

Metallurgical residues from Taplow

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Abstract

The material is indicative of blacksmithing, but the small scale of assemblage suggests the focus of the activity has not been located. Macroscopic slags from smithing occur in a linear array of features trending NNW-SSE in area 3 and possibly continuing into area 2. A cluster of smaller features in area 2 yielded a sparse hammerscale assemblage, as did two features in area 1.

The geographic structuring of the material suggests a coherency in the material assemblage, and given that some of those features are dated as Iron Age, it is likely that the entire assemblage belongs to that period.

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Background

The material submitted for investigation comprised 6 samples containing possible macroscopic slags and 41 samples of magnetic material retrieved from 21 separate soil samples. A full catalogue is presented in Table 1. A list of materials certainly or probably representing metallurgical residues is presented in Table 2.

The materials have all been examined using low powered binocular microscopy.

Description

The macroscopic samples included two (1123 and 1547) which were of natural ferruginous conglomeratic sandstone, and those will not be further described here.

The four samples bearing macroscopic slag are all of dense iron-rich slags, each comprising part of a small smithing hearth slag cake. They show dimpled lower surfaces, indicative of contact with the charcoal fuel.

The sample from 1373 is part of a moderately sized plano-convex cake. The fragment weighs 132g and probably indicates a total slag cake size of around 500g.

The other pieces are suggestive of rather smaller cakes. The piece from 1168 (142g) is either a complete irregular hearth slag lump or a fragment of a poorly-developed plano-convex cake. The pieces from 1663 and 1725 (56 and 124g respectively) form substantial parts of small plano-convex cakes.

The piece from 1373 may be slightly worn, but the other three appear reasonably fresh, so there is no strong evidence for residuality.

The micro-residues included large amounts of material in which natural ferruginous rock particles have become magnetic through heating. The samples also include a significant number of particles with a "slaggy" or "clinkery" appearance, but which are probably residues from organic materials, particularly bone. These materials will not be described further here as they are not indicative of any particular process.

Metallurgical micro-residues are represented by a few tiny slag fragments and some very small assemblages of hammerscale (spheroidal and flake) from a total of 14 contexts. Some of the natural materials (e.g. the natural conglomerates mentioned above) show the development of highly reflective ferruginous grain coatings, and these may be difficult to separate from hammerscale in some instances with further investigation. However, in the attached list the identification of flake hammerscale is reasonably certain, and even those samples were some doubt in the identification is expressed the material is very likely to be hammerscale. Flake hammerscale certainly or probably occurred in 9 contexts, spheroidal hammerscale in 3 contexts and slag fragments in 8 contexts.

One single possible slag grain (from 1245 sample "magnetic material") bears a blue inclusion, which might be indicative of copper alloy residue or corrosion.

Interpretation

All the identified metallurgical residues are indicative of iron working. The (rather small) assemblage of smithing hearth slag cake fragments are all indicative of cakes in the 100-500g range, suggestive of small-scale activity.

The volume of material (both macro- and micro-) which was recovered was very small, suggesting that it is unlikely that the focus of metallurgical activities was encountered. The material does, however, show a distinct geographical distribution which may indicate structures/features which were contemporaneous with the iron working activity.

Within area 1 two adjacent features (1007 and 1011) each yielded a single piece of probable hammerscale.

In area 2 a cluster of smaller features (1244, 1246, 1248 and 1250) again each yielded one or two pieces of hammerscale. Nearby feature 1151 also yielded a single piece of hammerscale. The nearby larger features 1130 and 1295 each yielded small assemblages with multiple hammerscale pieces. Feature 1373 towards the south of area 2 yielded a single piece of macroscopic smithing slag.

In area 3 feature 1228 yielded a microscopic piece of flowed material, which might, but is not certainly be metallurgical slag.

The other four features yielding residues in area 3 are very interesting: three of them yielded macroscopic smithing slags (1662, 1724, 1167) and the fourth (1122) two pieces of flake hammerscale. These four features are evenly sized (at least in plan) and form a linear array (a northward extension of which would pass fairly close to the feature 1373 yielding macroscopic slag in area 2).

