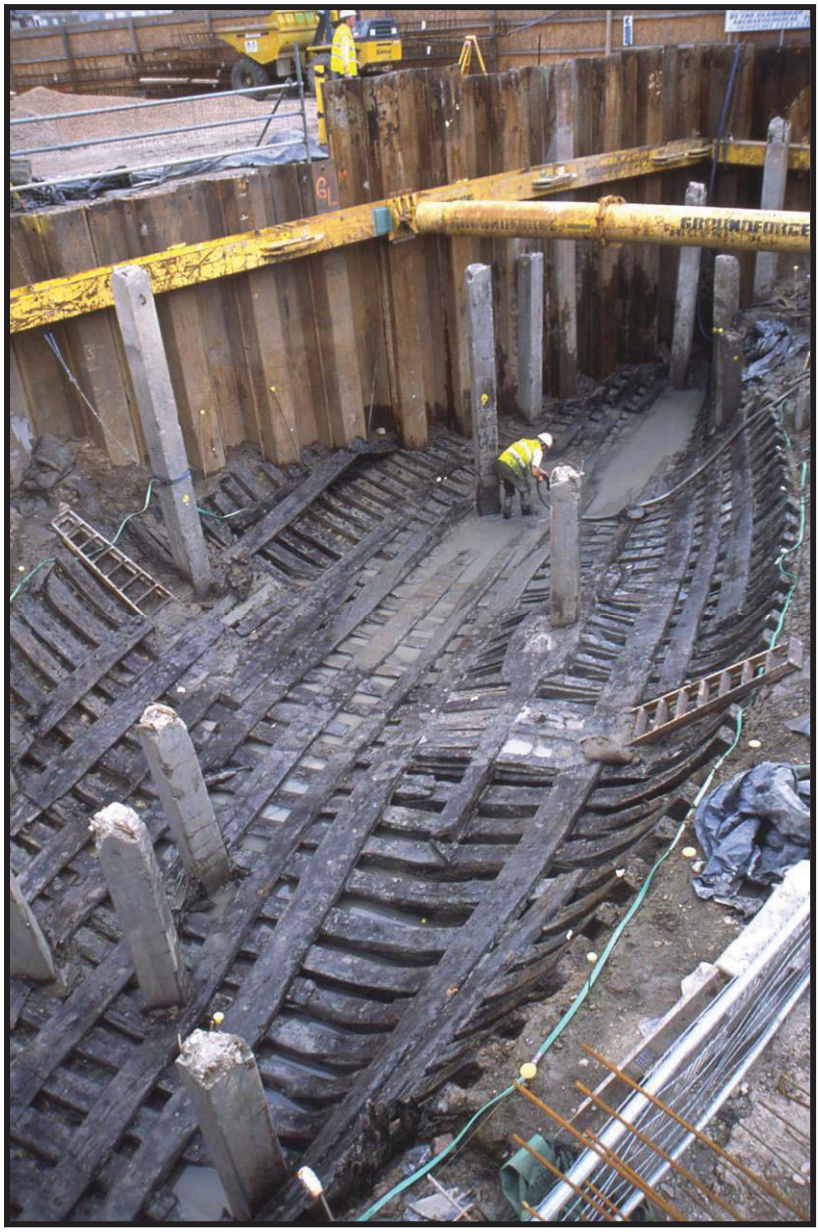
Newport Medieval Ship Project

Specialist Report:

POLLEN



Site number: GGAT 467
Site location: NGR: ST 31286 88169 Kingsway, Newport, South Wales, UK.

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CONTENTS

The Newport Ship Project

Introduction

In 2002, during the construction of the Riverfront Theatre, on the banks of the River Usk in Newport, South Wales, an archaeological find of great significance was unearthed. In the summer of that year, while undertaking the excavations for the theatre's orchestra pit, the well-preserved remains of a 15th century clinker built merchant vessel were discovered.

The site, which was surrounded by a cofferdam, was being monitored by the Glamorgan Gwent Archaeological Trust at the time of discovery. The ship lay in what is locally known as a pill or small inlet, with its stern closest to the river and its bow facing into the inlet. The timbers were covered in thick alluvial mud, which created an ideal anaerobic environment for successful preservation. Seventeen strakes of planking remained on the port side and thirty-five on the starboard side of the ship. The vessel was approximately 30m in length.

