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Assessment of residues from Caerphilly Castle (CCF/20/EV)

Dr Tim Young
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Dr T.P. Young

Abstract

The submitted material comprises 4 context-assemblages of rather concretionary material, including 13 items with a total weight of 818g. The material shows some similarity in sediment texture and in the abundance of coal dust; they may potentially share a common origin, even if recently reworked in some cases.

The slag material from context (12004) is indicative of blacksmithing using coal as fuel. This would be compatible with a medieval age, although a later age is possible. The fragment of vitrified hearth lining from context (9006) is also probably from coal-fuelled blacksmithing and suggests a medieval or early post-medieval age.

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Methods

All materials were examined visually, using a low-powered binocular microscope where required and catalogued (Table 1). The identifications of materials in this report, as an assessment, are necessarily limited and must be regarded as provisional.

The material derives from fieldwork at Caerphilly Castle with site-code CCF/20/EV. This assessment was conducted in November 2021 and was commissioned on behalf of Archaeology Wales by Rhiannon Philp.

Description of the assemblage

The submitted material comprised 13 pieces of ferruginous material with a total weight of 818g, from 4 distinct contexts, within two trenches inside Caerphilly Castle:

Context 9003 (Trench 9), interpreted as a deposit formed after abandonment of the castle, produced a single concretionary lump, probably formed by corrosion of a piece of iron. The concretion contained abundant coal debris.

Context 9006 (Trench 9), a modern levelling deposit, produced a fragment of vitrified hearth lining. The slagged face of the lining was dark in colour and contained some pale tabular inclusions (as well as wore abundant quartz inclusions). The tabular inclusions are almost certainly inclusions of partially melted coal shale derived from the fuel. The lining itself was oxidised fired and varied from a silty fabric with sparse medium sand grains at one end, to an extremely sand rich material, with grains of up to very coarse grade, at the other. This is strongly suggestive of hearth wall repair in the area around the blowhole/tuyère.

Context 12001 (Trench 12), probably a 20th-century levelling deposit, produced a single iron-rich concretion containing gravel, coal and fragment of coke. This piece will have been formed from the redistribution of iron from the weathering of an iron-rich material, probably of iron or slag.

Context 12004 (Trench 12), a spread of 'industrial waste' close to the western inner gatehouse, produced 10 fragments of ferruginous concretionary material. One appears to simply a concretion with an unknown core, two were pieces of corroded iron, but seven contained slag fragments, wither as a component within a concretion, or as the dominant item with only a thin accretionary coating. Most of the concretions contained pieces of coal/coke; some also contained charcoal. Only one contained visible clasts that were probably hammerscale. Three pieces of slag showed additional features: one was a small fragment of vesicular khaki-coloured glassy slag, one was a pale, dense, flow prill, and one, the largest fragment, was identifiable as part or all of a moderately substantial smithing hearth cake (SHC).

Interpretation

The materials all contained evidence for the use of coal, compatible with a medieval or post-medieval origin. The presence of sulphur in coal means that waste from coal-fuelled processes can be acidic, so the formation of secondary concretionary masses from the redistribution of iron released during weathering is common. In the case of the material from context (12004) at least, the originating process may be identified as blacksmithing. The character of the visible slag fragments is compatible with coal-fuelled smithing, as also suggested by the abundance of coal dust and some fragments of partially burnt coal (coke).

In this region, coal was employed as fuel for smithing during the Roman period, and again later from approximately the 13th century (although the precise date of its re-introduction is uncertain). The smithing assemblage from context (12004) is therefore compatible with the 13th-14th century date suggested by the pottery from the context. However, the assemblage need not be so early, with similar materials formed during blacksmithing of later periods also.

The vitrified lining fragment from context (9006) is also potentially medieval. From the late Middle Ages (perhaps the 14th century) onwards the use of a simple blowhole or of a ceramic tuyère, became replaced by the use of an iron tuyère, initially of wrought iron, but later of cast iron. The use of an iron tuyère reduces he impact of the hot-zone on the hearth wall leading to less slagging of the wall. Moreover, the variation in the fabric across the width of this piece is strongly suggestive of repair to the wall.

Despite the reworked nature of some of the collection, the assemblage suggests some coal-fuelled smithing was undertaken near to the investigated areas in the later Middle Ages or earlier post-medieval period. The materials show some similarity in sediment texture and in the abundance of coal dust; they may potentially share a common origin, even if recently reworked in some cases.

Further work

These are small assemblages of material with uncertain stratigraphic significance, so no further investigation of the materials is suggested.

Table 1: summary catalogue of materials. Weights in g.

Context	Weight	Number	Description
9003	16	1	concretion around corroded iron, contains coal fragments, but no scale.
9006	46	1	fragment of vitrified lining; lining is variable, fine with sparse medium sand one end, rich on coarse quartz sand the other; dark slag veneer has tabular clasts that appear likely to be coal-shale inclusions.
12001	42	1	iron rich concretion, containing pebbles, coal and coke
12004	730	1	concretionary mass apparently containing an incomplete double layer SHC; upper layer more complete than lower and depending upon original orientation it may be effectively complete, lower less than half area and probably proximal part of cake; 85mm x 125mm x 70mm overall; surface concealed by accretion.
	68	1	rounded sandy concretionary mass, with coal and slag
	42	1	concretion with slag, charcoal but surrounding a single piece of slag
	80	1	sandy concretion with glassy slag, coke, coal, charcoal,
	30	1	mixture of slag, exploding iron in sandy accretion
	36	1	flow of dense pale slag
	12	1	slag in concretion with coal, charcoal and possible scale
	10	2	exploded iron fragment in two (or more) pieces
	6	1	charcoal rich sandy concretion material

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Unit 6, Block C,
Western Industrial Estate,
Caerphilly,
CF83 1BQ

Office: 029 20881431
Mobile: 07802 413704

E-Mail: Tim.Young@GeoArch.co.uk
Web: www.GeoArch.co.uk