In summary, the material is consistent with an origin in small-scale blacksmithing. Such material is not particularly indicative of age, but nothing here would be inconsistent with treating the entire assemblage as Iron Age. The pattern of geographical distribution would suggest against the material being intrusive.

The patterning shows inclusion of macroscopic slag fragments in feature fills lying along a NNW-SSE array (area 3 and ?2), with microscopic residues occurring in mainly smaller features to the east of this line (areas 1 and 2)

Evaluation of potential

The material is has a rather low potential for further investigation. Analysis of possible hammerscale fragments could be undertaken to "firm-up" the identification of uncertain material, although the current catalogue is believed to be reasonably accurate. Microanalysis would be able to confirm or refute the identity of the possible Cu-alloy residue from 1245.

context	sample	weight	notes
Macroscopic materials			
1123			Natural conglomerate
1168		142	small smithing slag piece
1373		132	part of larger smithing hearth cake
1547			Natural conglomerate
1663		56	lobe of Fe slag with strong lining influence - probably smithing hearth cake
1725		124	part of poor smithing hearth cake
Microscopic materials			
1008	10 mm		stones
1008	10 hs		possible spheroidal scale, probably not flake scale
1012	11mm		stones
1012	11slag		6 pieces of clinkery materials - possibly bone?
1012	11hs		1 piece probable flake scale
1041	12 fh		1 piece ?rock
1041	12 mm		stones
1048	7 mm		probable flake scale, 1 slag piece, stones
1132	8 hs		flake, slag, stone
1132	8 mm		stones
1152	1 mm		stones
1152	1 slag		1 piece slag, 8 clinkery materials
1152	1 f		1 possible flake scale piece
1156	2 slag		2 clinkery materials
1156	2 mm		stones
1156	2 f		1 piece probable flake scale
1163	18 mm		stones
1168	3 slag		possible slag
1168	3 mm		stones
1205	4 mm		stones
1230	5 slag		slag bleb with viscous looking surface - definitely flown in part but could be related to clinkery materials
1230	5 mm		stones
1234	6 slag		3 clinkery materials
1234	6 mm		stones
1243	13 mm		stones
1245	14 mm		1 probable spheroidal scale, 1 possible slag with Cu inclusion?, stones
1247	15 hs		1 spheroidal and 1 probable flake scale
1247	15 mm		stones
1249	16 mm		stones
1249	16 slag		coal?
1249	16 f		1 piece of flake scale
1251	17 mm		stones
1251	17 f		1 piece of possible flake scale
1251	17 slag		2 bone, 1 stone, 2 possible slag/lining pieces
1252	9 f		1 possible flake scale piece
1252	9 slag		3 pieces - at least 2 probably organic
1252	9 mm		1 piece of flake scale, 1 slag piece, stones
1293	20 mm		stones
1297	19 f		3 probable flake scale pieces
1297	19 mm		stones
1474	21slag		burnt bone + melted organic residue

Table 1. Full catalogue by context (and sample where appropriate)

context	weight	notes
<i>Macroscopic materials</i>		
1168	142	small smithing slag piece
1373	132	part of larger smithing hearth cake
1663	56	lobe of Fe slag with strong lining influence - probably smithing hearth cake
1725	124	part of poor smithing hearth cake
<i>Microscopic materials</i>		
1008		1 piece possible spheroidal scale
1012		1 piece probable flake scale
1048		1 piece probable flake scale, 1 slag piece
1132		2 pieces of flake scale, slag
1152		1 possible flake scale piece, 1 piece slag
1156		1 piece probable flake scale
1168		possible slag
1230		slag bleb with viscous looking surface - definitely flown in part but could be related to clinkery materials
1245		1 probable spheroidal scale, 1 possible slag with Cu inclusion?, stones
1247		1 spheroidal and 1 probable flake scale
1249		1 piece of flake scale
1251		1 piece of possible flake scale, 2 possible slag/lining pieces
1252		2 pieces of flake scale, 1 slag piece
1297		3 probable flake scale pieces

Table 2. Metallurgical residues