GeoArch

Report 2025/12

Assessment of archaeometallurgical residues from New Pieces (interim provisional version)

Dr Tim Young
10th December 2025

Assessment of archaeometallurgical residues from New Pieces (interim provisional version)

Dr T.P. Young

Abstract

This report provides an interim statement on the assessment of residues from New Pieces. It covers a representative selection of 73 out of 227 items previously identified as 'ironstone', those 11 pieces previously identified as 'burnt clay' or 'ceramic' that show distinctive features, and all material previously identified as 'slag' with a weight over approximately 30g.It is believed this provides a sample of the material that is capable of providing a stable interpretation.

The iron ores form a coherent group (approximately 220 pieces with a weight of 3.5kg) of hematite-dominated lithologies, with the surfaces of the items coated in red ochre. The coherent nature of the group and its localised occurrence in the site suggest a deliberately acquired/stored assemblage. Many of the pieces show smoothed, abraded surfaces, although some show angular fractures. One piece shows a fine brown sediment with coarse highly polished quartz sand grains adhering to the surface. One piece shows small veins and vugs bearing fine-grained quartz as a secondary phase of mineralisation. The hematite is variously fine grained and massive, forming a foliated structure, forming a fine stalactitic structure and forming thin botryoidal crusts. Such features would tally with material derived from surface exposures of mineralised veins, perhaps with the ores liberated by dissolution of a host limestone. The general ore textures are compatible with the ores found along the marginal zones of the Triassic basins and thus a regional but not immediately local origin is possible, although the nearest known example of solution features of this type would be at Drybrook Quarry at the N end of the Forest of Dean sector of the orefield.

The fired clay assemblage totals approximately 4kg and mostly comprises rather amorphous material, perhaps largely burnt substrate rather than a prepared ceramic. Of those with a more diagnostic form, much was daub, with organic temper rather rare, but with good withy impressions. Vitrified furnace/hearth ceramic appears to be a very small part of the assemblage but includes a fragmented blowhole (probably from a smithing hearth). A single sherd of cupel (probably from the assaying of impure silver) was identified.

The slag assemblage totalled approximately 14kg, the majority of which (approximately 12kg) can be attributed to particularly large smithing hearth cakes (SHCs). Some smaller SHCs are also present: the assemblage of complete SHCs comprises 11 definite examples, ranging from 139g to 2659g, with a mean of 1004g. If some less certain examples are included, there may be as many as 17 examples, with a range of 60g to 2659g and a mean of 717g. Detailed statistical comparison of such a small assemblage, potentially skewed by taphonomic processes, is not possible, but five of the SHCs weighed more than 1.1kg, providing a strong indication that the processing, rather then the end use, of iron was a major part of the activities. Also in support of bloom processing are the relatively large number of apparently amorphous iron lumps present in the assemblage.

These features hint at an administrative role for the metallurgy, in processing of blooms produced elsewhere (as render?) and in the handling of the non-local iron ore, rather than the more typical style of high-status metalworking focused on artefact production.

Contents

Abstract 1

Contents 2

Methods 2

Results 2
Residues from iron smithing 2
Iron ore 2
Fired clay 2
Other materials 3

Interpretation 3

Discussion 3

Further work 3

References 3

Table 1 4
Table 2 7
Table 3 10
Table 4 11

Methods

This assessment was commissioned by Andy Seaman of Cardiff University. The materials described here derive from excavations undertaken at New Pieces, Powys, by Chris Arnold and Jeremy Huggett in 1996-2000. Some the assemblage (from context (002)) derives from the backfill of an earlier excavation by B.H.St. John O'Neil in 1933-1935.

This report provides an interim statement on the assessment of residues from New Pieces. It covers a representative selection of 73 out of 227 items previously identified as 'ironstone', those 11 pieces previously identified as 'burnt clay' or 'ceramic' that show distinctive features, and all material previously identified as 'slag' with a weight over approximately 30g.It is believed this provides a sample of the material that is capable of providing a stable interpretation.

All materials were examined visually in December 2025, using a low-powered binocular microscope where required. They have been catalogued (Tables 1 and 2). No instrumental analysis was undertaken.

Results

Residues from iron smithing

The vast majority of the iron-working residue assemblage was from smithing, and it is likely that it all was. No certain examples of iron smelting slags were noted, although some pieces were considered indeterminate.

The evidence is dominated by complete and fragmented examples of very large smithing hearth cakes (examples of 1000g in weight included examples weighing 2659g, 1886g, 1652g, 1622g and 1150g – and an example at 921g was only slightly less). These (and the fragmented material from large cakes) mostly showed formation in a deep hearth, so that the SHCs commonly had a lower, dense, bowl-shaped slag mass on the floor of the hearth, overlain by prilly slags containing abundant charcoal, with a second denser component at the top, close to the level of the blowhole. The upper surface was usually smooth, planar, but with shallow fuel dimples.

