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Abstract

The site has produced evidence for a small area of metalworking focused on two pits (C66 and C68) which can be interpreted as smithing hearths with a reasonable degree of confidence. The residues indicate that the site was being used for blacksmithing – the end use of iron in the fabrication or repair of artefacts, and not any stage of the actual production of iron.

The style and size of the heaths, together with the nature of the residues can be compared with other examples of medieval smithies, with a particularly close comparison being able to be drawn with an example of 12th-13th century age at Coolamurry, Co. Wexford.

Methods

The materials were examined visually (with a low-powered hand lens or microscope as required). The catalogue is presented in Table 1. As an assessment, the material was not subjected to any high-magnification optical inspection, nor to any form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

Some of the material was supplied in an only partially washed state. These samples were washed and the resultant washings were passed through a 63µm sieve; the retained fines were then separated by magnet.

The assemblage derives from archaeological works at the Narrow Water Bridge Project (Walsh 2013).

This work was commissioned by Maeve Tobin, of the Irish Archaeological Consultancy.

Results

Distribution of the residues

The material principally comprises assemblages from the fill of pit C66 (C67: approximately 1.25kg of residues recovered) and pit C68 (C69: 300g of residues), together with the overlying spread (C4: c. 1.1kg of recovered residues). The assemblages from within the two pits included material rich in hammerscale (both flake and spheroidal hammerscale), slag droplets, slag prills and slag flats (including pieces with right-angled re-entrants that may have spalled from the smith's tools). Associated spreads of charcoal-rich deposits produced little metallurgical residue, except for one slag bleb from deposit C70.

A single piece of probably associated iron slag was recovered from the topsoil (C2).

A fill (C37) of the non-metallurgical kiln (C22) produced a single piece of glassy fuel ash slag.

Description of the residues

Macroscopic residues from iron working: the assemblage was dominated (by weight) by a small number of fragments and a few almost complete examples of smithing hearth cakes (SHCs). The examples interpreted as being reasonably complete had fragment weights of 172g, 362g, 412g and 682g. The SHC fragments shared a degree of common texture, with basal crusts with prilly to micro-prilly lower surfaces, a strongly and irregularly vesicular crust and an upper surface bearing charcoal moulds. One example contained clasts of rounded tabular gravel.

Associated fragments of fired ceramic and ceramic-derived slag were also strongly sandy to gravelly. The only fragment of hearth lining like material was too small to determine whether it was hearth lining or from the face of a large ceramic tuyère (as would be typical for an Irish early medieval site).

The slag fines include prills, blebs and spheroids typical of slag bodies formed by slag which did not become incorporated within the SHC, but chilled separately within the fuel bed of the hearth.

Hearth fill C69 also produced a spalled sheet of rock with a deeply vitrified face and a small flow of green glassy slag (probably the siliceous stone fluxed by the fuel ash).

Microscopic residues from iron working: the evidence for microresidues comes partly from deliberate collections from the two pits (samples #19 and #20) and partly from sieving at a finer grade of the residues from washing the macroscopic slag specimens (sample #41) from one of the pits (C66). The microresidues include slag flats (including examples with right-angled re-entrants that are commonly formed as slag becomes attached to smiths tools), slag blisters, and hammerscale (both flake and spheroidal). Hammerscale is also seen inside small concretions (C69) (for terminology and illustration of similar materials from Coolamurry see Young 2011).

Non-metallurgical slags: a single piece of friable, green glassy fuel ash slag (FAS) was retrieved from the fill of Kiln C22 and resembles FAS from non-metallurgical contexts (e.g. cereal kilns and domestic hearths; e.g. Young 2010b) elsewhere.

Fired clay: contexts associated with hearth C68 (C14 and C70) yielded small assemblages of fired clay. In both case the clay included examples with smooth, if sometimes complexly 'folded' pale faces. These ceramics are silty, with little coarse quartz (unlike the evidence provided by the hearth lining/tuyère fragments); they do not show vitrified surfaces. These materials do not resemble any metallurgical ceramics and the pale surfaces may be contacts with a wood substrate (e.g. wattles). These are interpreted as being likely to be structural materials – although some clay finishing of a low-temperature section of hearth surround is a possibility.

Interpretation

The recovered assemblage is very small, but is indicative or iron working. The size of the SHCs is compatible with their origin in the end-use of iron (blacksmithing). There is no evidence for the site being involved in either the primary (smelting) or secondary (bloom-refining) stages of iron production.

The assemblage lacks evidence for the ceramic tuyères that are a typical feature of Irish medieval smithing, but given the very small size of the assemblage this may not be significant.

The two pits (C66: 0.82m by 0.54m by 0.11m deep; and C68: 1.46m by 0.99m by 0.21m deep; Walsh 2013) have similar axial ratios of 1.52 and 1.47 respectively. They contain good assemblages of both macroscopic and microscopic smithing residues. Such assemblages are not necessarily indicative of cut features being smithing hearths, since such residues would not normally be allowed to accumulate within the hearth during its period of use. The microresidues would be typical of those deposited very close to the hearth (or within the forge building, if the hearth was enclosed) – and transfer of material from floor to floor-level hearth is very easy. In this case, the morphology of the pits would be compatible with their origin as floor-level hearths.

The elongate hollow adjacent to C68 and filled with deposits interpreted as 'rake-out' deposits appears to have contained few, if any, pieces of metallurgical residue (unlike the reside-rich hearth fills) and the fired clay is interpreted above as being structural. It seems unlikely that the deposits are indeed rake-out – and may rather be structural elements back-filling an earlier worn working-hollow, associated with use of the hearth.

