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Assessment of archaeometallurgical residues from the A6 RC

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Abstract

The small assemblage (total 200g) comprised five fragments of poorly-preserved iron slag and one tiny fragment of vitrified hearth lining.

The iron slag fragments were probably all produced during smithing. One piece showed the characteristic shape of a smithing hearth cake (SHC), one other features likely to be indicative of a SHC fragment, while the other three showed remnants of dimpled surfaces suggestive of hearth slags.

The small chip of vitrified hearth material need not be from ironworking but may well also be so.

Preservation of the slags was poor, so no indication of the degree of reworking was preserved. The sparse assemblage makes it unlikely, however, that the smithing was undertaken within the excavated area.

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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 July 2018 and was commissioned by Colin Dunlop of Northern Archaeological Consultants Ltd.

Description of materials

The assemblage comprised a small collection (total of 6 pieces of residue weighing 200g), deriving from fills of four separate cuts, spread over three distinct areas (Table 1).

This collection included five fragments of poorly-preserved iron slag and one tiny fragment of vitrified hearth lining.

The iron slag fragments were probably all produced during smithing. One piece (s#153) showed the characteristic shape of a smithing hearth cake (SHC), one other (s#131) features likely to be indicative of a SHC fragment, and the other three showed remnants of dimpled surfaces suggestive of hearth slags.

The small chip of vitrified hearth material (FN#522) need not be from ironworking but may well also be. The deep green colour is indicative of the influence of wood ash. The high proportion of coarse quartz grains may have been concentrated from the original hearth wall, but the cermaic is likely to have been quartz-rich.

Interpretation

The two identifiable fragments of smithing hearth cake (both from fills of cut [2040]) are firmly indicative of an origin in ironworking. The large piece has a shape suggestive of a fragment from a small- to medium-sized SHC. In Ireland, SHCs of up to an original weight of perhaps 1200g (as indicated here) are usually attributable to blacksmithing, the end use of iron, rather than to any part of the process of the manufacture of the iron itself. The smaller of the two pieces contains small fragments of charcoal fuel. Charcoal became replaced by coal as the typical fuel of the blacksmith fairly late (19th to 20th century) across most of Ireland, with coal typically only being a major fuel for smithing in the later medieval and earlier post-medieval periods in the immediate areas of the coalfields and along the east coast. That means that the present material could be of any age from the early Iron Age to the 20th century.

The three smaller pieces of iron slag (from contexts (2072) and (4099)) show dimpled surfaces that are probably the result of contact with charcoal fuel. There are no indications of inclusions of coal or coal residue. These pieces may less certainly be attributed to an origin in smithing but are very likely to have that origin. The fragments s#4101 from context (4099) contained occasional coarse quartz grains; it is unclear whether these were picked-up from the hearth floor or

incorporated from a slag contribution from partially-melted hearth ceramic (as FN#522).

The single small chip of glassy slag rich in quartz grains (FN#522) is almost certainly a spalled chip from the vitrified surface of a hearth/furnace wall or from the face of a ceramic tuyère. It is entirely compatible with an origin in the same blacksmithing processes that produced the iron slag fragments, but that cannot be demonstrated with certainty. The preservation of this piece is better than the slags, but it is unclear whether it is less reworked, or simply more resistant to the local groundwater.

Further work

The very limited extent of the assemblage suggests that ironworking was not a major activity in the immediate investigated area. The residues are all rather weathered, so determining the extent of any reworking is difficult. Unless there are specific archaeological questions raised by the context within which these materials were found, there would be little benefit from any further laboratory analysis.

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

fill	cut	find/sample	licence	site	wt (g)	no	notes
2072	2071	s#85	AE/17/19	9	53	1	probable smithing slag in irregular sheet-like form; base shows broadly cuspate morphology, probably close to original shape; upper surface shows some small areas of preserved micro-dimpling; slag is decomposing; ashy(?) coating; internally shows very fine tubular vesicles.
2112	2040	s#153	AE/17/19	9	101	1	20-40mm thick piece from the side of an SHC; the upper surface shows remnants of maroon, smooth-surfaced lobes, possibly showing some shrinkage cracking; the lower surface is missing, and the slag is decomposing to black sand; lower part shows fine tubular vesicles, the upper is openly granular, with vuggy voids - but it is unclear how much of the porosity is due to weathering.
2186	2040	s#131	AE/17/19	9	28	1	small fragment of very weathered, highly vesicular grey slag; some vesicles contain small fragments of charcoal; probably smithing slag fragment and equant shape of fragment suggests it is likely to be from an SHC.
4099	4098	s#4101	AE/17/32	8	17	2	two very similar fragments of a dark porous slag with remnants of a dimpled and prilly surface; internally the slag was very vesicular and contained occasional quartz sand inclusions.
5027	5021	FN#522	AE/16/43	2	0.91	1	small fragment of glassy slag, with (at least superficially) a green colour and abundant large included white quartz grains, ranging up to approximately 2mm; this is probably a chip of slaggy material spalled from the face of a piece of sand-rich furnace/hearth lining

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