Certain smaller SHCs included examples with weights of 381g, 333g, 154g, 150g and 139g. Other examples of small SHCs were less certain, with the possibility that they represent just a portion of an originally larger slag mass.

The was abundant evidence throughout for the use of charcoal as fuel.

The dense iron slags were accompanied by some low-density materials, mostly associated with alteration of the hearth lining. These have been classed in Table 3 as ''hearth wall' where evidence survived for the ceramic substrate. Where this was absent, low-density materials have been classed as fuel ash slag (FAS).

Iron ore

The assemblage included abundant small fragments of a hematitic iron ore. Only approximately one third of these pieces has been examined so far.

The iron ores form a coherent group (approximately 220 pieces with a weight of 3.5kg) of hematite-dominated lithologies, with the surfaces of the items coated in red ochre. The coherent nature of the group and its localised occurrence in the site suggest a deliberately acquired/stored assemblage. Many of the pieces show smoothed, abraded surfaces, although some show angular fractures. One piece shows a fine brown sediment with coarse highly polished quartz sand grains adhering to the surface. One piece shows small veins and vugs bearing fine-grained quartz as a secondary phase of mineralisation. The hematite is variously fine grained and massive, forming a foliated structure, forming a fine stalactitic structure and forming thin botryoidal crusts.

Although much of the material appears in an almost 'as-found' state, it is noteworthy that the granulometry of the particles shows a quite narrow distribution. Of the examined material, the particles ranged from 2.3g to 77g in weight, with a mean of 16.1g. 80% of the ore particles were under 25g in weight. Such material would be appropriate for smelting in a bloomery furnace in that state.

Fired-clay

The fired clay assemblage totals approximately 4kg and mostly comprises rather amorphous material, perhaps largely burnt substrate rather than a prepared ceramic. Of those with a more diagnostic form, much was daub, with organic temper rather rare, but with good withy impressions. Vitrified furnace/hearth ceramic appears to be a very small part of the assemblage but includes a fragmented blowhole (probably from a smithing hearth).

A single small sherd of cupel (probably from the assaying of impure silver) was identified from context (002).

Other materials

The assemblage contained several examples of iron lumps, typically now in a rather poor state of preservation. It is possible that the larger examples of these still contain some metallic iron. These pieces are likely to present lost or discarded iron from the bloom processing process. There was also a small SHC that had fragmented because of corrosion of the metallic iron it contained. It is therefore possible that some of the other iron lumps might be large iron inclusions within slag, rather than discrete iron pieces

Various pieces of natural stone were present in the assemblage, but these require no further description or discussion.

Interpretation

The features of the iron ore samples would tally with material derived from surface exposures of mineralised veins, perhaps with the ores having been liberated by dissolution of a host limestone. The general ore textures are compatible with the ores found along the marginal zones of the Triassic basins and thus a relatively local origin is possible (see Young & Thomas 1988, 1989; Young 2000 for details of ore petrology from the Bristol Channel Orefield, to the S of the present area), although the nearest known example of solution features of this type would be at Drybrook Quarry at the N end of the Forest of Dean sector of the orefield. Little is know of minor occurrences of hematite in the northern parts of the same rift system, because the mineral did not reach quantities exploitable in the industrial period.

In contrast with the abundance of ore specimens from the excavations, there was no definite indications of iron smelting having been undertaken on the site (notwithstanding the very small size of the excavated area within the overall site).

The evidence for the iron smithing is suggestive of the importance of bloom processing (again, the small area of investigation could easily lead to a strong taphonomic bias if, for instance, the large SHCs had been employed as posthole-packing). Table 4 provides a comparison with SHC assemblages from selected other sites. The occurrence of a small proportion of large SHCs in addition to the main population of sub-800g cakes from blacksmithing, has been noted on sites such as Llantwit Major even though those sites are not believed to have been major iron production sites. The proportion of such large SHCs increases on sites such as Widecombe and Burlescombe which are believed to have been more specialist production sites. Thus, small taphonomic biases may affect the ability correctly to interpret sites.

Discussion

The archaeometallurgical residues are apparently indicative of the handling of iron ore for smelting, and the processing of raw blooms after smelting, but not for smelting itself – and not for high levels of activity in the end use of the iron (blacksmithing) either. It may also be noteworthy that the site has so far produced relatively little evidence for the production of artefacts in other materials – which provides a contrast with most high-status sites of the period.