Hearth C68 has been dated been means of a willow charcoal, with a date of cal. AD1044–1218 (2σ) (UBA 24998). This date suggests an origin in the 11th-13th centuries, broadly the same as the evidence for the hearths at Coolamurry (Young 2008a). This site provides a very close analogue for Cornamucklagh – not only in date, but in the style of residue, style of hearth and overall style of deposits. Coolamurry possessed three smithing hearths, each associated with a spread of degraded smithing residues and charcoal. There was some evidence for at least one of the hearths at Coolamurry being enclosed within a structure (smithy) of some sort. A further similarity of Coolamurry with Cornamucklagh was the occurrence of pottery in the gullies of the structure – and reasonable pottery assemblages are not common on iron working sites.

Comparable floor-level smithing hearths have been found on many broadly contemporary sites. These include the following examples, which have also yielded evidence for end-use blacksmithing:

Killeany 1 (Young 2008b)
- (F237): 1.37m x 0.9m and 0.16m deep
- (F264): 1.49m x 0.94m and 0.17m deep

Dunlo (Young 2010a*;* Cal AD 985-1028).
- (C16): 1.35m x 0.95m and 0.18m deep

Coolamurry (Young 2008a; 12th-13th century)
- (C27): 1m x 0.9m and 0.2m deep
- (C59): 0.92m x 0.82m and 0.30m deep.
- (C100): 1.2m x 0.8m

Garryleagh (Young 2009; Cal AD 1283-1318 & 1352-1390)
- (C13): 0.9m x 0.87m and 0.15m deep.

The residue assemblage of Cornamucklagh resembles that of Coolamurry, which had substantial deposits of fines in the hearths, but with associated slag spreads which yielded 41 substantially complete SHCs with a mean weight of 386g. The slightly younger smithy at Garryleagh yielded an assemblage of 25 SHCs with a mean weight of 331g. Garryleagh did yield ceramic tuyères, but these were not identifiable at Coolamurry – as at Cornamucklagh. It may be that for sites with the slag preserved in hearth fills and trampled spreads that the preservation potential of the tuyères is low.

In summary, the assemblage and the hearths closely resemble those of medieval smithies elsewhere. A particularly close parallel may be drawn with the 12th-13th century site at Coolamurry, Co. Wexford.

Evaluation of potential

The assemblage has little potential to provide further detailed information from further analysis at this time and accordingly none is recommended. Smithing assemblages of this period are not particularly common or well-known and so retention of the assemblage is advised.

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Table 1: Summary Catalogue

Context	Sample	Sample wt.	Item wt.	Notes
c2	s38	11.5		single blebby prill of sand rich slag
c4	s36	162.3		three pieces of soft ferruginous concretion with abundant mineralised plant debris, plus one piece, now fractured into three, of heavily vitrified siliceous material, probably gravelly hearth lining
c4	s37	1100	412	part of very dense SHC, tabular; 85mm x 100mm x 40mm; upper surfaces shows charcoal moulds and is accreted with plant-rich material; base gently curved, probably finely prilly
			172	fragment of slag sheet with microprilly base (probably SHC crust fragment), with irregular upper protuberance or accretion
			172	irregular prilly mass, probably a small SHC, 70mm x 70mm x 45mm
			102	prilly charcoal-rich SHC fragment
			96	prilly charcoal-rich SHC fragment
			30	iron-rich concretion
			10	slightly concave, very highly vitrified lining fragment, half with dark sandy glaze, the other half a greyer crystalline material. This has a flap around the margin at one end, just possibly a blowhole margin, but may just be crack. Rear shows sandy/gravelly matrix poor in clay.
			24	small microprilly slag fragment
			6	elongate rusty flow slag prill
			4	grey vesicular slag scrap with microprilly margin
			2	slightly lobate slag scrap
c14	s27	28.8		similar to sample 30 - but just one fragment shows a gently concave pale surface. More strongly burnt pale grey fragments full of shrinkage voids occur in both
c14	s27	<1		mainly small natural pellets, but includes one tiny slag blister
c37	s11	1.4		very pale green fuel ash slag, with smooth central lobe passing into cream-coloured spikes
c37	s39	43		fragmented piece of weathered metamorphic rock
c67	s20	22.3		small assemblage of slag blebs, fragments flats etc. with some accretions. Fines include FHS.
c67	s40	70		small fragments of highly concreted slag and stone. Slag mainly lining-rich but some dense fragments. Accretion includes FHS.
c67	s41	1160	682	125mm x 105mm x 65mm plano-convex SHC; broken at one end where it shows sediment contact on base - probably at burr; also has pebbles internally; away from burr the lower bowl fades, becoming prilly, but upper slab is better developed, giving two-layer appearance; top of slab has charcoal impressions
			362	(85mm) x 105mm x 55mm (bowl 40mm), broken slightly irregular SHC; base well formed, strongly curved, microprilly; top accreted but shows raised lobes above large vesicles, internally appears to have crust 8-15mm thick, which is strongly and irregularly vesicular. [washed matrix sieved at 63 microns and rich in FHS with some SHS, together with fine slag debris and rusty material]
c69	s19	171		mixed assemblage of small fragments, mainly blebby flows of partially-melted rock, sand and slag, including nice flow slag around fine charcoal. Also contains glazed stones and several pieces of smithing floor concretion rich in FHS. Fines include FHS and SHS, also slag flats including right-angled ones (from tools) and slag spheroids.
c69	s43	117.5		spalled face from large heat-affected glazed stone with prominent green glassy slag flow down wall.
c70		49.3		oxidised fired silty clay fragments with small (clay?) pellets; commonly shows a complexly folded pale surface - possibly a contact with (wattle?) substrate
c70		3.3		rounded bleb of slightly sandy slag, dished one side, probably a very viscous bleb of lining slag
c111	s29	<1		ashy stone fragments

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