A silver French coin was found purposely inserted into the keel of the vessel, dating the ship to after May 1447. Dendrochronological research has shown the hull planking to be from the Basque country and after 1449 in date.

After a much publicised 'Save Our Ship' campaign, it was decided that the ship would not be recorded and discarded but excavated with the aim to conserve. The riders, stringers, braces, mast step, frames and overlapping clinker planks and keel were dismantled one by one and lifted. Almost 2000 ship components as well as hundreds of artefacts were excavated.

This report examines the pollen samples recovered during the excavations of the Newport Medieval Ship site.

A pollen analysis of eight samples from Newport Medieval Ship, South Wales.

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Introduction

This report describes a detailed palaeoecological analysis of eight samples from The Newport Medieval Ship site, South Wales. A preliminary pollen assessment of two luting samples from the site, by Oxford Archaeology in 2010, determined that pollen was poorly preserved, and in low concentration. Due to the importance of the site further sediment samples were selected from a variety of contexts and locations across the vessel for full analysis. The programme of work carried out aims to determine the potential for providing information regarding the ship's cargo and crew diet, together with reconstruction of environmental conditions prior to, and after abandonment of the ship.

Laboratory Procedures

Samples for pollen analysis were prepared by Dr. Roderick Bale at The University of Wales Trinity St David Environmental Archaeology Laboratories, using conventional procedures (Moore *et al*., 1991), including treatment with HCl to remove carbonates, HF digestion to remove silicates and acetolysis to digest organic matter. Given the poor pollen preservation in the initial assessment and the high mineral content of all eight samples selected, sample size was increased from the standard 1ml to 2mls during full analysis in an attempt to concentrate the pollen grains. The samples were also passed through microsieves (aperture 10µ) prior to chemical digestion, a procedure effective in concentrating pollen grains in sediments of low primary pollen content (Walker & Lowe, 1990). A known quantity of *Lycopodium* spores were added to each sample to enable the calculation of pollen concentrations within the samples (Stockmarr, 1971). The residues were mounted in silicon oil and analysed under a Leica C2 microscope at a magnification of x400, with critical identifications at x630 and, where necessary, under oil at x1000. Pollen was identified using standard pollen keys (e.g. Andrew, 1980; Moore *et al*., 1991) and type collections. Plant nomenclature follows Stace (1997). The state of pollen preservation is referred to using the categories identified by Jones *et al*. (2007), e.g. corroded (biochemical deterioration) and degraded (chemical deterioration).

Results

Samples 68 <154> and 160 <130> were selected from the same interframe space (6) from brownish silty clay <154>, overlain by alluvium <130>. Sample 107 <152> and 108 <130>, were located in interframe 45 from the basal organic deposit <152> and the immediately overlying minerogenic deposits <130> respectively. Sample 57 <152> was also from the basal organic deposits, whilst Sample 99 was from context <130>. Sample 177 was from a clay layer rich in organic and caulking material <171>. A spot sample was also taken from alluvium <1002> in Monolith Tin 426, which was located directly under the ship, approximately amidship.

Pollen preservation and concentration was generally poor. A sum of 300 land pollen grains was only achieved in one sample (57 <152>). In the seven remaining samples it was not deemed possible to achieve a count of 300 TLP. Indeed, pollen concentration was so low that the number of pollen grains to 100 Lycopodium spores was counted, only in an attempt to establish the range of taxa present. The results of the pollen analyses are shown in Table 1.

