Report on the metalworking remains at Portmarnock, Station Road, Co. Dublin (16E0613)

Dr. Paul Rondelez
Macroom, Co. Cork

27 January 2018

Introduction

Archaeological excavation at Station Road, Portmarnock, Co. Dublin uncovered a circular enclosure. Several of the fills of the enclosing ditch as well as internal features produced iron slag and vitrified ceramic material (total: 5975g). The material is related to secondary iron smithing, evidenced by smithing hearth cakes and tuyere fragments, and the production of copper-alloy objects using crucibles. The site is a further example of an enclosed Early Medieval site with both limited ironworking and production of non-ferrous metals.

Description of the material

Most of the metalworking material was recovered from the enclosing ditch (C49/C50/C124). This material included six smithing hearth cakes (Figs. 1 and 2) next to smaller and more fragmentary material from the southern part of the ditch and two smithing hearth cakes and other slag from the northwestern part of that ditch. Radiocarbon analysis on organic material from a basal fill of this ditch returned a date of AD 429-600 (all dates 2 sigma) while material from two mid-fills returned dates of AD 417-620 and AD 561-646.

Close to the southern part of the enclosing ditch, cereal-drying kiln C261 yielded a small amount of slag. Organic material from the same fill as this slag returned a radiocarbon date of AD 883-1011.

A small lump of slag was recovered from the upper fill of another cereal-drying kiln, C119, located further to the north while a smithing hearth cake with adhering hammerscale was recovered from a mid-fill of that kiln. A soil sample from the basal fill of this kiln yielded no magnetic material while a soil sample from the fill with the smithing hearth cake yielded flake hammerscale. Radiocarbon analysis on organic material from the basal fill of this kiln returned a date of AD 408-585.

To the west, a pit (C138) measuring 0.78m by 0.82m yielded eight pieces of slag from its upper fill and ten pieces from its lower fill. Flake hammerscale was retrieved from a soil sample of the lower fill.

Further west again, near the western part of the enclosing ditch, further metalworking waste was found in two pits. Pit C156 was large and shallow and contained seven fragments of vitrified tuyere front, possibly all belonging to the same piece. A soil sample from the same fill yielded no magnetic material. Three more fragments of vitrified tuyere front (Fig. 3) were recovered from pit or well C154 as well as a fragment of a crucible. Organic material from the same fill as the tuyere fragments returned a date of AD 428-608.

A linear feature C87 crossed the interior of the enclosure from south east to north west. Three pieces of slag and a crucible fragment (Fig. 4) were recovered from this feature. Radiocarbon analysis on organic material from the basal fill of this linear returned a date of AD 419-547. A parallel linear C249 yielded six pieces of slag and a further crucible fragment.

Two fragments of weathered vitrified tuyere material were found in a linear feature C307, to the north of the former.

Discussion

Apart from small undiagnostic pieces, all the slag is recognizable as partial or complete smithing hearth cakes. Smithing hearth cakes form during smithing below the iron and are accumulations of lost iron, clay from the bellows protectors and impurities within the hearth or the fuel.

The weights of the smithing hearth cakes, varying between 168g and 1340g, are typical of secondary ironworking. Assemblages related to primary bloom processing generally include cakes weighing several kilograms.

Some pieces of slag show flow structure. While flow structure is typical for smelting slag it is also frequently observed with assemblages related only to smithing.

The evidence for the Early Medieval period in Ireland points to smiths consistently using clay tuyeres, the circular fronts of which becomes vitrified during use. This is reflected by the material from Portmarnock.

The three crucibles fragments have a very similar creamy white fabric. The shape suggested by the rim sherd from linear feature C87, bag-shaped base under a near-vertical rim, is not a common crucible type in Ireland (Comber 2004:33). The red glaze on two of the fragments point to copper alloys being used.

Pit C138, containing both slag and hammerscale, was likely a smithing hearth while the hammerscale from kiln C119 indicates that this feature was used for smithing work.

Based on the radiocarbon dates, the enclosure was occupied in the fifth to seventh centuries. Kiln C261, which also yielded some slag, appears to be of a younger date.

Conclusions

Metalworking activity at the circular enclosure at Portmarnock consisted of small-scale iron- and copper working mainly dated to the fifth to seventh centuries.

The ironworking waste is derived from secondary iron smithing activities, evidenced by smithing hearth cakes and vitrified tuyere fragments. The several kilograms of ironworking waste recovered suggest a limited activity. Small-scale smithing has been observed at other contemporary enclosed sites, for example at Baronstown 1 (Linane and Kinsella 2009) and Roestown 2 (O'Hara 2009). Interestingly, at Baronstown, and other sites, some of the slag was also recovered from cereal-drying kilns. This could suggest that the smithing carried out at these sites was related to the harvesting period when perhaps the agricultural tools were repaired.

