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Assessment of materials from Flore, Glassthorpe, Northamptonshire

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Abstract

The submitted assemblage comprised 55 fragments of fuel ash slag (FAS) with a total weight of approximately 1kg from 8 distinct archaeological contexts. The largest piece was a substantial block weighing 818g.

Although FAS may be produced by a wide variety of mostly non-metallurgical processes, the presence of a large block is suggestive of the slag produced in long-lived domestic hearths, particularly during the Iron Age. Such slags have been referred to informally in the past as 'Iron Age grey slag'.

Contents

Abstract 1

Contents 1

Methods 1

Results 1
Fuel ash slag 1

Interpretation 1

Further work 2

References 3

Table 1: summary catalogue 4

Methods

All materials were examined visually, using a low-powered binocular microscope where required. The identifications of materials in this report, as an assessment during which no instrumental analysis was undertaken, are necessarily limited and must be regarded as provisional.

This assessment was conducted in July 2023 and was commissioned by Rhiannon Philp of Archaeology Wales. The materials derive from evaluation work undertaken at Glassthorpe, Flore, Northamptonshire (FGN/22/EV).

Results

Fuel ash slag

The collection includes 55 fragments (1063g) of variegated fuel ash slag. The slag is mostly quite heavily fragmented, but there is one substantial block from a sheet at least 100mm in thickness. The vesicularity is variable but is mostly coarse. Some pieces show enclaves of much more finely vesicular material, possibly indicating the incorporation of fragmental material from the hearth wall, as well more gradual incorporation of finely granular material.

Some individual context assemblages are of slightly more finely vesicular texture, leading to a slightly denser slag. These pieces are markedly darker in colour than typical and they contain abundant coarse sand grains.

Interpretation

Fuel ash slags are formed by the partial melting of silica- and alumina-rich hearth materials under the fluxing influence of the alkali and alkali earth elements present in the fuel ash. The major fluxing elements are calcium and potassium in the wood or charcoal burning hearths. The partially melted material will contain relict grains (mostly of quarz). In geological terms such a material is a 'buchite'. The process may be enhanced by the presence of any additional calcium in the substrate.

Fuel ash slags are not characteristic of a particular process but indicate a hearth, particularly one cut into an unconsolidated substrate, that has spent a considerable time at elevated temperature. Several archaeologically significant processes/installations may produce FAS under appropriate conditions. Probably the most common of these is within cereal drying kilns. (e.g. South Hook, Young 2010a, 2010b; Llandeilo, Young 2015; Bornais, Young 2012a, 2020).

Larger hearths may produce correspondingly larger and thick FAS blocks. Mound1 at Bornais, for instance, produced a large quantity of FAS in much larger fragments of sheet-like cakes (Young 2012a), apparently from large Late Norse hearths. Similarly, domestic hearths are the probable source for the 'Iron Age grey slags' that occur in Middle Iron Age contexts and that have been particularly recorded in central and eastern England (Cowgill 2000, 2008; Cowgill *et al*. 2001; Swiss & McDonnell 2001; Young 2009, 2011, 2013; Young & Bowstead Stallybrass 2003). A particularly large deposit was encountered in association with the hillfort bank at Malmesbury (Young 2011).

The association of FAS of this type with the Middle Iron Age is likely to be cultural, maybe due to the continuous maintenance of a substantial, perhaps communal, hearth fire.

Further work

Detailed analysis would be unlikely to be capable of providing further evidence for the precise nature of the origin of these residues. Consequently, no further investigation is recommended.

References

COWGILL, J. 2000, Assessment report on the slags recovered from the excavations at Billingley Thorpe, Thurnscoe, South Yorkshire (BDT99). Archive report produced for Northern Archaeological Associates.

COWGILL, J. 2008, Report on the slag and associated finds from Normanton Industrial Estate (NOI 06). Archive report produced for West Yorkshire Archaeology Service

COWGILL, J, MACK, I., and McDONNELL, G., 2001, Report on the slags and related material from Grange Park, Courteenhall, Northamptonshire (GPC 99). Publication report produced for Birmingham University Field Archaeology Unit.

