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Evaluation of Archaeometallurgical residues from the M7/M8 Contract 2: Derrinsallagh 4 (E2180)

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Abstract

The Derrinsallagh 4 extension yielded approximately 3.3kg of residues from iron smelting. These were mainly within a furnace (believed to be C656), but some also occurred in pit C667.

The residues from within the furnace may have been dumped there, rather than being in situ. They include pieces of vitrified furnace wall suggestive of a furnace wall with a protruding or overhanging blowhole, similar to that postulated for furnace C397.

Contents

Abstract 1

Methods 1

Results 2

Interpretation 3

Evaluation of potential..... 2

References 2

Catalogue 3

Methods

All investigated materials were examined visually, using a low-powered binocular microscope where necessary. All significant materials were summarily described and recorded to a database (Table 1). As an evaluation, the materials were not subjected to any high-magnification optical inspection, nor to any other form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

Results

The residues are all either certainly iron smelting residues or are compatible with that origin. C660 contains a variety of residues, mainly associated with the blowing wall of the furnace (four pieces of vitrified wall from close to the blowhole) and slag formation near to that wall. The assemblage does not include the small scale slag pieces so typical of the lower parts of the pits of slagpit iron smelting furnaces (compare the assemblage from Derrinsallagh 5; Young 2008b). This could be due to a sampling bias, with a lack of collection of the smaller residue fragments from C660, but is perhaps more likely to be a genuine difference, perhaps suggesting the furnace was emptied, before large waste pieces were dumped into it.

The material from C660 includes what is probably the region of wall from close to an overhanging blowhole (as probably occurred in the late stage use of C397 and may have occurred in the earlier use too), together with some slags from the wall below.

The material from C659 includes “sinter” (a granular residue from the slagpit floor formed from ore dust and other materials falling through the charge), together with other blebby slags normally found on the slagpit floor, as well as flow slags which would have solidified within the fuel bed. This material is much more like a normal base-of-pit assemblage than that from the stratigraphically lower C660. This supports the idea that the residues were dumped into this furnace, rather than being in situ from its last smelt.

Pit fill C676 (Pit C667) yielded a sparse assemblage of smelting residues, all fine materials likely to have formed low in a slag pit furnace.

Interpretation

The interpretation of these deposits is complicated by problems with the stratigraphic report – in which contexts C659 and C660 are described as fills of both furnaces C656 and C609, apparently in error. In the context listing they are given as fills of C656, with no fills of C609 being listed.

These two furnaces are adjoining and have rather similar morphologies, although the context descriptions of the fills are different (despite the numbering).

General comments on the contexts are offered here, which may need amendment once the stratigraphy is clarified. It is assumed here that these fills are probably those of furnace C656.

Context 659 (assuming this is the same context C659 as the slag assemblage) has a 14C date to the first centuries BC/AD, on ash charcoal. This appears to be a period of diversity in furnace construction, and the site records should be examined carefully to determine whether they reveal more about these furnaces than is currently apparent.

Both furnaces C656 and C609 are described as being rather elongate, which raises the possibility that they may have been furnaces with an arch, comparable to furnace C397 which was examined in detail (Young 2008b). In particular C659 is described as being "0.95m in length, 0.50m in width, and 0.30m in depth", dimensions not too dissimilar to those of the furnace C397 excavated in detail.

For the description of furnace C609, C659 is described as a possible collapsed superstructure whereas for C656, C659 is listed as a brown fill. In both descriptions C660 is a lower dark, charcoal and slag-rich deposit. The residues from C659 are rather unlikely to have been derived from a context described as a collapsed superstructure, supporting the assignation of these assemblages to furnace C656. The residue assemblage from C659 is mixture of various, possibly redeposit smelting residues. This is in agreement with the possibility of C659 as an upper, post-abandonment fill of the a slagpit. C660 does not contain an assemblage typical of the lower fills of slagpits, and may indicate dumping of slag into the furnace on its abandonment.

Evaluation of potential

The residues from Derrinsallagh 4 as a whole represent a very important collection that is worthy of full retention and much detailed study. The material from the extension should be viewed as a small component of the whole. Further analysis would be best directed at good complete suites of slags left in situ in furnaces; this material may have been redeposited, and is therefore a much lower priority for further investigation.

It should be retained in full along with the remainder of the material from the site.

It is strongly recommended that the site records are re-examined to attempt to determine the type of furnace that represented by the structure in which residues were found.

References

YOUNG, T.P. 2008a. Evaluation of Archaeometallurgical residues from the M7/M8 Contract 2: Derrinsallagh 5 (E2181). *GeoArch Report 2008/24.*

YOUNG, T.P. 2008b. M7/M8 Contract 2. Detailed recording of furnace C397, Derrinsallagh 4 (E2180), *GeoArch Report 2008/34.*

F	sample	context wt	wt	no	notes
1	547	44	44	2	single piece of dense, probably flow-, slag, broken in 2
659	525	1400	422	48	flow slag, mainly in small blebby prills with small charcoal moulds
659	525		216	9	lining slags, gravelly
659	525		414	32	rusty sinter
659	525		84	9	dull blebs associated with sinter
659	525		82	18	fragments of clay and stones, many glazed and/or vesicular
659	525		60	1	slag formed of small prills with small charcoal moulds
659	525		116		bits and dust
660	535	1800	340	26	flow slag, blebby, small charcoal moulds
660	535		424	15	fragments of massive to prilly slag blocks - some with faces suggesting they originated adjacent to the wall
660	535		608	1	block of lining 170 wide, 100 wide incurved densely vitrified pad, attached to small prilly slag cake extending 60 into hearth, curve suggests that the blowhole area was overhanging and curved – possible to interpret this as the base of a dome.
660	535		118	3	fired wall
660	535		306		dust and small bits
676	528	120	52	5	sintery material
676	528		44	5	well developed flow slag prills
676	528		24	1	dull flows on sintery material

Table 1. Summary catalogue of residues by context and sample.

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