PALAEOENVIRONMENTAL ASSESSMENT OF SAMPLES FROM ABERMAGWR ROMANO-BRITISH VILLA

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1. INTRODUCTION

1.1 In November 2012 the author was asked by Toby Driver (RCAHMW) to examine three context samples for palaeoenvironmental information. Two samples were to be assessed for palynological (pollen) potential, and two required suitable material for radiocarbon dating to be extracted. The samples had been acquired during excavation at Abermagwr Romano-British Villa.

2. MATERIALS AND METHODS

2.1 Three context samples were submitted for palaeoenvironmental assessment. These were identified by context number assigned by the excavator, and comprised 062, 073, 098. Samples 062 and 073 required suitable material to be extracted for radiocarbon dating. Samples 073 and 098 were to be assessed for palynological potential by identifying the state of pollen preservation. All samples were contained within polythene bags. Sample 062 comprised two bagged samples of material, identified as originating from different parts of the same context.

2.2 Small sub-samples (*c.*1cm^2) were removed from 073 and 098. These sub-samples were then prepared for pollen analysis using standard techniques (Moore *et al.,* 1991), including treatment with HCl to remove carbonates, micro-sieving through a mesh aperture of 10µ, HF digestion to remove silicates and acetolysis to digest organic matter. 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. Counting and identification was carried out using an Zeiss Axiolab at x400 magnification, and with the aid of a reference collection of type slides, online pollen image databases, and the pollen and spore key in Moore *et al.* (1991). For the purposes of assessment a count of 100 grains was attempted. Where concentrations were low, counting was continued until a count of 100 *Lycopodium* grains was achieved.

2.3 As the submitted quantities of material were relatively small, the entire samples requiring extraction of material for radiocarbon dating were processed as follows. The largest fragments were extracted by hand-sorting, then, in accordance with the Association of Environmental Archaeology guidelines (1995) the remainder of each sample was subjected to flotation and wet-sieved through a nest of sieves in the mesh size range 5mm to 0.5mm for the isolation of the various organic and inorganic components. The residues and flots were dried before being hand-sorted by eye and using a binocular microscope.

2.4 Samples of charcoal greater than 4mm were submitted to Environmental Archaeological Services at Durham University in order to identify species and thus isolate the most suitable material for radiocarbon dating (see report in Appendix).

3.0 RESULTS

3.1 General Summary of Results

Pollen concentrations from both samples were very low, with five grains only from context 073, and ten from 098 (per 100 *Lycopodium* spores). Very low values of moss and fern spores were present in 073, and fern spores only in 098. Further analysis on these samples is not recommended. Organic material from contexts 062 and 073 consisted entirely of wood charcoal. No other macrofossils were present.

3.2 *CONTEXT 062*

Context No.	062
Context Description	Late hearth, northern edge of Room 1, constructed of former roof slates (thus post-dating the abandonment of the building).
Quantity & Packing	1 x 10g bagged sample 1 x 175g bagged sample
Hand-sorted large inclusions	Wood charcoal fragments only 42g (from larger sample only)
Wet sieving & flotation	Wood charcoal fragments only
Weight >4mm	14g (from larger sample only)
Species Identified	Oak stemwood
Suitability of material for Radiocarbon Dating	Y (with proviso regarding long-lived species)

3.3 *CONTEXT 073*

Context No.	073
Context Description	Inner (west) ditch (090). Lowest charcoal rich soil below (072).
Quantity & Packing	1 x 40g bagged sample (sub-sample removed for pollen preparation)
Hand-sorted large inclusions	Wood charcoal fragments only 6g
Wet sieving & flotation	Wood charcoal fragments only
Weight >4mm	0
Species Identified	Oak, alder stemwood, hazel branchwood
Suitability of material for Radiocarbon Dating	Y
Pollen Concentration	Low
Pollen Detail	*Quercus* (oak)*:* 1grain *Alnus glutinosa* (alder)*:*1 grain *Corylus avellana*-type (hazel): 1 grain Poaceae (grass): 2 grains *Sphagnum* (moss)*:* 2 spores *Polypodium vulgare* (fern): 2 spores *(Lycopodium:* 100 spores)

3.4 *CONTEXT 098*

Context No.	098
Context Description	Oven, adjacent to hearth or charcoal deposits (036), south part of Room 2.
Quantity & Packing	1 x 745g bagged sample (sub-sample removed for pollen preparation: remainder of sample retained)
Pollen Concentration	Low
Pollen Detail	*Corylus avellana*-type (hazel): 1 grain Poaceae (grass): 7 grains Lactuceae (e.g. dandelion): 2 grains *Polypodium vulgare* (fern): 4 spores *(Lycopodium:* 100 spores)

4.0 DISCUSSION

4.1 Context 062

The sample originated from a hearth constructed from demolition debris, namely roof slates, which presumably relate to the original building. The smaller portion of the sample was extracted from between the slates and may relate directly to the life of the hearth. Unfortunately, the organic material within this sample was limited in quantity and rather friable in nature making further analysis unviable. The larger portion of the sample was from immediately below the slate hearth. All organic material extracted from this sample comprised fragments of wood charcoal. No other macrofossils were identified. Further analysis identified this as oak stemwood. It should be considered that the charcoal from this sample may have its origins in timbers from the original building. This may have implications for any radiocarbon dates acquired from this material as they will relate to the original construction, not the post-abandonment period. Alternatively fresh fuel wood may have been gathered for the purposes of burning on this hearth. However, it is important to bear in mind when using oak to acquire radiocarbon dates that oak can be a very long-lived tree and can therefore provide earlier dates than expected. With this proviso in mind, those fragments of oak charcoal from this sample considered most suitable for radiocarbon dating have been extracted and identified.