SWISS, A.J. & McDONNELL, G. 2001, Report on the Analysis of 'Iron Age Grey' Slag from the Conoco Site at Killingholme, Lincolnshire, CNK00. Archive report produced for Humberside Field Archaeology.

YOUNG, T. 2005. Site Activities: slag and related materials. pp. 174-176. In: Niall Sharples (ed.), *A Norse Farmstead in the Outer Hebrides. Excavations at Mound 3, Bornais, South Uist*. Oxbow Books, Oxford.

YOUNG, T.P. 2009. Evaluation of possible archaeometallurgical resides from Malmesbury, Wiltshire. *GeoArch Report 2009/15*, 2pp.

YOUNG, T.P. 2010a. Fuel ash slags from corn-drying kilns, South Hook LNG Terminal. *GeoArch Report 2010/04*, 24 pp.

YOUNG, T.P. 2010b. Fuel ash slags. p. 163 in: Crane, & Murphy K., Early medieval settlement, iron smelting and crop processing at South Hook, Herbranston, Pembrokeshire, 2004-05. *Archaeologia Cambrensis*, **159**, 117-196.

YOUNG, T.P. 2011. Possible archaeometallurgical residues pp. 89-90 in: M. Collard & T. Havard. The prehistoric and medieval defences of Malmesbury: archaeological investigations at Holloway, 2005-2006. *Wiltshire Archaeological & Natural History Magazine*, **104**, 79-94.

YOUNG, T.P. 2012a. The slag. pp. 289-295 In: Niall Sharples (ed.) *A Late Iron Age farmstead in the Outer Hebrides Excavations at Mound 1, Bornais, South Uist*. Oxbow Books.

YOUNG, T.P. 2012b. Evaluation of archaeometallurgical residues and associated material from Tai Cochion & Trefarthen Roman settlement, Anglesey (G1632-T, G1632). *GeoArch Report 2012/20*, 12pp.

YOUNG, T.P. 2013. Assessment of pyrotechnological residues from Eaton Camp, Herefordshire. *GeoArch Report 2013/22*, 3pp.

YOUNG, T.P. 2015. Fuel ash slags from Ysgol Bro Dinefwr, Llandeilo, Carmarthenshire. *GeoArch Report 2014-32*. 20pp.

YOUNG, T.P. 2020. The slag. *pp.* 51-56 *in:* Niall Sharples (ed.) *The Economy of a Norse Settlement in the Outer Hebrides; Excavations at Mounds 2 and 2A, Bornais, South Uist*. Oxbow Books.

YOUNG, T & BOWSTEAD STALLYBRASS, H.S. 2003. Metallurgical residues and related materials. In: Thomas, A, Holbrook, N and Bateman, C. Later Prehistoric and Romano-British burial and Settlement at Hucclecote, Gloucestershire: Excavations in advance of the Gloucester Business Park Link Road, 1988. *Bristol and Gloucestershire Archaeological Report No. 2*. 52-55.

Table 1: summary catalogue, weights in g,

context	sample	label	l wt	l no	notes
18006			818	1	large block of fuel ash slag, variegated, mostly grey with whiteish patches, some reddening on lobes, some red/purple sediment, voids up to 75mm, 100mm thick, way-up is unclear, probable base shows crude lobes and an almost ropey texture, opposing face is a fracture.
18009			58	16	sandy grey FAS, mostly fine grained, just a few pieces of more coarsely vesicular nature
18009	504	slag/burnt fuel ash slag	1.44	5	small fragments of fuel ash slag
18009	504	slag	0.83	18	small fragments of fuel ash slag
20001			28	1	crudely lobate dark grey FAS
22006			90	5	variegated dark FAS, some almost black, but with pale patches, some browner zones, coarse sand widely distributed
25010			14	1	grey fuel ash slag with a reddened lobe surface, bears more finely vesicular orange clasts
29012			1	2	small fragments of FAS, one shows glassy surface suggesting a prill-like morphology
32006			52	5	fragments of grey FAS with reddened lobate surfaces
1340001	7	slag	0.09	1	worn fragment of silty FAS

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