

# Report on the finds related to metalworking from Liscahane, Co. Cork (E235)

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## Introduction

Following quarrying activity at a ringfort site at Liscahane, Co. Cork in 1981, several trenches were archaeologically investigated between 1981 and 1984. These uncovered a souterrain, two older circular buildings, the ringfort ditch and various pits and postholes. Over 3 kg of slag was recovered from various contexts. These were visually studied with the purpose of determining the nature of the metalworking on the site.

## Description of the finds related to metalworking

### **235:38**

3.0 x 2.9 x 1.6 cm                      10g                      C.252

Fragment of vitrification. Outer part shiny reddish black. Inner part varying from shiny reddish black to shiny greenish grey matrix with numerous cavities (air bubbles)

### **235:44**

2.6 x 2.2 x 1.2 cm                      6g                      C.100

Small fragment of vitrified clay. Vitrification is glassy greenish grey. Fabric is brown orange burnt clay.

### **235: 67**

5.6 x 2.7 x 1.9 cm                      34g                      C.111

Dense roughly finger-shaped slag piece. Upper part shows very minor indications of flow pattern with some inclusions of small stones and pebbles. Lower side is crystallised (fayalite?)

### **235: 68**

[numbered as E235: 153 on piece]

4.6 x 2.9 x 1.6 cm                      26g                      C.111

Vitrified clay. Vitrification is glassy greenish black, 1 mm thick. Irregular vitrification. Fabric is fine grained clay, creamy to orange without inclusions.

**235: 69**

3.2 x 2.9 x 1.6 cm                      15g                      C.112

Vitrified clay. Vitrification covered by clayey encrustation. Fabric is fine grained clay without inclusions. Bright orange colour, possibly slightly convex.

**235: 70**

1.8 x 1.4 x 0.8 cm                      1g                      C.117

Black to dark brown encrustation with clayey inclusions

**235: 72**

2.4 x 2.4 x 1.8 cm                      11g                      C.111

Irregular rusty lump with multiple inclusions of small stones and pebbles

**235: 75**

X    8g                      C.111

11 fragments of one piece of slaggy material. Dark grey to rusty colour with clay encrustation on the outside

**235: 76**

5.7 x 4.7 x 2.8 cm                      88g                      C.118

Large piece of vitrification, roughly rectangular piece. One side: dull to shiny greenish black vitrification. Other sides: shiny milky grey vitrification with a lot of cavities (air bubbles)

**235: 77**

2.4 x 2.4 x 1.9 cm                      9g                      C.106a

Light piece of greenish black vitrification. Glassey structure all round.

**235: 79**

2.9 x 2.4 x 1.4 cm                      7g                      C.121

Irregular lump of vitrification, reddish-black, dull with clayey inclusions

**235: 81**

1.2 x 1.2 x 0.8 cm            4g            C.117

Irregular lump of black encrustation

**235: 82**

5.3 x 3.7 x 3.5 cm            29g            C.121

Medium dense, irregular lump. Rusty and grey-brown colour with a few imprints of small charcoal pieces

**235: 84**

2.8 x 2.7 x 1.1 cm            6g            C.121

Vitrified clay. Irregular shape, possibly slightly concave. Vitrification is dull, black and 3 mm thick. Fabric is fine grained clay, creamy to orange without inclusions.

**235: 85**

0.9 x 0.9 x 0.9 cm            1g            C.117

Small slag droplet

**235: 86 [a]**

10.7 x 6.5 x 6.5 cm            461g            C.100

Half bun-shaped piece of slag. Upper side irregular, partially dull grey, partially rusty coloured. Lower side is more or less regular convex, also grey combined with rusty colour.

**253: 86 [b]**

9.9 x 8.9 x 2.2 cm            253g            C.100

Bun-shaped piece of slag. Upper side rather flat with shiny grey areas, but mostly covered in a rusty concretion. Lower side is roughly convex, nearly entirely rusty coloured

**253: 86 [c]**

8.6 x 4.5 x 3.6 cm            216g            C.100

Part of a bun-shaped piece of slag (old fracture). Upper side: dull, light grey, rather irregular surface

with some imprints of small pieces of charcoal. Fracture: Light grey with some medium sized and multiple smaller cavities (air bubbles). Lower side: convex with a creamy to light grey colour

**253: 86 [d]**

[numbered as E253: 154 on piece]

8.0 x 5.9 x 2.6 cm                      166g                      C.100

Part of larger, bun-shaped piece of slag (old fracture). Upper side: Irregular, small area of shiny grey, rest clayey, rusty colour. Some imprints of small charcoal pieces. Fracture: shiny milky grey. Lower side: smooth rusty coloured

**253: 86 [e]**

8.1 x 6.1 x 4.2 cm                      132g                      C.100

Half bun-shaped piece of slag. Upper side: rather smooth, mostly rusty coloured with a small area of limited crystallisation (fayalite?). Lower side: very irregular, rusty coloured.