4.2 Context 073

The sample originated from the inner ditch, and may provide evidence regarding the early chronology of the enclosure ditches around the villa. The charcoal evidence identifies oak, alder and hazel. The samples of alder and hazel should both provide suitable material for radiocarbon dating as they originate from less long-lived species, and contain branchwood which is especially useful for dating purposes. Pollen concentrations were extremely low, and as such very little information can be derived from the pollen evidence. However, oak, alder and hazel were all identified, supporting the evidence from the charcoal. Hazel readily occupies open ground and produces plentiful pollen. It may have formed part of a mixed local woodland along with oak, or

occupied areas of scrub or hedging. Alder would flourish in any wet areas, such as may be provided by the ditch, or any water-course nearby. The presence of grass pollen simply identifies areas of open ground. Fern and moss spores are particularly resistant to decay and their low level presence here is not significant.

4.3 Context 098

The pollen concentrations from this sample were again very low, and consequently little information can be derived from them. The presence of open areas is indicated by grass pollen, and species such as *Taraxacum officinale (*dandelion) are common on disturbed ground, as would be expected in an area of occupation.

5.0 CONCLUSION

The samples from contexts 062 and 073 provided plentiful wood charcoal, which was identified to species level. That from context 073 is particularly suitable for radiocarbon dating as it contains charcoal from both alder and hazel. No other macrofossils were identified from either sample. Pollen concentrations in both samples 073 and 098 were disappointingly low, and little information could be provided. However, that from 073 supports the charcoal evidence, identifying alder, oak and hazel as growing close to the sampling site, and species common to open, disturbed ground were identified in 098.

6.0 ACKNOWLEDGEMENTS

The author would like to thank Mr Toby Driver (RCAHMW), Dr. Roderick Bale for preparing the pollen samples at the University of Wales, Trinity St David, and Lorne Elliott and Dr Charlotte O'Brien of Environmental Archaeology Service, Durham University for charcoal identification.

7.0 REFERENCES

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Stockmarr, J. (1971): Tablets with spores used in absolute pollen analysis. *Pollen et Spores*, **13**, pp 615.

APPENDIX

Abermagwr Wales
charcoal identification

report 3108 March 2013

Contents

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1. Summary

The project

1.1 This report presents the results of the assessment of charcoal samples taken during archaeological works at Abermagwr, Wales, in order to identify material suitable for radiocarbon dating.

1.2 The works were commissioned by Ardea, and conducted by Archaeological Services Durham University.

Results

1.3 The charcoal samples from 062 (both flot and handpicked) were entirely comprised of oak timber. Sample 073 contained fragments of hazel, alder and oak.

Recommendations

1.4 Fragments of hazel and alder charcoal present in sample 073 are suitable for AMS radiocarbon dating.

1.5 Fragments of oak timber charcoal present in 062 are not normally recommended for radiocarbon dating due to the long-lived nature of this taxon.

2. Project background

Location and background

2.1 Charcoal samples taken during archaeological works at Abermagwr, Wales, were assessed for suitable radiocarbon dating material. These comprised two hand-recovered samples 062 and 073 and a >4mm flot sample 062. This report presents

the results of assessment of the samples.

Objective
2.2 The objective was to assess the charcoal and identify material suitable for radiocarbon dating.

Dates
2.3 Samples were received by Archaeological Services on 11th March 2013. Assessment and report preparation was conducted on 13th March 2013.

Personnel
2.4 Charcoal identification and report preparation were conducted by Lorne Elliott.

Archive
2.5 The charcoal samples and radiocarbon material have been returned to Ardea.

3. Methods
3.1 Charcoal fragments were identified, in order to provide material suitable for radiocarbon dating. The transverse, radial and tangential sections were examined at up to x600 magnification using a Leica DMLM microscope. Identifications were assisted by the descriptions of Schweingruber (1990) and Hather (2000), and modern reference material held in the Environmental Laboratory at Archaeological Services Durham University. Material recommended for dating was cleaned of adhering roots and other organic material, wrapped in tin foil and put in labelled bags.

4. Results
062 4mm flot
4.1 This sample entirely comprised oak stemwood charcoal. All of the charcoal was friable and fragmentary in nature. Two fragments were selected for dating (116mg with 5 growth rings) and (62mg with 2 growth rings). No other material was available for dating.

062 handpicked
4.2 This sample entirely comprised oak stemwood charcoal. All of the charcoal was friable and fragmentary in nature. A single fragment was selected for dating (245mg with 5 growth rings). No other material was available for dating.

073 handpicked
4.3 This sample comprised four fragments. This comprised two fragments of hazel branchwood (43mg with 3 growth rings) and (18mg with 2 growth rings), a fragment of alder stemwood (44mg with 2 growth rings) and a fragment of oak (318mg with 5 growth rings).

5. Recommendations
5.1 Fragments of hazel and alder charcoal present in sample 073 are suitable for AMS

radiocarbon dating.

5.2 Fragments of oak timber charcoal present in 062 are not normally recommended for radiocarbon dating due to the long-lived nature of this taxon.

6. Sources

Hather, J G, 2000 *The identification of the Northern European Woods: a guide for archaeologists and conservators*. London

Schweingruber, F H, 1990 *Microscopic wood anatomy*. Birmensdorf

Appendix 1: Material available for radiocarbon dating

Sample	Single entity 1	Weight	Single entity 2	Weight	Notes
062	handpicked oak charcoal	245mg	-		All charcoal is oak timber (not normally recommended)
062	4mm flot oak charcoal	116mg	oak charcoal	62mg	All charcoal is oak timber (not normally recommended)
073	handpicked hazel charcoal	43mg	alder charcoal	44mg	Also a fragment of hazel
	charcoal	18mg	and oak		
	charcoal	318mg			