type, *Pinus* type and *Picea* type pollen. At 33cm there are a small number of Holocene pollen grains which include Alnus *Quercus*, *Corylus*, Poaceae and Cyperaceae.

3.2 Column <43>

Sample column <43> spans contexts (upper; 1065) and (lower; 1066) of the moat fill. Although pollen is rather poorly preserved in these mineral sediments, absolute pollen frequencies of 30-35,000 grains/ml allowed sufficient numbers to be identified and calculated to produce a pollen diagram. This, is very preliminary comprising only 4 levels . Sample depths have been recalculated to actual column depths from their O.D. heights. These are as follows.

0cm	58.67m.OD.
16cm	58.51m.OD.
28cm	58.39m.OD.

43cm 58.24m.OD.

Within this profile, there are indications of a changing environment between 28cm and 16cm (cf. change between contexts (1066) and (1065)?). With more detailed analysis this might constitute a division into two pollen assemblage zones. Additional work is, however, required to substantiate this. The pollen/vegetation characteristics are as follows.

Trees and Shrubs: Quercus is more important in the lower half the profile (to 29%) with Corylus avellana type (15-20%). Alnus, however expands in the upper levels (to 48%) whilst Quercus is at low levels. Corylus avellana type remains important (23%) with incoming Ilex aquifolium (holly) and a single badly degraded grain of Tilia.

Herbs Herbaceous diversity is poor. Poaceae are most important but declining from 25% at the base top 7% at the top of the profile. Also present are substantial values of Cereal pollen especially in the lowest levels (15%). There are few marsh (i.e. Cyperaceae) and no aquatic taxa present.

Spores of ferns: Pteridium aquilinum is most important, expanding to 20% (sum+spores) with monolete forms and Polypodium vulgare.

4 DISCUSSION AND INFERRED VEGETATION

Column <43> provide a complete record of vegetation change from the fills of the moat/ditch although pollen preservation is not good (due to alkaline waters?). The lowest levels (date ?) show greater quantities of cereal pollen age, non-cultivated grasses, other weeds. This may represent nearby arable cultivation or pollen derived from crop processing or from domestic refuse (esp. faecal debris). Tree and shrub pollen suggest a typical background woodland of oak and hazel woodland which was probably managed. However, there is a reduction of oak which may be due to (a.) felling or (b.) a statistical response to the expansion of alder. Additional pollen data is required to establish the exact nature of this possible environmental change. In the upper context (1065) alder becomes important with values which may suggest its growth on the fringes or within the moat/ditch. A single well preserved record of holly at 16cm indicates local growth of this poorly represented taxon.

Columns <38> and <39> are a continuous sequence through medieval sediments on the fringes of the moat/ditch. As noted, pollen has only been recovered from the upper *c.*30cm of column <38>. As with column<43>, alder is important, perhaps growing in or along the fringes of the ditch. Similarly with <43>, the upper levels have a slightly greater diversity of tree types which in addition to typical oak and hazel also includes elm, ash, lime/lindens and hornbeam. Oak and hazel pollen is typical of the background, regional pollen component of

the historic period coming from managed woodland after widespread clearance during the late-prehistoric (BA) period.

The lower half of column <38> and whole of <39> are enigmatic. Holocene, medieval pollen dies out from a depth of 30cm (in 38). Below this are very substantial numbers of pollen of Cretaceous age. These include trilete spores of filicales and degraded saccate pollen of coniferales. However, in addition to these are grains there are also better preserved grains of *Abies* type (fir), *Picea* type (spruce) and *Pinus* (pine). The former are not native during this interglacial but were abundant in earlier warm phase (inter-stadial and inter-glacial periods). *Pinus* whilst a native is, however, a very uncommon pollen type in Jurassic and Cretaceous sediments. Thus, it is possible that these lower sediments may be of interglacial age (but a pre-temperate stage) of a glacial, inter-stadial phase.

4.1 Suggested additional analysis.

Pollen has been successfully extracted from two profiles of the ditch/moat at this site. Useful preliminary data has been obtained which identifies the local vegetation communities and hints at some possible changes which occurred during the later part of the history of the site. That is, an increase in alder and an increase in the diversity of woodland taxa whilst cereal pollen (cultivation and use of the ditch for domestic waste) declines. This is a feature of both profiles.

Additional pollen analysis is required to obtained better taxonomic and temporal detail and address those aspects noted above. This should consist of analysis of column <43. and upper half of column <38> at 4cm intervals with minimum pollen counts (sum) of 300-400 grains per level where preservation permits.

Finally, the lower sediments of profile <38> and whole of <39> whilst not being of medieval age may be of Pleistocene age. Do other data provide any other clues as to their age?

5 REFERENCES

ADS, 2006 CTRL digital archive, Archaeology Data Service, http://ads.ahds.ac.uk/catalogue/projArch/ctrl

Bennett, K D, Whittington, G, and Edwards, K J, 1994 Recent plant nomenclatural changes and pollen morphology in the British Isles, *Quaternary Newsletter* **73**, 1-6

Moore, P D, and Webb, J A, 1978 *An illustrated guide to pollen analysis*, London

Moore, P D, Webb, J A, and Collinson, M E, 1991 *Pollen analysis*, Second edition, Oxford

Scaife, R G, 1994 The plant remains, in French, C A I, *The archaeology along the A605 Elton-Haddon Bypass, Cambridgeshire*, Fenland Archaeological Trust Monograph **2**, 154-167

Stace, C, 1991 *New flora of the British Isles*, Cambridge

Stockmarr, J, 1971 Tablets with spores used in absolute pollen analysis, *Pollen et Spores* **13**, 614-621

URS, 2003 CTRL Section 1: Updated project design for archaeological analysis and publication, volume 2 - Contractors' method statement, unpubl. report prepared by RLE and Oxford Wessex Archaeology Joint Venture, for Union Railways (South) Limited, in ADS 2006

Table 1: Pollen and spores obtained from Column <38> (raw data)

Trees & Shrubs	***9cm***	***21cm***	***33cm***	
Betula		1		
Pinus		1	1	25
Picea				11
Abies				3
Quercus	25	7	3	
Tilia		1		
Fraxinus excelsior		1	1	
Alnus glutinosa	30	54	5	
Corylus avellana type		12	8	1
Calluna vulgaris		1		
Herbs				
Sinapis type		1		
Trifolium type		1		
Apiaceae		2		
Fallopia convolvulus			1	
Rumex		1	1	
Rumex conglomeratus type		1		
Plantago lanceolata			3	
Artemisia		1		
Lactucoideae		1	1	
Poaceae	15	20	1	
Cereal type		5	1	
Glyceria type			1	
Marsh/Aquatic				
Cyperaceae		1	2	2
Potamogeton type		1	1	
Myriophyllum spicatum		1		
Typha angustifolia type	5	1		
Spores				
Pteridium aquilinum		4	11	11
Dryopteris (monolete) type		1	18	5
Sphagnum			1	
Pre-Quaternary			48	