Sample 57 <152>

a) Arboreal pollen was high in this sample, with *Alnus* (birch) being the dominant element, together with *Quercus* (oak), *Corylus* t. (hazel), and to a lesser extent *Betula* (birch), *Salix* (willow), *Pinus* (pine) and *Ulmus* (elm). This is likely to reflect the presence of alder growing along the riverside or more extensive areas of alder-carr woodland further afield, together with mixed oak wood and scrub in the vicinity.

b) Herbaceous pollen was also well-represented, comprising c. 47% TLP, including species which are indicative of a diverse range of habitats. Poaceae pollen dominates the herb taxa. Several other species indicative of grassland vegetation communities were also recorded, including Lactuceae (dandelion) and *Trifolium* (clover). No cereal-type pollen was identified and there was limited evidence of arable-weed species, although Chenopodiaceae (goosefoot) e.g. fat-hen (*Chenopodium album*), *Anthemis* t. e.g. stinking camomile (*Anthemis cotula*), *Rumex obtusifolius* (broad-leaved dock) and *Sinapis*-type (mustard) are species commonly found in a range of habitats, including arable and disturbed grounds.

c) Freshwater and estuarine habitats were represented by the pollen from this assemblage. Cyperaceae (sedge), *Filipendula* (meadowsweet), *Hydrocotyle vulgaris* (marsh pennywort) and *Equisetum* (horsetail) indicate marsh, fen, and riverside habitats. Several species of Chenopodiaceae, *Aster* t. (daisy) and *Anthemis* t. (chamomile) are also typical salt marsh vegetation communities, together with *Limonium vulgare*-type (common sea lavender) and *Plantago maritima* (sea plantain).

d) *Calluna vulgaris* (ling heather) and *Sphagnum* (peat moss) spores are indicative of raised-bog or heathland communities.

e) The occurrence of *Trichuris* (whipworm) parasite ova suggests the presence of excrement. Interestingly, *Trichuris* ova were also identified in the initial assessment of two luting samples, and may have derived from waste on the ship, animal fibres or town waste deposited by the river (Caseldine and Griffiths, 2010).

Sample 160 <130> and 68 <154>

Selected from Interframe 6, a TLP of no more than 10 was achieved in either sample. The sample from the basal alluvial clay deposit (68 <154>) was dominated by *Pinus* pollen and is likely to reflect an over-representation of pine pollen, which is common in alluvial sediments such as these (Hopkins, 1950). Sample 160 from the overlying alluvium <130> recorded a wider range of pollen taxa, albeit in low concentrations. These included *Alnus*, *Corylus* t., Ericaceae und. (heathers), Poaceae, *Helianthumum* (rock rose) and *Urtica dioica* (stinging nettle).

Sample 107 <130> and 108 <152>

Selected from Interframe 45, these samples again had low pollen concentrations, although slightly higher in sample 108 from the basal organic deposit. Both samples had a relatively diverse range of pollen taxa. The pollen assemblage in the alluvium sample 107 is similar in composition to sample 160, reflecting both tree, shrub and herbaceous taxa, including *Alnus*, *Betula*, *Corylus* t., *Quercus*, *Salix*, Cyperaceae, Lactuceae, Poaceae and Chenopodiaceae.

Sample 108 was dominated by herbaceous taxa, including Poaceae, Ericaceae, Cyperaceae, Lactuceae, *Filipendula*, *Aster* t., *Plantago* und, Rosaceae und. (rose), *Rumex* t. and *Urtica dioica*. Tree and shrub pollen included *Quercus*, *Corylus* t., *Carpinus* (hornbeam), *Pinus* and *Taxus* (yew). Filicales (fern) spores were also noted.

Sample 99 <130>

Tree, shrub and herbaceous taxa were represented in the pollen assemblage from this sample, with a TLP count of 36. Most notable was the occurrence of a single pollen grain of *Avena sativa* (common oat).

Sample 177 <171>

A low TLP count of 7 was achieved in this sample. Those taxa noted include *Corylus* t., Ericaceae, Poaceae and *Anthemis* t.

Monolith Sample 426 <1002>

A range of taxa was recorded in this sample, in which a count of only 19 TLP was achieved. *Alnus*, *Quercus*, *Corylus* t., *Carpinus*, Poaceae, Lactuceae, *Rumex obtusifolius*, Chenopodiaceae and *Plantago* (including *P. maritima*) were noted, together with Filicales spores, *Sphagnum* and the aquatic taxon, *Sparganium erectum*-type (bur-reed).

