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Assessment of materials from Calstock 2011 season, supplementary report

Dr Tim Young
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Dr T.P. Young

Abstract

The submitted material comprises a small quantity of sieved residues in addition to those reported upon previously. The additional material derives from two contexts ((4010) and (4520)), from both of which ironworking residues had been described in the previous report.

Context (4010) produced a small hand-sorted assemblage (106g total) of low-density slag (38.0g), fired gravelly hearth lining (44.4g), fragments of charcoal (0.4g), some smithing floor debris (7.6g) and iron fragments (9.1g), including parts of three probable hobnails and a lightly larger nail head.

Context (4520) produced a hand-picked assemblage of 12.36g of microresidues, dominated by flake hammerscale, with scarce amounts of spheroidal hammerscale and slag droplets.

Both assemblages complement other material from the same contexts described in the previous report and thus the results of the assessment remain unaltered.

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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 May 2023 and was commissioned by Dr Chris Smart of Exeter University. The materials derive from the 2011 season of excavations at Calstock, most of which were reported upon previously (Young 2012).

Results

Context (4010) produced a small hand-sorted assemblage (106g total) of low-density slag (38.0g), fired gravelly hearth lining (44.4g), fragments of charcoal (0.4g), some smithing floor debris (7.6g) and iron fragments (9.1g), including parts of three probable hobnails and a lightly larger nail head. This context was a fill of ditch [4009] in Trench C.

Context (4520) produced a hand-picked assemblage of 12.36g of microresidues, dominated by flake hammerscale, with scarce amounts of spheroidal hammerscale and slag droplets. This context was a fill of [4511] in Trench D.

Interpretation

The additional materials complement those previously described. Young (2012) stated:

> 'The difference in the two assemblages (notwithstanding the rather small total amount of material available on which to base an interpretation) suggests that the two operations may have been undertaking rather different tasks. The material from Trench 'D' is perhaps more typical of smithy waste and may represent residue from a typical range of smithing activities. The lower density slags and small SHCs from Trench 'C' may be tentatively taken to suggest smithing operations with a lower loss of iron. Such activities might be those perhaps involving a lesser amount of forge welding and other high-temperature techniques. The residues in Trench 'C' were associated with finds of small nails, and a nailing operation, particularly if using pre-forged rod, might be the sort of activity that could have generated these residues.'

The additional material from context (4010) adds further examples of low-density slags, hearth wall and nails.

The additional material from Trench D similarly adds a rich micro-residue assemblage to what is known of material from context (4520). This assemblage with its

abundant flake hammerscale and some spheroidal hammerscale appears a typical blacksmithing residue.

Further work

The additional material does not change the recommendations of 2012.

References

YOUNG, T.P. 2012. Evaluation of archaeometallurgical residues from Calstock 2011. GeoArch Report 2012/13, 10pp.

Table 1: Summary catalogue by context Calstock 2011, sample and bag. Assm = assemblage of fine sieved materials, BOM = burnt organic material, FAS = fuel ash slag, SHC = smithing hearth cake, SHS = spheroidal hammerscale, FHS = flake hammerscale

C	S	label	wt	no	description
1572	1307			assm	stone, with rare slag fragments, rust and some BOM
1589	1308			assm	stone, with rare slag fragments, one slag bleb and a very few pieces of FHS
1593	1309			assm	mainly rock fragments, coated in buff powder - unclear if this is derived from sediment or a fired clay. Rock particles include a few dark goethite (?) grains
1671	1314			assm	stone, minor possible bone and BOM
1672	1321			assm	stone, minor BOM and some rust/pan
2299	1350			assm	stone with some FHS, rare slag fragments and BOM
4010	12	sieve	248g bag		
			24	1	Top-shaped concretion - contains iron (large nail head or similar?
			8.04	7	fragments of thin (<3mm) highly bloated gritty ceramic with thin slag layer on outside and locally extending round or through onto planar inner surface; whole c40mmx40mm - clay coat from brazing or heat treatment- or simply peeled off stone in fabric?
			20.6	1	concretion with iron
			14.5	1	granular dense mass around exploding iron
			78	10	heavily accreted slags with an overall blebby form - accreted blebs or poor flow slags?
			54	2	stones
			28	1	dense slag fragment
4010	12	sieve	66	assm	5 pieces of vitrified hearth wall, thin slag, then c5mm vitrified and grey, then oxidised fired below 1 pot rim 1 slag/ash/charcoal concretion, contains iron 1 burnt stone
4010	12	hand sorted	106g bag		
			38.0	Assm.	low-density slag; various in dimpled prills and blebs, highly vesicular
			44.4		hearth lining, gravelly, oxidised fired in the main, may pass forward into Fuel Ash slag-like bloated material
			0.4		charcoal
			7.6		smithing floor concretion
			9.1		iron fragments including parts of three probable hobnails and a lightly larger nail head
4010		slag	418g bag		
			192	1	stone
			88	1	rounded mass of lining slag with charcoal impressed into base - piece of failed hearth wall?
			84	8	fragment piece of slag with good dense prills on base, passing up into a friable rusty upper part - possibly a lump from a prilly SHC but now too broken to interpret properly
			8	1	corroded iron
			32	2	two rounded pieces of very rusty slag- apparently iron-bearing slag - though just possibly concretions containing both slag and iron