**253: 86 [f]**

6.4 x 5.0 x 2.6 cm                      69g                      C.100

Irregular shaped piece of slag. Upper side: dull grey, clayey and rusty coloured with a concretion of small stones at one side. Also two cavities (air bubbles). Lower side: dull grey, clayey and rusty coloured.

**253: 86 [g]**

3.8 x 2.6 x 2.8 cm                      21g                      C.100

Slightly convex piece of vitrified clay. Upper side: shiny to dull greenish grey glaze. Fracture (modern?): layered structure (lower side to upper) pinkish fine grained clay (16 mm), slag (7 mm), grey fine grained clay (4-6 mm), pinkish-orange fine grained clay (3 mm) upper greenish grey vitrification.

**253: 86 [h]**

2.8 x 2.4 x 1.5 cm                      7g                      C.100

Small rusty lump with vitrification adhering. Vitrification is shiny greenish-black, 0.9 cm thick.

**253: 86 [i]**

2.1 x 1.4 x 0.8 cm                      5g                      C.100

Small, rather dense piece of slag with grey metallic shiny colour.

**253: 86 [j]**

3.3 x 2.8 x 2.6 cm	16g	C.100
3.3 x 2.5 x 1.2 cm	13g	

Two pieces of dark dull to shiny brown-grey slag with smooth flow structure

**253: 86 [k]**

4.0 x 2.7 x 1.8 cm	10g	C.100
3.4 x 2.4 x 1.6 cm	9g	

Two pieces of shiny greenish black vitrification with clayey components

**253: 86 [l]**

X	336g	C.100
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Twelve pieces of dark brown to rusty irregular lumps

**235: 87**

4.4 x 4.0 x 2.3 cm	34g	C.100
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Roughly triangular piece of slag. Upper side shows very slight indications of flow pattern with one impression of a medium sized charcoal fragment. Other sides have grey vitrified areas with small cavities (air bubbles) and black to dark-brown coloured areas with impressions of small charcoal fragments

**235: 89**

5.3 x 3.2 x 2.6 cm	37g	C.121
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Slag piece. Upper side is shiny dark grey with rusty areas. Lower side is half crystallised (fayalite), half rusty

**235: 90**

6.2 x 6.0 x 2.9	74g	C.121
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Roughly circular bun-shaped slag piece. Broken into three pieces. Exterior is friable, dark brown encrustation. Interior is dark grey to rusty slaggy material

**235: 92**

8.0 x 5.1 x 5.1 cm                      117g                      C.121

Roughly rectangular shaped piece of slag with an 'extension' on the lower side. Reddish-brown to grey colour with rusty areas. Indications of flow structure. Imprints of small charcoal fragments on the back of the 'extension'.

**235: 94[a]**

6.6 x 5.8 x 4.3 cm                      115g                      C.121

Slag with clay. The slag is dark and glassy, highly vitrified with small to large cavities (air bubbles). The clay has a convex smooth surface. It is creamy to pinky coloured and has a fine grained texture without inclusions. Tuyere fragment.

**235: 94 [b]**

2.6 x 2.4 x 1.2 cm                      6g                      C.121

Vitrified clay. Vitrification is greenish black and thin (1 mm). Fabric is fine grained clay, creamy to orange, without inclusions

**235: 95**

1.6 x 1.4 x 1.1 cm                      1g                      C.111

Vitrified clay. Vitrification is greenish black and 4 mm thick. Fabric is fine grained, pinkish-grey clay without inclusions

**235: 111**

4.5 x 3.2 x 2.6 cm                      15g                      C127

Light, irregular lump. Rusty coloured with some imprints of small pieces of charcoal

**235: 112**

11.1 x 8.9 x 4.2 cm                      414 g                      C127

Bun-shaped slag piece. Encrusted with numerous gravel and small stone fragments on both the upper and lower sides. Broken in two pieces. Interior is dark grey to brown and goes over to more rusty towards the exterior. Shows imprints of small pieces of charcoal.

**235: 114**

3.1 x 2.6 x 1.9 cm                      9g                      C121b

Light piece of encrustation formed around medium sized charcoal pieces. Slightly vitrified.