Discussion

The sparsity of pollen in the sediments from Newport Medieval Ship has limited the palaeoecological inferences that can be made. It is particularly disappointing that pollen concentration within the majority of the samples was too poor for any reliable vegetational inferences to be made. Only in sample 57 <152> was a pollen count of 300 TLP achieved during analysis. Although it was hoped that the basal organic deposit <152>, which was represented in this sample, reflected material from within the bilges of the ship, thereby adding to the understanding of its function in terms of cargo, crew diet and conditions, this does not appear to be the case. The taxa present included species indicative of a range of vegetation communities and habitats, with a lack of species of any economic significance. The occurrence of *Trichuris* ova in this sample may be indicative of the presence of excrement, reflecting material washed in from the town or human/animal excrement on the ship itself.

Relatively little can be ascertained from the remaining samples. Evidence of species of economic significance are limited to a single pollen grain of *Avena sativa* in sample 99, which may indicate cereal cultivation in the vicinity of the site but could also reflect material brought on board the ship or from animal dung.

As found in the plant macrofossil analysis (Caseldine and Griffiths, 2010), heather and other ericaceous pollen were found in relatively high frequencies in two samples taken from the basal organic deposit <152>, samples 57 (Interframe 27) and 108 (Interframe 45), and although a natural source for this pollen is entirely possible, it may also indicate the use of this material as dunnage on the ship.

It has not been possible to identify any spatial patterns relating to different functional areas within the ship due to the lack of pollen in the selected samples. The two previous plant macrofossil assessments (Smith and Nicholson, 2009; Caseldine and Griffiths, 2010) suggested that the frame stations at the bow and stern of the ship were more productive with regards to plant and other environemental remains than those from the middle of the ship. This does not however, appear to be the case for the pollen, with the only productive sample being located at Interframe 27, approximately mid-ship.

Conclusions

It is evident from this report that any further pollen analysis carried out on sediment samples is likely to produce poor results. However, it is recommended that, given the importance in terms of providing information on ship building techniques, that the remaining luting samples be processed for pollen analysis. This will involve experimentation during the preparation procedure in order to maximise the concentration of pollen in the samples.

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Table 1. Pollen data from Newport Ship, expressed as actual pollen counts.

Pollen Sample No	Sample 1	Sample 7	Sample 3	Sample 5	Sample 6	Sample 4	Sample 8	Sample 2
Sample No	57	160	68	107	108	99	177	426
Context No	152	130	154	130	152	130	171	1002
Interframe No	27	6	6	45	45	33	59	
Pollen type								
Total Trees & Shrubs	**158**	**3**	**10**	**7**	**9**	**16**	**1**	**9**
Alnus	52	2		2		4		4
Betula	18			1				
Corylus t.	26	1		1	1	3	1	1
Carpinus					1			1
Ilex						1		
Pinus	10		9		1	1		
Quercus	38		1	2	5	6		3
Salix	12			1				
Taxus					1			
Tilia						1		
Ulmus	2							
Total Herbs	**142**	**6**	**0**	**5**	**30**	**20**	**6**	**10**
Calluna	12							
Cyperaceae und.	8			1	2	2		
Ericaceae und.		1			6		2	
Lactuceae und.	4			1	1			2
Poaceae und.	92	3		2	14	8	3	3
Avena sativa						1		
Chenopodiaceae und.	4			1				1
Filipendula	2				2	2		
Helianthemum		1						
Hydrocotyle vulgaris	2							
Limonium vulgare	2							
Anthemis t.	2						1	
Aster t.	2				1	1		
Plantago und.					1			1
Plantago coronopus						2		
Plantago lanceolata						1		
Plantago maritima	2							1
Plantago media/major								
Potentilla						1		
Rosaceae und.					1			
Rumex t.					1			

Rumex obtusifolius	2							2
Sinapis t.	6							
Trifolium	2					1		
Urtica dioica		1			1			
Apiaceae und.						1		
TLP	**300**	**9**	**10**	**12**	**39**	**36**	**7**	**19**
Pteridophytes								
Filicales und.	24			1	7	5		2
Polypodium	6				1			
Sphagnum	2			1				1
Pteropsida trilete					6			
Aquatics								
Equisetum	3							
Sparganium erectum type								1
Lycopodium (exotic)	456	100	100	100	100	100	100	110
Crumpled	2							
Degraded		1						