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Report 2011/34

Evaluation of archaeometallurgical residues from Castle Field Camp, Cardiff

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28th September 2011

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Abstract

The submitted materials included ten fragments of probable archaeometallurgical residues from a single context (1006).Although complete reconstruction of all the fragments was not possible, there were sufficient links to suggest that these fragments were derived from just two original pieces.

One piece was a fragment of highly bloated, vitrified, reduced-fired clay with a surface layer of green wood-ash glaze. This fragment is likely, but not certainly, from the wall of a metallurgical hearth of furnace. Such extremes of firing are rare in other circumstances, but are not unknown, for instance, from cereal drying kilns.

The second piece was a highly fragment lump of weathered iron slag. The slag was fine grained and moderately vesicular. The most likely interpretation of this piece is that it was part of a smithing hearth cake, residue from iron-working (smithing) with charcoal fuel.

Neither piece is particularly diagnostic of age.

Contents

Methods

All materials were examined visually with a low-powered binocular microscope. As an evaluation, 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. The summary catalogue of examined material is given in Table 1.

This project was undertaken for Archaeological Landscape Investigation.

Results

The ten pieces of residue appear to be broken fragments from just two original pieces.

One of these was a small (16g) fragment of highly bloated vitrified clay. The external surface appeared to have a green wood-ash glaze. The piece was reduced fired. There were no visible metal residues, nor did the glaze have any obvious colour suggesting contamination from a metallurgical process.

The second piece is a fragment of dense grey, vesicular iron slag. The texture is typical of a slag from iron-working (smithing), but the lump is too incomplete to be certain that it represents part of a smithing hearth cake, although a rounded end with inclusions of hearth ceramic certainly suggest that possibility. The slag contains no surviving visible inclusions of fuel, but one (upper?) surface is planar, dimpled and rusty, with the surface of the 'dimples' suggesting these were formed in contact with charcoal.

Interpretation

The slag piece is certainly indicative of smithing, with charcoal as fuel. This has been the dominant fuel for smithing purposes since the early Iron Age. Locally, there is a tendency for much Roman smithing to have been fuelled by coal, for instance at Trowbridge (Young 2010), Caerleon (Young & Kearns 2010), Cardiff Castle (Young & Kearns 2010) and Caerwent (Young 2006). Coal progressively became the dominant fuel again for smithing after about the 13th century. However, even in those periods, charcoal was still employed (particularly so for bloom smithing) and was used even in some industrial contexts into the 20th century.

The vitrified clay could be from a smithing hearth – but could equally be derived from an entirely different process.

Evaluation of potential

The materials have little potential for providing further information through additional investigation.

References

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Table 1: summary catalogue

Context	Weight	Notes
1006	88.1	7 pieces of dark grey vesicular slag, probably originally 1 piece broken during excavation. The piece is badly fragmented and some fragments (possibly 30% of the original piece) are missing, so reconstruction of the form is difficult. One End is bulbous and rounded, with some pale, hearth lining-influenced inclusions, , this adjoins a planar, but dimpled and rusted surface (the original top?). The piece is reminiscent of the burr (proximal) end of a smithing hearth cake (SHC), but it is also just possible it is a rounded hearth slag lump. There are no surviving fuel inclusions, but the dimpled surface has slight impressions after charcoal.
	15.6	3 pieces of partially vitrified clay, probably originally 1 piece. Surface shows a thin dark glass, greenish, lying over a zone of extremely vesicular, bloated ceramic, of variable thickness (<6mm). This in turn lies on indurated and slightly possibly brecciated reduced fired clay.

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