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Evaluation of archaeometallurgical residues from Ballynane 1, N86 Annascaul to Gortbreagoge Scheme, Co. Kerry (11E345)

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Abstract

The submitted assemblage comprised 1.1kg of variable slag, all attributable to ironworking (smithing), all from fill F8 of pit F3. The assemblage included an almost complete dense smithing hearth cake (SHC) weighing approximately 500g, together with two smaller, less typical, low-density SHCs (or pro-tuyère tongues) weighing 96g and 102g.

The remainder of the assemblage comprised fragments of broken SHCs broadly similar to the above, together with some sheet-like slags probably representing slag accumulations which did not develop into full SHCs.

Such a smithing assemblage is not readily dateable, but the general style is probably most closely matched elsewhere by early medieval – medieval assemblages rather than by examples of younger or older dates.

Contents

Methods

All materials were examined visually with a low-powered binocular microscope where required. As an evaluation, 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. The summary catalogue of examined material is given in Table 1.

This project was undertaken for Archer Heritage Planning.

Results

The assemblage was a small, but coherent, collection of slag pieces, all compatible with an origin in ironworking (smithing).

Most of the material (by weight) is in the form of smithing hearth cakes. One example is almost complete (498g) and is a dense plano-convex shape. A second fragment (122g) derives from a rather similar cake.

A second group of cakes are classifiable either as small SHCs or as pro-tuyère tongues. This latter term was introduced by Young (2009; in prep.) to describe small SHC-like cakes with a glassy, silicate-rich, upper plate and pendent iron-rich prills below. They were interpreted as being either SHCs in their own right, or as small bodies attached to the front faces of ceramic tuyères which fed more substantial iron-rich slag cakes at a lower level in the hearth (and becoming equivalent to the inclined lining slag plate preserved on the upper surfaces of many large SHCs). The examples in this category have weights of 102g and 96g, but there are also several similar fragments.

The assemblage also includes several small slag pieces which do not appear to be part of an SHC or tongue. These may be unconsolidated hearth slags, or incipient SHC pieces.

Interpretation

The diversity of slag cake textures and weights is typical of early medieval and medieval ironworking in Ireland, although a different date is possible, if less likely. There are far too few examples of SHCs however to comment on a detailed comparison of the size distribution here to that at other sites.

Sites interpreted as being involved simply with blacksmithing (the end use of iron) typically show a variety of SHC/tongue size because of the variety of tasks being undertaken in the forge. The larger, denser slag cakes are likely to be the result of activities involving a substantial degree of welding – either because of the fabrication task, or because the smith has had to fold and weld rather impure raw iron to

create the starting material for his work. This latter activity appears to be important in most forges prior to the late medieval period, when the supply of higher quality finished iron seems to have become the norm (see discussion, for instance, in Young 2011). At the same period, it is likely that the use of iron tuyères became more common, which also reduced the supply of silicate material to the hearth. After this period, the frequency of SHCs with weights over 400g becomes much reduced, although some do still occur (e.g. Dabal & Young 2011).

Thus overall, although the assemblage is very small, it is most likely to represent a small smithing operation of some period between c. AD 600 and 1400, although an origin outside this period is possible.

Evaluation of potential

Although interesting, the assemblage contains little that might provide additional useful information through further detailed analysis.

No further analysis of the assemblage is recommended (unless perhaps a radiocarbon date indicates a date substantially outside the age bracket indicated above).

As a small, isolated, assemblage the material is of low priority for retention.

References

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Table 1: Summary Catalogue of archaeometallurgical residues from F8, Ballynane 1.

Weight	Number (fragments)	Notes
498	1	Most of a dense, almost plano-convex SHC. 105mm x (95mm) x 30mm. The upper surface has thin glassy layer, the base is sandy. There is accretion with organic moulds on the upper surface and some accretion also hides details of the broken section - probably this break is the proximal end
96	1	105mm x 65mm x 32mm, main part 70mm x 65mm x 25mm but has a slight elongation at one end. Very slightly biconvex low density cake, way up is not certain. Slightly and gently dimpled probable base, with vesicular slag texture; upper part is poorly preserved but seems to be a honeycomb of coarse plates with a smooth top.
122	1	(45mm)x(80mm)x25mm small fragment from the margin of a dense SHC. Possible vertical proximal edge has lining slag blebs attached to it. Base neatly curved as larger SHC fragment above, top largely concealed by large rusty accretion. Section shows vesicles in lower part - upper obscure but may be massive
30	7	blebs and part-blebs of low density lining slag. Broadly similar material to the item below
102	1 (2)	80mm x 85mm x 30mm, concavo-convex irregularly palmate slag with lobate margin. Base has pendent prills and dimples, top is dished and of dark glass. Internally it is a vesicular slag. This is probably classifiable as a small SHC
76	1 (2)	9mm x 40mm x 20mm slag fragment. Dense slag sheet 5-7mm thick probably forms then base, overlain by irregular slag with deep dimples and raised lobes, could possibly be other way up, but unlikely. Probable fuel fragments (charcoal) in lower dimples. Top smooth but irregular, vesicular. Fairly dense slag
64	1 (2)	70mm x 50mm x 20mm, dense slag in odd shape, probably a slightly dimpled sheet with an irregular sub-angular raised lump of dense slag
42	1 (2)	70mm x 50mm x 30mm folded flap of lining slag with recent break. Base (?) planar with charcoal dimples, top curves down and away from curved fracture surface (possibly scar of tuyère tip?)
46	1	55mm x 45mm x 25mm, small lump of rather lobate lining dominated slag, possibly pressed against a curved surface. Hearth slag
48	1	(45mm) x (50mm) x 40mm fragment of small SHC or tongue. Upper 5mm is smooth black lining slag influenced glass, below this is dense crystalline iron slag extending into pendent prills between charcoal impressions. Edge of piece on one side is vertical and has broken bubbles of lining slag (like clinker - so this is probably detachment from proximal wall. Piece wedge-shaped in section, thins rapidly towards distal edge.
8	2	iron rich concretions similar to those on the upper surfaces of the SHCs above
12	5	small fragments of lining influenced glassy slag with quartz grains

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