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Evaluation of archaeometallurgical
residues from AA06/86, High Street &
St Mary's Lane, Much Wenlock

Dr Tim Young
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Dr T.P. Young

Abstract

This assemblage comprised 16 pieces of archaeometallurgical residue weighing approximately 2kg. The assemblage was probably all derived from iron working (blacksmithing). The assemblage included three substantially complete smithing hearth cakes. These had weights of 164, 670 and probably about 830g. The presence of SHCs with weights over 0.5kg is typical of smithing assemblages of medieval and early post-medieval age, and is contrast to earlier periods.

Several of the pieces in this assemblage, including both the large SHCs, show clear evidence of coal having been used as fuel (in addition to charcoal in some instances). The timing of the adoption of coal as fuel for smithing is very variable. After a period of common usage in the Roman period, coal becomes employed again in the Middle Ages, but does rise to prominence until post-Medieval times, with charcoal usage persisting in some areas and for some purposes into the 20th century. The large size of the SHCs is in contrast to modern forge clinkers however, and probably indicates the use of a ceramic tuyère or a blowhole in a clay wall, rather than the iron tuyère which becomes adopted in the 19th century.

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Methods

All the material from the collection was inspected visually (and with a low-powered stereo-microscope where necessary) and recorded to a spreadsheet (the content of which is presented as Table 1).

As an evaluation, the materials were not subjected to any high-magnification optical inspection, nor to any other form of instrumental analysis (with the exception of representative examples of the crucible sherds). The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

Results

The catalogue is presented in Table 1.

The material includes material which can either be assigned to with certainty to an origin in iron-working (blacksmithing) or which is compatible with such an origin. Accordingly it is not anticipated that the material contains material from other processes.

The most significant components of the assemblage are the three smithing hearth cakes (SHCs). One of these is small (164g) and only yields evidence for charcoal fuel. But the other two are large (670g and an interpreted original weight of about 830g). Both of these large cakes and one of the smaller slag fragments showed evidence for coal-shale inclusions, both as well-reserved superficial inclusions, and as pale, partially-melted, fragments incorporated within the body of the slag.

The smaller slag fragments were all either certainly or possibly fragments derived from broken SHCs.

One piece within the collection was a corroded iron fragment. This piece was labelled a "gromp", a term more properly reserved for the detached pieces of bloom formed in a smelting furnace, rather than iron debris from the smithing process.

Interpretation

The material can all be referred to blacksmithing. The observation of the use of coal as a fuel is important, particularly if the material is actually medieval rather than later. The introduction of coal as a smithing fuel is not well documented.

The relatively large size of the SHCs would place them at the upper limit of the size observed in Roman blacksmithing assemblages (e.g. the largest SHCs at Marsh Leys Farm, Beds, was 824g and at Carmarthen 820g, with average SHC weight of those assemblages 333g and 227g; Young 2005 and Crew 2003 respectively). Large collections of medieval blacksmithing residues do, however, include a significant proportion of larger cakes. Average SHC weight in period 8 (11th-13th centuries) at Worcester Deansway was 492g, rising to 499g in period 9 (13th-15th centuries), with maximum SHC weight 1490 and 1800g for the two periods respectively (McDonnell & Swiss 2004). At Burton Dassett McDonnell (1992) recorded a maximum SHC site of 1670g with an average of 550g, for a 14th-15th century assemblage. The present material compares favourably with these medieval assemblages.

Late post-medieval coal-fired forges tend to produce rather poorly consolidated "clinker" rather than the dense SHCs of the type seen here. This probably reflects the greater fluxing of the iron-rich debris by molten material derived from the hearth lining and/or the ceramic tuyère in early forges when compared with the modern system employing a cast-iron tuyère. The date of introduction of iron tuyères is not well known, but would appear to be late 18th or 19th century.

The small volume of material recovered would indicate smithing close to, but probably not within the immediate area of the excavated site.

Evaluation of potential

The potential for small smithing assemblages to yield useful information on analysis is rather limited, and detailed analysis of such an assemblage would not normally be recommended. However, if the large SHCs can be firmly dated as being medieval, then documentation of their composition would have potential for assisting with understanding of the introduction of coal into the smithy.

References

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		<i>Context</i>	<i>Weight(g)</i>	<i>Notes</i>
AA06	86	53	24	Vitrified and vesicular piece with very low density - probably a vitrified stone rather than a slag
			38	Small piece of broken vesicular slag, similar to other pieces here, fractured along large coal inclusion
			216	Probably deformed small SHC fragment. Textures similar to large lump below
			62	Dense vesicular slag, broken from the large SHC below
			662	Incomplete SHC, probably less than 20% missing (of which 62g piece above is part). Top with flow lobes with maroon sheen in places. Base rough to microdimpled, strongly convex. Fuel residues include both coal and probable charcoal debris. 85x115x65mm of which dense bowl is 50mm. Top shows curved smooth margin, 62g fragment attaches to this edge which suggests it was the distal side
AA06	86	330	82	Corroded iron lump
			48	Vesicular indet. slag fragment
			90	7 fragments of indet. vesicular slag
AA06	86	558	164	Small SHC, 65x70x40mm, of which bowl 30mm, mainly flat topped with some marginal lobing, base lumpy but details obscured by accretion, accretion contains flake and spheroidal hammerscale and charcoal. Slag contains thin stick like charcoal pieces.
			670	Probably an essentially complete SHC, 95x105x70mm, slightly irregular biconvex form. Has clear coal residue inclusions (shale), upper surface not well preserved - has small area suggestive of a non-wetted contact (tongs?).

Table 1. Summary catalogue

GeoArch



geoarchaeological, archaeometallurgical & geophysical investigations

54 Heol y Cadno,
Thornhill,
Cardiff,
CF14 9DY.

Mobile:
Fax:
E-Mail:
Web:

07802 413704
08700 547366
Tim.Young@GeoArch.co.uk
www.GeoArch.co.uk