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Assessment of residues from Wickwar (HEW20)

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Abstract

The submitted material comprised 305g of material from four contexts of which 287g were archaeometallurgical residues.

Archaeometallurgical residues from (305) and (308) comprise residues from blacksmithing with coal fuel. The pieces in the assemblage are blebs and sheets of lining slag, intermixed with zones of denser slag and occasional inclusions of coked coal and coal shale.

A single piece of dense flow-lobed slag from (106) is probably a fragment of tapped bloomery iron smelting slag.

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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. Concretionary materials are checked with a small hand metal detector to ascertain whether they contain any surviving iron.

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

This assessment was conducted in July 2020 and was commissioned by Andy Hood of Foundations Archaeology Ltd.

Description of the assemblage

Archaeometallurgical residues

The submitted material (Table 1) comprised 305g of material from four contexts of which 287g were archaeometallurgical residues:

Context 106, 8.8g (1 piece)
This context produced a single 8.8g fragment of a dense, dark, flow-lobed slag. The slag showed surficial oxidation on the upper surface, but not the lower, which had apparently moulded over a previous flow.

This texture is probably indicating of the piece being a bloomery tapslag from pre-industrial iron making. Other interpretation are plausible, for slags of the same broad composition and potentially accumulating on flow-lobed masses, may be produced during some processes of conversion of cast iron to wrought iron (fining, puddling), as well as the initial stages of copper smelting and even, rarely, during smithing.

Context 305, 275.8g (31 pieces)
This collection is of rather heterogenous smithing residues ranging from vitrified and slagged hearth lining, through lining slags (rich in coarse residual quartz grains), to dense fine-grained grey slag lobes. The materials are typically rather mixed with complexly interfolded dense and lining slags forming rounded or crudely lobate lumps.

Many of the slag lumps bear clasts of coal shale and the more sheet-like morphologies often have coke particles deeply impressed within dimples on the surfaces.

These pieces are typical of residues from light blacksmithing with coal fuel in a clay hearth.

Context 308, 2.6g (1 piece)
This single piece is a rudely lobate dark, mostly glassy lining-influenced slag with a probable coal shale clast embedded in one surface.

This fragment belongs to the same general group of materials as those from (305) and probably shares the same source.

Other materials

Context 305, 8.62g (4 pieces)
In addition to the archaeometallurgical residues listed above, the collection from (305) contained 4 other items:

- A fragment (5.9g) of a secondary iron oxide crust that has formed from corrosion of a piece of narrow strap iron (or blade fragment). The piece contains no surviving metal and the iron object is represented by a void.
- A tiny fragment of bone (0.1g)
- Two ferruginous concretions, both nearing charcoal and a very small amount of flake hammerscale. Neither contains iron metal and the source of redistributed iron is uncertain.

Context 306, 2.19g (1 piece)
This context produced a single ferruginous concretion with a very granular texture. The piece does not contain metallic iron and the source of redistributed iron is uncertain.

Context 308, 6.44g (1 piece)
This context produced a single ferruginous concretion with a very granular texture. The piece does not contain metallic iron and the source of redistributed iron is uncertain.

Interpretation

The archaeometallurgical residues from contexts (305) and (308) provide evidence for blacksmithing using coal as fuel within a clay-walled hearth. The limited nature of the assemblage limits the degree to which the residue assemblage may be interpreted; there is a lack of evidence for smithing hearth cakes in the limited collections – and it is the weight of these that can usually shed much light on the nature of the activity. However, the dominance of small scraps of strongly lining-influenced material tends to be typical of rural sites undertaking rather light and/or intermittent work.

That the blacksmithing employed coal as fuel is an expression of a regional phenomenon, in which coal was employed at almost all sites undertaking blacksmithing (the working of iron to produce or repair artefacts) as opposed to bloomsmithing (part of the *chaîne operatoire* of the production of raw iron). The economics behind this have not been investigated, but the widespread supplanting of charcoal as the preferred blacksmithing fuel at this period may indicate other pressures on sources of charcoal. The source of coal in this area might be either from the west (Forest of Dean) or south (Bristol Coalfield). A local is likely, but cannot be assumed, for coal became employed even on some sites in NW Wales, well away from potential sources (Young 2011, 2012).

Other Roman sites in the Severn Vale producing evidence for smithing using coal include Frocester Court (Price 2000; Thomas 2000), Kingswood (Young 2017), Cleevelands (2018a) and Lockleaze (Young 2018b) and, to the northwest of the Severn/Bristol Channel, Cardiff Castle (Young & Kearns 2011), Trowbridge (Young 2009a, 2009b), Bulmore (Young 1999), Caerau (Young 2020) and Caerwent (Young 2006).

The small fragment from context (106) is probably indicative of iron smelting in a bloomery furnace of Roman or medieval age. Roman iron smelting is widespread in the Severn Vale, certainly employing ore imported from the Forest of Dean, but also probably using more local ores (Iron Acton, Pucklechurch, Hanham…). The use of local sources is perhaps more likely for the current location.

The presence of evidence for both some iron smelting and the end use of iron (blacksmithing) on the same site is quite common in the area. Frocester Court Villa (Price 2000; Thomas 2000), Lockleaze Villa (Young 2018b) and Kingswood (Young 2017) are examples of recently-investigated assemblages. The two activities are probably best regarded as entirely separate – blacksmithing being a standard activity on a rural estate of the period with smelting typically being a more intermittent activity, perhaps associated with specific building projects or with itinerant iron-makers sporadically utilising local woodland resources.

Although the discussion above has focused on Roman examples, it is clear that medieval metallurgical activity in the area was very similar. Archaeometallurgical residues of the two periods cannot, however, readily be separated on the basis of very small assemblages such as this.

Further work

The slags are, as described above, are a rather small assemblage and are not capable of yielding significant further evidence if they were to be subjected to detailed analysis at this stage, so none is recommended. The likelihood of metallurgical activity in the vicinity of the assessment is, however, strong.

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

context		item wt.	no.	notes
106	7	8.83	1	fragment of dense, very dark, slag in tapslag-like flow lobes. Surface weathered but strongly reddened on top, base shows a marginal fuel (?) impression but is mostly moulded over preceding lobe, metallic lustre on base, very low vesicularity.
305		254	25	small blebby, heterogeneous lumps, lining slag, denser slag, inclusions of coke and shale, inclusion present on both upper and lower surfaces on dimpled sheet-like specimens, others more twisted nubs and blebby prills.
		8.04	3	as above, but essentially glazed and slagged hearth ceramic
		5.94	1	magnetite crust from now disappeared iron object - possible strap-like fragment but thins towards one edge - so just possibly a blade fragment.
		13.77	2	dense flow lobed slag - resemble some lobes within the lining slag lumps,
		2.56	2	ferruginous concretions, have included charcoal and gravel, with small amount of hammerscale
		0.12	1	bone fragment
306		2.19	1	granular ferruginous concretion, no MD response.
308		2.64	1	crudely lobate dark glassy (mostly) lining slag, possible coal shale clast on one surface
		6.44	1	lobate rusty irregular piece. Rusty rounded lobes have coarse sand embedded within; presumably this is largely accretion, but it is unclear if this has an iron or clinker core; there is no MD response; could be natural

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