Limited evidence for non-ferrous metalworking is also known from Early Medieval enclosed sites. Small amounts of crucible fragments were recovered from Roestown 2, Co. Meath (O'Hara 2009) and Faughart Lower, Co. Louth (Bowen and Dawkes 2011)

Bibliography

Bowen P. and Dawkes G. 2011 *Report of Phase 2 Excavations at Site 116 Faughart Lower, Co. Louth*. Unpublished final excavation report, Archaeological Development Services Ltd.

Comber M. 2004 *Native Evidence of Non-ferrous Metalworking in Early Historic Ireland* (= British Archaeological Reports, International Series 1296), BAR Publishing, Oxford.

Linane S. J. and Kinsella J. 2009 *Report on the archaeological excavation of Baronstown 1, Co. Meath*. Unpublished final excavation report, Archaeological Consultancy Services Ltd.

O'Hara R. 2009 *Report on the archaeological excavation of Roestown 2, Co. Meath*. Unpublished final excavation report, Archaeological Consultancy Services Ltd.

Catalogue

Material not related to metalworking is listed in italics

Cut	Slot/ Quadrant	Fill	Feature type	Description	Weight (g)
49	5/6	66	Enclosing ditch	Piece of rather light slag with many cavities caused by charcoal inclusions	167
49	9	118	Enclosing ditch	Large rather dense and bun-shaped Smithing Hearth Cake. Lower surface is rather smooth while the upper surface is irregular due to many imprints of charcoal fragments.	762
49	9	118	Enclosing ditch	Small fragment of rather dense slag.	44
49	9	122	Enclosing ditch	Three pieces of light slag-like material	48
50	15/16	258	Enclosing ditch	Rather dense and rather irregular Smithing Hearth Cake. Oxidized surface. Contains embedded charcoal inclusions.	560
87	E5	88	Linear	Two fragments of rather dense slag. The larger piece has embedded charcoal.	150
87	D5	88	Linear	Small piece of rather dense slag with charcoal impressions.	10
87	G5	266	Linear	Crucible fragment. Rim sherd of a small crucible (estimated original diameter 50mm, estimated original height 35mm, max. thickness 10mm). Bag-shaped base but with near-vertical rim above a . Inner vitrification is brown, red and green, the latter two indicating the metal melted was copper.	4
87	*E5*	*288*	*Linear*	*Two pieces of natural stone (quartz-like)*	
87	*E5*	*288*	*Linear*	*Highly vitrified unknown substance. Likely not related to metalworking activities*	
92	*H5*	*127*	*Pit*	*A sample (50g) of the flotation residue contained no magnetic material*	
119	G5	120	Kiln	Small rather light lump of slag with multiple charcoal impressions	16
119	G5	123	Kiln	Small rather dense, rather irregular Smithing Hearth Cake. Has embedded charcoal fragments	168
119	G5	123	Kiln	A sample (50g) of the flotation residue contained flake hammerscale	1
119	*G5*	*125*	*Kiln*	*A sample (50g) of the flotation residue contained no magnetic material*	

124	14	158	Enclosing ditch	Large dense Smithing Hearth Cake. Upper and lower surfaces are relatively smooth. Has embedded charcoal fragments.	1340
124	14	158	Enclosing ditch	Small lump of rather dense slag	27
124	14	159	Enclosing ditch	Rather dense irregular Smithing Hearth Cake. Might consist of two cakes fused together. Lower surface is rather smooth while the upper surface is rather irregular	673
124	11	170	Enclosing ditch	Rather dense bun-shaped Smithing Hearth Cake. Lower surface is rather smooth while the upper part has a squarish protrusion.	507
124	11	170	Enclosing ditch	Fractured small lump of unusual light slag. The lower part is light brown and the upper part light grey. It appears to have very low iron content.	27
124	14/15	200	Enclosing ditch	Very elongated rather dense Smithing Hearth Cake. It has embedded charcoal.	389
124	*14/15*	*200*	*Enclosing ditch*	*Two small lumps of compacted (heat-affected?) clay. Probably not related to metalworking activities*	
124	*13*	*216*	*Enclosing ditch*	*Small lump of heat-affected clay. Probably not related to metalworking activities*	
124	*16*	*245*	*Enclosing ditch*	*Seven fragments of friable heat-affected clay. Probably not related to metalworking activities*	
138	E6	139	Smithing hearth?	Eight pieces of rather light to rather dense slag. All are irregular, except one which shows distinct flow structure	76
138	E6	145	Smithing hearth?	Ten small fragments of irregular, rather dense slag. Some pieces have embedded flake hammerscale and charcoal	113
138	E6	145	Smithing hearth?	A sample (50g) of the flotation residue contained small amounts of flake hammerscale	1
154	D6	155	Deep pit/well	Three fragments (two fitting) of very likely the same vitrified ceramic tuyere front. The tuyere appears to have originally been circular, but the diameter cannot be estimated	263
154	D6	242	Deep pit/well	Fragment of light grey thin-walled (6mm) ceramic vessel. Lightly vitrified on both surfaces and spots of red vitreous material on the outer surface. Crucible fragment.	2