4010		fired clay	240g bag	assm	around a dozen pieces of fragmented piece of deeply vitrified and slagged wall, oxidised fired with gravelly texture, reduced surface and slag locally to 20mm.
4011		fired clay	62g bag	assm	well-vitrified oxidised fired clay broken into rather small fragments - similar to 4010 material
4011			76	1	approximately plano-convex mass, internally prilly, coarse lining slag with maroon surface - probably a crude SHC
4014	17	sieving finds	7.4	1	oxidised fired gravelly ceramic, convex surface with black glass with fuel impressions
			4.4	1	small concretion
			23.7	10	small blebs and sheet fragments of dimpled highly vesicular slag with charcoal inclusions and impressions
4014	17	slag hand sorted	41g	assm	6 stones, 5 corrosion around small long nails?, 2 corrosion around ?hobnails, 10 small corrosion/concretion fragments (one with a piece of SHS), 4 pieces slagged gravel, 1 vitrified bloated ceramic or stone, 8 pieces of blebby slag with charcoal, 7 fragments of angular dense dark slag, 10 blebs of iron slag, 19 blebs / fragments of lining slag with derived crystals (2 of which are almost pure green glass)
4014	17	hammerscale hand-sorted		assm	stones with good amount of FHS, with blisters, angular slag fragments, rust particles and vesicular sandy grey lining slag with maroon surface
4016	2	stage 2 hand sieve, magnetic residue, 1000micron		assm	stone, some probably oxidised and reduced fired clay particles, possible BOM?
4032	9	stage 2 hand sieve, magnetic residue, 1000micron	23g	assm	stone with moderately abundant FHS, some slag fragments, droplets, and SHS
4032	9	stage 2 hand sieve, hammerscale, 1000micron		assm	mainly good large flake hammerscale, 1 droplet fragment and a couple of pieces of slag flats
4032	9	stage 2 hand sieve, slag, 1000micron	112g bag		
			70	3	slagged, vitrified and in one case bloated, pebbles
			45	assm	small fragments and blebs and droplets of lining-influenced slags
4033		fired clay	26	1	broken lump of oxidised fired material containing large amounts of shillet and some large quartz grains
4033		fired clay	2	1	very fine grained pale daub-like fired clay
4033		slag	118g bag		
			36	1	low density rounded mass of slag with deeply-impressed charcoal moulds, similar to those on the top of the SHC below, highly vesicular. Has one fractured face - so might be the margin from an SHC
			2	1	small concretion on iron
			74	1	low density plano-convex mass, somewhat dimpled well formed base, internally vesicular with some charcoal moulds impressed from top, most of top missing - probably a very small SHC
4048	15	hammerscale hand sorted		assm	stone with good amount of FHS and few angular slag fragments
4048	15	slag - hand sorted	26g		1 piece fired clay, 1 piece charcoal, 3 blebby lining slag pieces, 4 pieces of pumice-like FAS, 3 stones, 9 pieces of concretion - 1of which possible flat-headed nail?
4048		fired clay	7	assm	fine buff fired clay, possibly daub, has tubes of few mm diameter - straw? (well striated...)
4049		fired clay	8	1	small fragment of buff fired gravelly clay with smoothed grey surface with white surface

4052		fired clay	4	1	orange gravelly fired clay with thin grey surface layer
4069	14	sieving finds	38g bag	assm	badly fragmented vesicular lining/FAS, 1 more dense but very irregular slag becoming more lining-rich to one end, plus two small pieces of pottery
4074	10	stage 2 hand sieve, magnetic residue, 1000micron		assm	stones, small fragments of Fe-Mn pan,
4076		clay	1	1	bag of crushed oxidised fired clay
4077		fired clay	38	5	5 pieces of fired clay, oxidised, larger ones with deep vitrification layer becoming vesicular and flowed outwards,
4080		slag	16	1	appears to be a 'bog iron ore' that is overgrowing a charcoal-rich sediment (i.e. grown within the context)
4512	1	stage 2 hand sieve, magnetic residue, 1000micron		assm	stones, large pieces of vesicular lining slag (some with very large vesicles), good large FHS, slag flats, slag droplet, rust and concretion fragments, dimpled slag blebs, some with slightly maroon surfaces
4520	7	slag sieving finds	1085g bag		
			148	1	large block of slag concealed by accretion - has flow lobes on one margin- probably a dense SHC fragment from shape - in which case the smaller pieces below may be from similar margins
			42	6	small slag pieces - some well flowed with large rounded voids
			remainder	c.45	smithing floor
4520		hand sorted	12.4	assm.	mostly FHS, but some SHS present and also some slag spheroids.
4520		industrial waste	1740g bag		
			112	1	accreted SHC fragment
			326	1	accreted SHC fragment - possibly c40-60% - 30mm thick dense bowl with 5mm thick glassy top pealing up at broken centre
			186	1	accreted SHC fragment
			80	1	accreted SHC fragment
			118	1	accreted SHC fragment
			92	1	accreted SHC fragment
			72	1	accreted SHC fragment
			50	1	accreted SHC fragment
			48	1	slag fragment with curved (bent?) flowed top and dimpled base
			142	3	accreted slag fragments indet
			remainder	many	smithing floor concretion fragments

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Unit 6,
Western Industrial Estate,
Caerphilly,
CF83 1BQ

Office: 029 20881431
Mobile: 07802 413704

E-Mail: Tim.Young@GeoArch.co.uk
Web: www.GeoArch.co.uk