# GeoArch

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# Assessment of archaeometallurgical residues from Abbotstown, Co. Dublin, 13E020

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## Abstract

*The submitted sample comprised a single broken smithing hearth cake (SHC) weighing approximately 556g. The slag cake is well-formed and is dense, despite its vesicularity, due to the presence of at least one large metallic iron clast. The slag contains clasts of charcoal.*

*Such an SHC is well within the range of weights and sizes produced during blacksmithing in the medieval period in Ireland. The compact, dense nature of the SHC, together with the presence of a significant iron clast, suggest this cake was produced during heavy forge work or during a process such as refining partly refined bloomery iron or hearth steel-making.*

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## 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.

This project was undertaken for Irish Archaeological Consultancy Ltd., commissioned by Maeve Tobin.

## Results

The sample comprises a single fragmented smithing hearth cake (from c149 of 13E020) in three parts. The cake weighs approximately 556g and measures 100mm by 105mm and is up to 40mm thick. The SHC contains two distinct slag layers, a lower bowl which extends up to a crudely lobate lip distally, and which is typically seen in section as a 4-8mm thick layer of fine grained, vesicular slag, and a upper layer of dense slag, up to 25mm thick, with a low degree of vesicularity but with scattered large charcoal clasts. The two layers are separated in section by a layer of large, rounded tabular vesicles .

The base of the SHC is finely dimpled, with a bulging mass of iron corrosion products close to the centre, indicative of a corroding metallic iron clast at this point.

The top of the SHC is slightly dished, with smooth impressions of fuel lumps.

## Interpretation

This piece is a good example of a well-formed smithing hearth cake. Understanding of the development of SHCs is not very well advanced; identifying particular activities of the smith through the waste products is only currently possible in a rather general manner.

An SHC of this type is typically approximately 55% iron by weight – so this example represents a loss of 300g of iron from the work to the hearth. Such a high loss may simply be due to extended work periods, but in the case of a dense SHC such as this, it is likely that this figure is due to processes which entail a high loss of metal – such as significant spells of heating metal to welding heat, or to a process such as small-scale steel making in the hearth.

One particular process that may involve a high rate of iron loss to the hearth, is the working of incompletely refined iron into finished bar iron. It has been argued that this was commonly a task undertaken by blacksmiths in medieval Ireland (Young 2009), rather than all iron being fully refined at the primary production site. In contrast, SHCs from specialist bloom-refining sites typically weigh more than 1kg.

## Evaluation of potential

A single isolated SHC would not normally be considered worth pursuing for further analysis. It is not recommended that further analysis be considered in this case.

## References

YOUNG, T.P. 2009. Evaluation of archaeometallurgical residues from the N8 Fermoy-Mitchelstown, Garryleagh, Co. Cork (E2433), *GeoArch Report 2009/47*, 10 pp.

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