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Assessment of archaeometallurgical residues from Whaddon (WHAD17)

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Abstract

The submitted materials included two concretions cored on iron (from context (1631) and a fragment of burnt limestone (from context (1631)). The remainder comprised a small collection of pyrotechnological residues (330g; 18 fragments, probably fewer original pieces).

Of these technological pieces, one may be a metallurgical slag and certainly involved the burning of coal; the others are examples of fuel ash slags of non-metallurgical origin.

The coal-shale bearing piece, from context (1113) is likely, but not certainly, a residue from ironworking (blacksmithing). The use of coal as a fuel for blacksmithing was widespread in the Roman period.

The materials from contexts (1104), (1135) and the remainder of the material from context (1113) are low-density fuel ash slags (FAS). Such slags form as a viscous partial melt of a usually calcareous substrate under the fluxing influence of calcareous wood ash. These residues typically result from long-burning fires in hearths cut into calcareous substrates (such as the lime-rich subsoils of much of the Severn Vale). These fires may simply be domestic (as in the variation of FAS commonly referred to as 'Iron Age grey slag'). In the Roman period the most commonly encountered sources of FAS are probably cereal-drying kilns.

Contents

Abstract 1

Contents 1

Methods 2

Results 2
- General description of the assemblage 2
- Pyrotechnological residues 2

Interpretation 2

Further work 2

References 3

Table 1: summary catalogue 4

Methods

All materials were examined visually, using a low-powered binocular microscope where required. As an assessment, the materials were not subjected to any high-magnification optical inspection, not to any form of instrumental analysis.

The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

This assessment was conducted in April 2018 and was commissioned by Ed McSloy of Cotswold Archaeology.

Results

General description of the assemblage

The submitted materials included two concretions cored on iron (from context (1631) and a fragment of burnt limestone (from context (1631)). The remainder comprised a small collection of pyrotechnological residues (330g; 18 fragments, probably fewer original pieces).

Pyrotechnological residues

Of the pyrotechnological pieces, one may be a metallurgical slag and certainly involved the burning of coal; the others are examples of fuel ash slags of non-metallurgical origin.

The coal-shale bearing piece, from context (1113) is a fragment of a dimpled sheet of lining slag. The slag is formed of a dark glass, binding grains of quartz and small fragments of partially-altered shale, probably coal shale.

The materials from contexts (1104), (1135) and the remainder of the material from context (1113) are low-density fuel ash slags (FAS). These slags are formed of a pale grey glass which binds partially-melted quartz grains, and (in the case of the fragment from context (1104)) small clots of sediment derived from the hearth substrate. The slags show the development of crudely flow-lobed surfaces, both on the surface of the fragments and as internal divisions.

Interpretation

The presence of coal-fuelled blacksmithing residues is typical of most Roman rural sites in Gloucestershire (e.g. the site at Cleevelands close to the present site; Young 2016a).

FAS form as a viscous partial melt of a usually calcareous substrate under the fluxing influence of calcareous wood ash. These residues typically result from long-burning fires in hearths cut into calcareous substrates (such as the lime-rich subsoils of much of the Severn Vale). These fires may simply be domestic (as in the variation of FAS commonly referred to as 'Iron Age grey slag'; Cowgill 2000, 2008; Cowgill *et al.* 2001; Swiss & McDonnell 2001; Young 2009, 2012a). In the Roman period, however, the most commonly encountered sources of FAS are probably cereal-drying kilns (the FAS from which are known from examples of various periods; Young 2010a, 2010b, 2015, 2016b).

Further work

The limited assemblage means that there is little research potential the pyrotechnological residues. X-radiography of the concretions might aid with the identification of their iron cores.

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Table 1: summary catalogue of material submitted as archaeometallurgical residues. Weights in grams.

context	item wt	item no	notes	spot date
1104	10	1	low-density grey FAS in crude flow lobes with purple grey surfaces, carries partially-melted quartz and possible partially-melted clots of sediment	MC1-eC2
1113	20	1	small piece of lining slag with coal shale inclusions, deeply dimpled on both sides	MLC4
1113	102	6	grey FAS, carries partially-melted grains of quartz	MLC4
1135	30	5	grey glassy FAS, carries grains of quartz, highly vesicular	MC1-EC2
1168	168	5	grey partially-melted FAS, with crude flow lobe surfaces of grey, vesicular, slightly denser than some examples	C1+
1631	44	2	concretions on iron	C2-C4
1918	74	1	burnt shelly limestone	LC2-C4

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