**235: 115**

3.7 x 2.6 x 2.3 cm                      11g                      C121b  
2.9 x 1.9 x 1.4 cm                      6g

Concretion of clay, pebbles and gravel held together by black material, possibly very slight vitrification

**235: 117**

9.4 x 8.3 x 3.2 cm                      241g                      C121b

Flat, roughly circular piece of slag. Upper side is dark grey with minor indications of flow structure and some rusty areas. Lower side is irregular and rusty coloured

**235: 122**

3.2 x 2.9 x 1.8 cm                      7g                      C133a

Vitrified Clay. Vitrification is dark grey to black going over to the colour of the fabric on one side and is between 2 and 3 mm thick. Fabric consists of fine grained creamy grey clay. Contains a 5 to 10 mm large inclusion of a rounded stone, but otherwise no inclusions.

## Summary of the metalworking debris per context

### **C.100: topsoil (1748g)**

Five pieces or fragments of bun-shaped slag (235:86[a] - [e])

15 undiagnostic pieces of slag (235:86[f], [i] and [l] and 235:87)

Two pieces of vitrified clay (235:44 and 86[g]) and two pieces of slag with vitrification (235:86[h] and [k])

Two pieces of dark dull to shiny brown-grey slag with smooth flow structure (235:86[j])

### **C.106a: fill of large industrial pit (9g)**

One piece of vitrification (235:77)

### **C.111: fill of bulldozer/cultivation trench (80g)**

Dense roughly finger-shaped slag piece (235:67).

Two pieces of vitrified clay (235:68 and 95).

One irregular rusty lump (235:72) and 11 fragments of one piece of slaggy material (235:75).

**C.112: fill of linear feature cutting C.117 (15g)**

One piece of vitrified clay (235:69).

**C. 117: redeposited boulder clay in SW corner of cutting 1 and in cutting 2 (6g)**

Two pieces of encrustation (235:70 and 81) and a small slag droplet (235:85)

**C.118: fill of foundation trench of structure 2 (88g)**

One large piece of vitrification (235:76)

**C.121: backfill over the souterrain capstones (391g)**

One roughly bun-shaped piece of slag (235:90)

One tuyere fragment with adhering slag (235:94[a])

Two pieces of vitrified clay (235:84 and 94[b]) and a piece of vitrification (235:79)

Three undiagnostic slag pieces (235:82, 89 and 92)

**C.121b: backfill in souterrain trench (267g)**

One roughly circular piece of slag (235:117) and two pieces of encrustation/concretion (235:114 and 115)

**C.127: burnt spread within souterrain (429g)**

One bun-shaped slag piece (235:112) and an irregular lump (235:111)

**C. 133a: fill of souterrain vent (7g)**

One piece of vitrified clay (235:122)

**C.252: linear cut**

Small piece of vitrification (235:38)

## Discussion

Small to medium sized bun-shaped pieces of slag, without a well formed flow structure, are known as Smithing Hearth Cakes (SHC's) and are one of the characteristic finds connected to iron smithing activity in Pre-modern times. Although slag with flow structure is typical for smelting sites, small amounts can occur on smithing sites (Crew 1996:2).



A variety of options can be employed to protect the wooden bellows-end from the heat in the hearth/furnace. Sometimes a simple hole in the heart/furnace clay structure will suffice. Alternatively, specially made clay (or later, iron) tuyeres will be inserted into the clay structure or used on their own. Early and Late Medieval Irish smithing sites seem to be characterised by the presence clay tuyeres (Young 2009: 87, 92).

Fragments of vitrified clay can represent the reaction of fuel ash with either a furnace wall, a smithing hearth clay superstructure, clay lining or a clay tuyere. The slightly concave pieces of vitrified lining might indicate the presence of the use of a clay wall or lining as part of the smithing hearth construction, but as the tuyeres are 'digested' during the ironworking they could also belong to deformed tuyeres. The pieces of vitrification, often called 'fuel ash slag', are the result of the interaction of the fuel ash and any clay material around, and can occur on either smelting or smithing sites.

It can be reasonably assumed that the metalworking debris retrieved at Liscahane is the result of iron smithing. No indications for the working of non-ferrous metals were noted, such as crucibles, green staining, etc.

Most of the metalworking debris was found in topsoil and in disturbed contexts, but the occurrence of a piece of slag in the foundation trench of structure 2 would indicate at least part of the metalworking activity was contemporary or older than this structure.

## Bibliography

- Crew P. 1996. *Bloom refining and smithing slags and other residues*. (=Historical Metallurgy Society. Archaeology Datasheet 6).
- Young T. 2009. Archaeometallurgical residues from Coolamurry 7, 04E0323. (= GeoArch Report 2006/10). In D. A. McCullough *N30 Moneytucker to Jamestown Re-alignment: Archaeological Resolution. Final Report 04E0323. Site 7 Coolamurry Townland, Co. Wexford*. Valerie J. Keeley Ltd: 65-138.