

Report on the archaeometallurgical remains  
excavated at Ballygarran, Co. Waterford  
by M. Bowman in 1940

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## **Introduction**

In 1940, M. Bowman excavated a site in the townland of Ballygarran, Co. Waterford during which seemingly yielded large amounts of metalworking production remains. The excavation was never published, but a report exists (Bowman 1940) and only a tiny fraction (668g) of the metalworking debris found is available for study. This report is compiled to accompany the M.A. Thesis by John Curtin (UCC) on the Ballygarran excavation.

## **Description of the site and the surviving remains related to metalworking**

In general, the extant unpublished report is a poor description of the excavation results with only fragmentary and at times confusing description of the excavated remains and little regard for stratigraphy. This is not helped by the insistence that the site was the location of an early, wooden church although very little evidence for this was found.

Between 100 and 150 kg of 'iron' was found during the excavation. Based on the amount recorded, its relation to the 'furnace' (see below) and especially as the smithing hearth cake in the preserved assemblage is labelled 'iron' it is assumed that most if not all of this 'iron' was, in fact, slag. The weight of the pieces of this 'iron' varied from c. 200g to 9kg (0.5 to 20lb). The preserved piece of 'iron' is a smithing hearth cake weighing 490g. This the typical waste from early secondary iron smithing processes, comprising both iron object manufacture and alteration. The piece weighing 9kg, however, is very large for smithing hearth cakes, even for Irish standards. This could represent iron smelting slag or possibly a large slab of smithing pan, the rusted together iron-rich particles which cover the anvil area.

The same smithing hearth cake had small particles of coal embedded in its surface. No fuel could be identified in the other, much smaller, slag fragments, but a piece of coal was included with three pieces of this slag. The excavator also asked about the earliest date for the use of coal in 'iron smelting' in Ireland.<sup>1</sup>

A 'possible crucible fragment' and 'baked clay' was respectively interpreted as likely and possible tuyere material. Ceramic tuyeres were commonly used as bellow protectors in Irish smithing activities from Early Medieval times onwards. One of the possible tuyere fragments had charcoal

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<sup>1</sup> Pers. Comm. John Curtin

inclusions.

A large quantity of the 'iron', together with charcoal and quartz fragments, was recovered from a structure described as the 'furnace'. This 'furnace' is both described as a 'pit' and as the area (c. 3.6 by 2.7m) enclosed on three sides by a kerb of stones. It would seem possible that the interior of the kerb consisted of a hollow. A line of stones and another at right angles, together with part of the kerb of stones was interpreted as a possible grave, although no skeletal remains were found.

## **Interpretation**

Any interpretation of the available evidence will be tentative based on the small amount and meagre quality of it.

The preserved smithing hearth cake clearly points to secondary smithing (object manufacture and/or alteration) being carried out at Ballygarran and the large quantity would suggest at least one period of intense activity. There were no indications that other metals than iron were processed at the site.

The coal inclusions would suggest a date later than the thirteenth to fourteenth century (Rondelez 2014: 179-181), while ceramic tuyeres are known to have been used in Ireland until at least the 17<sup>th</sup> to 18<sup>th</sup> century (Young 2008). The occurrence of both coal and charcoal might indicate two periods of use but both fuel types are known to have been used side by side, in some cases both being embedded in the same piece of slag (Rondelez 2012).

The structure ('furnace') wherein the ironworking activities appear to have taken place is difficult to interpret. It is not impossible that the kerb represents one side of a smithy, with the 'grave' being the foundations of a waist-high forge. If this was the case, this would very likely imply a date later than AD 1600 (Rondelez 2014: 286), but other interpretations are possible.

## **Catalogue**

1000:3786 ['iron']

smithing hearth cake, 490g, rather smooth lower surface with curving upwards at c. 45° angle likely indicating that the edge of the smithing hearth. Upper surface is irregular with one rather deep

hollow possibly a blowing hollow. Although the piece was not cleaned some coal particles can be identified

1940:805.2 ['slag sample']

Three tiny slag fragments, 3g.

1940:807.1 [Crucible fragment (possible)']

Likely tuyere fragment, 2g. Oxidised clay with a thin slag layer on its outer surface

1940:818.1 ['iron slag fragments (5)']

Five small pieces/fragments of slag, 10g. No fuel could be identified

1940:838 ['copper object fragment']

Likely copper object fragment, 1g. Thin, flat piece of oxidised copper, likely not production waste.

1940:852 ['Copper object']

Copper droplet, 1g. Not possible to tell if object or production waste.

1940:853 ['metalworking waste']

Three pieces of slag, one dense, 21g. One piece of coal, 5g

1940:855 ['Baked clay sample']

Two rather large pieces brick-like material, 98g.

1940:856.3 ['Baked clay sample']

Possible tuyere fragments, 3g. One larger and several tiny lumps of heat-affected clay. The larger piece shows some vitrification on one side and also charcoal inclusions

1940:857.1 ['slag fragments (5)']

Five small pieces of slag, 30g. As the pieces were not cleaned no fuel could be positively identified

1940:872.2 ['iron slag']

Highly vitrified stoney material, 9g. Has inclusions of black glassy material. Either heavily heat-affected forge hearth wall or related to non-metallurgical pyrotechnical process.

## Bibliography

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