156	D6	157	Pit	Seven fragments of vitrified tuyere front. Although none appear to fit they likely belong to one tuyere	196
156	*D6*	*195*	*Pit*	*A sample (50g) of the flotation residue contained no magnetic material*	
168	*H7*	*187*	*Pit*	*A sample (50g) of the flotation residue contained only natural stone attracted by the magnet.*	
168	*H7*	*187*	*Pit*	*A sample (50g) of the flotation residue contained only natural stone attracted by the magnet.*	
214	*G7*	*213*	*Kiln*	*Lump of heat-affected clay with frequent inclusions of small pebbles. Probably not related to metalworking activities*	70
214	*G7*	*213*	*Kiln*	*Two samples (50g each) of the flotation residue contained only a few pieces of naturally magnetic material*	
249	C4	250	Linear	Five irregular pieces of rather dense slag. Some pieces have embedded charcoal	219
249	C4	250	Linear	Small fragment of light grey thin-walled (5mm) ceramic vessel with vitrification on its outer surface. Crucible material	1
249	E5	286	Linear	Small piece of rather dense slag	16
261	G7	292	Kiln	Four fragments of rather dense slag	105
261	*G7*	*292*	*Kiln*	*Two pieces of natural stone*	
307	G3	308	Linear	Two pieces of weathered vitrified tuyere material.	18

Figures

Fig. 1. Irregular smithing hearth cake from enclosing ditch C124

Fig. 2. Smithing hearth cake with cavities after charcoal from enclosing ditch C49

Fig. 3. Fragments of vitrified tuyere front from pit/well C154

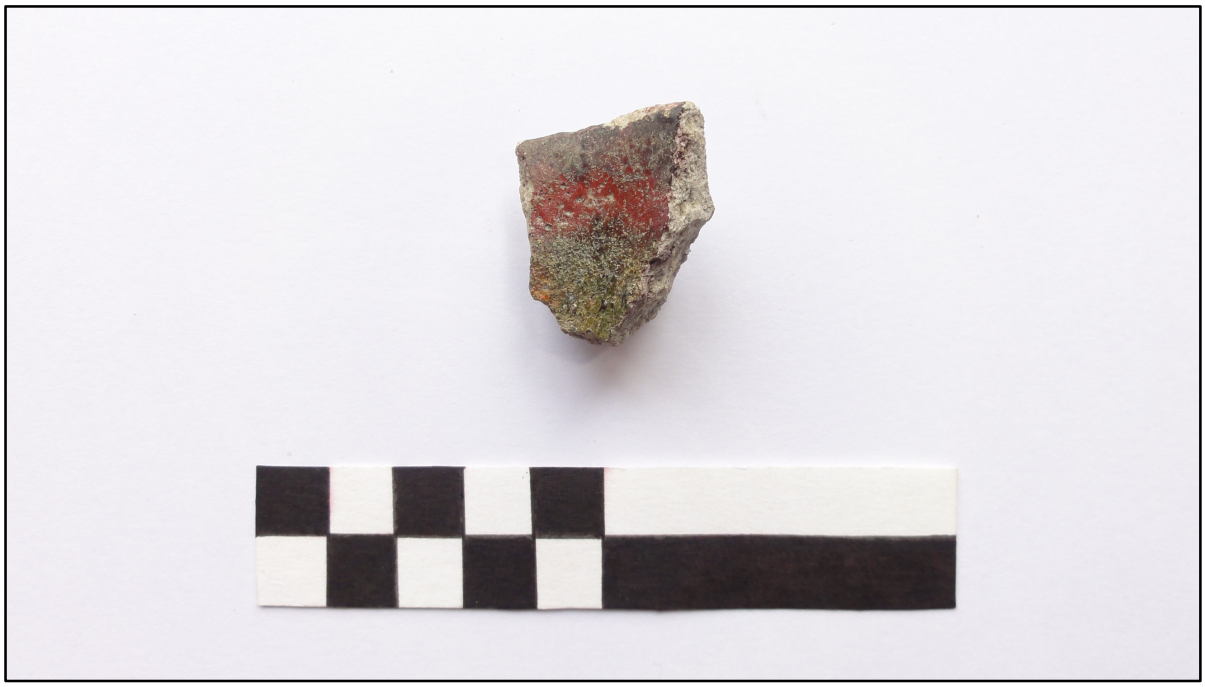

Fig. 4. Crucible fragment from linear feature C87