Any conclusions must be very tentative at present, but the metalworking assemblage might be held to suggest and administrative role (e.g. in the receipt, perhaps, of a render of raw blooms and in the handling of non-local iron ores), rather than the sorts of artefact production typical indicative of high status, or 'royal', residential sites.

Further work

These materials would be capable of providing further information of archaeological significance through detailed laboratory analysis (for instance the likely source of the iron ores and clarification of details of the process). However, formal proposal of further work must await completion of the examination of the whole assemblage.

References

YOUNG, T.P. 2000. Chapter 10. The Paviland Ochres: characterisation and sourcing. *In:* ALDHOUSE-GREEN, S., *Paviland Cave and the 'Red Lady': a definitive report*. Western Academic and Specialist Press Limited, 205-225.

YOUNG, T.P. 2007. Evaluation of archaeometallurgical residues from Willow Street and Mill Street, Worcester. *GeoArch Report 2007/12*. 10pp.

YOUNG, T.P. 2009. Evaluation of archaeometallurgical residues from 35 Mill Street, Worcester, *GeoArch Report 2009/33*, 9 pp.

YOUNG, T.P. 2016. Assessment of archaeometallurgical residues from Tidworth, Wiltshire (ACW338). *GeoArch Report 2016//20*. 11pp.

YOUNG, T.P. 2016. Archaeometallurgical residues from Hen Gastell, Llanwnda, Gwynedd. *GeoArch Report 2016/37*. 97pp.

YOUNG, T.P. 2018. Assessment of archaeometallurgical residues from Burlescombe (ACD1753 & ACD1767). *GeoArch Report 2018/11*, 20pp.

YOUNG, T.P. 2019. Assessment of archaeometallurgical residues from Widecombe, Devon. *GeoArch Report 2019/02*, 6pp.

YOUNG, T.P. & THOMAS, G.R. 1998. The cargo: iron ore analysis. pp. 105-111 *In:* Nayling, N. *The Magor Pill Medieval Wreck*, CBA Research Report 115, Council for British Archaeology.

YOUNG, T.P. & THOMAS G.R. 1999. Provenancing iron ore from the Bristol Channel Orefield: the cargo of the Magor Pill Boat. *In:* POLLARD, A.M. (ed) *Geoarchaeology: exploration, environments, resources*, Geological Society of London, Special Publication, 165, 103-121.

Table 1: catalogue of examined 'ironstone'. Weight in g.

Year	C		find	Wt (g)	No.	Notes
NP96	001	A	3	21	1	cubic lump - probably a section trough a tabular body approximately 12mm thick,
NP96	001	A	9	6.9	1	angular fragment of slightly irregular hematite
NP96	001	A	12	17.7	1	irregularly tabular c10mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	001	A	14	5.2	1	complex hematite, some parts finely crystalline (saccharoidal) but also botryoidal films
NP96	001	A	30	5.2	1	angular fragment of smoothed hematite
NP96	001	A	38	10.3	1	small smoothed hematite particle, possibly originally botryoidal on a slightly larger cale than typical here
NP96	001	A	58	6.8	1	angular fragment, interior mainly finely crystalline, but is cut by some botryoidal surfaces
NP96	001	A	62	13.7	1	irregular smooth fragment of complex hematite, possibly containing quartz-bearing small vugs
NP96	001	A	68	2.7	1	irregularly botryoidal vein forming thin (3mm) sheet inside ruddle
NP96	001	A	76	17.8	1	angular fragment of hematite with platy texture, suggesting vein at least 25mm thick
NP96	001	A	77	5.9	1	small fragment of brownish iron-rich material - unclear if the same ore or different
NP96	001	A	97	20.2	1	smoothed haematised piece, tabular up to c12mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	001	A	98	6.7	1	smoothed irregular fragment with haematite forming hollow stalactites
NP96	001	A	102	25.1	1	angular fragment of complex hemerae with botryoidal films around original void pace
NP96	001	A	106	12.6	1	Small fragment of pale, vesicular probably smithing slag, has pale flowed surface (probably viscous) on top
NP96	001	A	108	24.2	1	smoothed haematised piece, tabular c12mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers, fractured pebble?
NP96	001	A	130	14.6	1	smoothed haematised piece, tabular c10mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	002	A	13	3.5	1	very irregular lumpy hematite in crudely tabular ruddle
NP96	002	A	20	23.4	1	very dense, irregular but smoothed lump with one planar face
NP96	002	A	60	42.9	1	angular fragment of dense hematite
NP96	002	A	69	6.3	1	angular fragment rich in ruddle
NP96	002	A	75	5.7	1	one planar face - remainder seems to be dense protrusions from that passing through the ruddle
NP96	002	A	80	16.2	1	very dense, irregular but smoothed lump with one possibly planar face
NP96	002	A	167	2.3	1	small worn fragment with irregular hematite protrusions through ruddle
NP96	002	A	178	11.1	1	irregular hematite sheet to 10mm pushing through ruddle matrix
NP96	002	A	209	19.9	1	tabular fractured fragment of hematite, 9mm thick, angular, hematite bears small <1mm voids
NP96	002	A	215	6	1	thin sheet of lower grade? Hematite in ruddle
NP96	002	A	223	15.3	1	angular fragment from extremely fine-grained hematite, slight feathering on fracture surfaces
NP96	002	A	266	33.4	1	fine grained hematite, rather slag-like in appearance, but shows strong internal slickensides
NP96	002	A	266	15.6	2	Small smoothed hematite fragments
NP96	002	A	280	8.8	1	smoothed hematised piece, tabular c6mm, in over-cleaned ruddle
NP96	002	A	395	6.6	1	small chip of ore with ruddle forming entre surface

