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Assessment of archaeometallurgical residues from the A465 sections 5 & 6 (Heads of the Valleys) [HOTV/21/SMR]

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Abstract

The investigated materials comprised a small collection of fourteen pieces with a total weight of 2170g. Eleven pieces were fragments of concretion (total 764g) with an iron-rich composition, just three pieces (1406g) were archaeometallurgical residues.

Context (403) of Asset 8 yielded a single fragment (530g) of a 50mm-thich dense, dark slag sheet, probably a refining slag. Context (2400) of the Gurnos S WB produced a 452g angular fragment of green glassy blast furnace slag. Context (3029) yielded a 424g fragment from the top of a tapped flow of green glassy blast furnace slag. All three pieces would be compatible with a late 18th or more likely 19th century age.

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

This assessment was conducted in March 2024 and was commissioned by Dr Rhiannon Philp of Archaeology Wales.

Results

General description of the assemblage

The investigated materials comprised a small collection of fourteen pieces with a total weight of 2170g. Just three pieces (1406g) were archaeometallurgical residues; the other eleven pieces were fragments of concretion (total 764g) with an iron-rich composition (Table 1).

Archaeometallurgical residues

Context (403) of Asset 8 (on the line of the Aberdare Rhondda Railway) yielded a single fragment (530g) of a 50mm-thich dense, dark slag sheet. probably a refining slag (Young & Hart 2018). The top has dull flow slag lobes. The base is dimpled with rounded bulbous protrusions. The slag is grey, internally moderately vesicular, locally with elongate crystals, probably of olivine.

Context (2400) of the Gurnos S WB produced a 452g angular fragment of green glassy blast furnace slag. The piece shows conchoidal fractures and some minor devitrification.

Context (3029) from Asset 22 (the Parc Hensol farmstead) yielded a 424g fragment from the top of a tapped flow of green glassy blast furnace slag. The surface shows arcuate ridges from flow beneath a viscous surface. There is some devitrification on the margins.

Other materials

Context (1017) (New Area 1) yielded a single small concretion (4g) around a 4mm square rod of mineralised iron, very likely to be a nail shank.

Context (2204) (Trewaun WB) produced two adjoining fragments (total 12g) of ferruginous, coal-bearing concretion spalled from surface of metal artefact. Some white material on the surface hints at this having been coated iron (galvanized?). The shape suggests this is the rounded margin and base of a flat-bottomed, cylinder-like form, 30mm in diameter.

Context (2211), from Asset 22, produced two fragments of coal-bearing concretion: one (24g)

containing a mineralised fragment of sheet iron the other bears the imprint of mineralised wood on one planar face and the curved impression of a ribbed object (probably glass or ceramic) on the other.

Context (4616) (Asset 46) produced six fragments (total of 704g) of ferruginous concretion, bearing fragments of coal, shale and sandstone. A 308g fragment contained a 120x70mm curved sheet of cast iron, probably a fragment of a cast iron pot. A second fragment of probable cast iron pot, albeit rather thinner than the first, was present in a second, 120g, concretion fragment. A small, 8g, fragment showed an undulating smooth small contact area with a greenish colour, so this was probably a spall from a copper alloy object. Another small, 22g, piece showed a void created by the complete weathering out of a small fragment of sheet iron. Two larger pieces (118g and 130g) of concretion contained larger pieces of concretion also contained sheet iron, probably in more complex shapes. The final piece contained an iron object that was not exposed, but the superficial form of the concretion suggests it is either an incomplete chain link, or more likely a small hook (85x45x10mm) but would require X-Ray to determine. This fragment also contains fragments of domestic pottery including piece of creamware(?) cup.

Interpretation

The archaeometallurgical residues are waste from primary blast furnace iron making and from the refinery process, the first step in the conversion of the resultant pig iron into bar iron. These materials are likely to date between the very late 18th and mid-19th century.

Further work

The residue assemblage comprises materials produced in enormous quantities in the Merthyr Tydfil area in the 19th century. They occur both on tips of waste material and also commonly as construction materials in railway track beds, road makeup and similar settings – from where they may have been reworked into tertiary settings. They require no further investigation.

The concretionary materials will be discussed further in the treatment of the metal objects recovered from the project.

Reference

YOUNG, T.P. & HART, R. 2018. The refining process (2): new data from Ynysfach Ironworks, Merthyr Tydfil. *Historical Metallurgy*, **51**, 34-50.

Table 1: summary catalogue of items retrieved as archaeometallurgical residues, listed by context and bag. Weights in grams.

Context	Site	Weight	No	Notes
403	Asset 8	530	1	fragment from a dense slag sheet, c50mm thick; top with dull flow slag lobes; base dimpled with rounded protrusions; internally moderately vesicular, grey slag, locally with elongate grains; possibly a refining slag
1017	New Area 1	4	1	small concretion around c4mm square-section mineralised iron; very likely, but not certainly a nail shank
2204	Trewaun WB	12	2	broken, coal-bearing concretion spalled from surface of a metal artefact; some white on surface hints at coated iron; shape suggests this is the rounded margin and base of a flat-bottomed, cylinder-like form, 30mm in diameter
2211	Asset 22	24	1	fragment of coal-bearing concretion containing a fragment of mineralised sheet iron; no details visible
		16	1	fragment of coal-bearing concretion; bears imprint of mineralised wood on one planar face, and the curved impression of a ribbed object on the other - potentially a fragment of glass or ceramic
		2	assm	debris/dust
3029		424	1	rather worn fragment from the top of slag flow; shows crescentic ridges from viscous flow; mostly dark green glass, but with some devitrification on surfaces
2400	Gurnos S WB	452	1	dominantly green glassy blast furnace slag; minor devitrification spots; angular fragment with conchoidal fractures
4616	Asset 46	308	1	fragment of coal-, shale- and sandstone-bearing concretion with a large curving sheet of iron; 120x70mm angular fragment, from (probably) a cast iron pot
		120	1	angular fragment of curving ferrous sheet in similar concretion; probably another cast iron pot fragment, but noticeably thinner than the first piece
		8	1	fragment of similar concretion, one surface shows an undulating smooth small contact area with a greenish colour; probably a spall from a copper alloy object
		22	1	small fragment of similar concretion with a curving small void suggestive of the complete weathering-out of a sheet iron object
		118	1	fragment of concretion with multiple internal oxide layers, suggesting iron movement away from central sheet iron fragment (details not seen of the core)
		130	1	fragment of concretion containing iron object; surface morphology suggests a chain-link fragment or more likely a small hook (85x45x10mm), but would require X-Ray to determine this properly; also contains fragments of domestic pottery including piece of creamware cup?

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