NP96	002	A	403	9.2	1	smoothed haematised piece, tabular up to c7mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	002	A	435	6.7	1	highly polished irregular fragment with abundant ruddle
NP96	002	A	436	11.3	1	smoothed haematised piece, tabular c10mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	002	A	486	7.4	1	very irregular lumpy hematite in crudely tabular ruddle
NP96	002	A	489	40.9	1	rather 'lumpy' textured ore (possibly ex-sulphide), minor botryoidal layer on surface
NP96	002	A	491	21.1	1	angular fragment of slightly granular-appearing hematite
NP96	002	A	501	10.4	1	smoothed haematised piece, tabular c6mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	002	A	538	27.3	1	somewhat tabular, smooth, possibly pebble
NP96	002	A	542	10.1	1	smoothed haematised piece, tabular c10mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	002	A	546	11.5	1	angular cuboidal fragment
NP96	002	A	554	7.5	1	pebble of pale rock with black rounded particles, not ironstone
NP96	002	A	559	10.7	1	smoothed haematised piece, tabular c10mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	002	A	574	22.2	1	irregular very dese angular fragment wit highly sooth faces
NP96	002	A	574	45.2	1	very dense smooth large lump, encased in pale khaki matrix
NP96	002	A	654	32.6	1	worn fragment of stalactitic ore
NP96	002	A	681	7.8	1	slightly irregular sub-angular fragment, less dense than other pieces, ore ruddle
NP96	002	A	700	9.8	1	smoothed haematised piece, tabular c10mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP96	002	A	706	45	1	ruddle coated finely crystalline gey material with spheroidal pores - possibly slag
NP96	002	A	715	11.3	1	rounded hematite lump with planar (fractured?) face
NP96	002	A	732	5.1	1	smoothed haematised piece, tabular c5mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers (broken to check interior -good hematite
NP96	002	A	744	26.6	1	variegated green sharply fractured fine tuff, almost flinty
NP96	002	A	780	6.3	1	small worn fragment with irregular hematite protrusions through ruddle
NP96	002	A	818	12	1	very irregularly shaped fragment with irregular hematite protrusions through ruddle
NP96	002	A	946	33	1	finely crystalline hematite embedded in ruddle
NP96	002	A	950	2.9	1	smoothed haematised piece, tabular c5mm, in over-cleaned ruddle, surfaces show fine scale botryoidal layers
NP97	008	A	23	23.52	1	angular lump of mostly botryoidal hematite, contains vugs and veins of small late quartz
NP97	008	A	106	12.8	1	one planar face, some possible triangular outlines, interior is ?platy, angular with abundant ruddle
NP97	008	A	244	23.8	1	angular hematite fragment - botryoidal veins irregular below ruddle, also orange matrix with very large, rounded quartz grains
NP97	008	A	299	77	1	reddened, possibly bunt, igneous rock
NP97	008	A	457	4.7	1	angular hematite fragment - botryoidal veins irregular below ruddle
NP98	0	A	12	12.5	4	slightly haematised coarse igneous rocks
NP98	009	A	60	40.2	1	pinkish igneous rock
NP98	009	A	88	8.1	1	small angular fragment of haematite in ruddle
NP98	009	A	116	4.8	1	hard orange siltstone
NP98	009	A	157	3.4	1	hard red siltstone

NP98	009	A	221	27.8	1	irregular iron ore pebble with one flat face, possible coarse country rock material in ruddle, ore foliated
NP98	009	A	221	28.1	1	somewhat granular ore lump with one planar surface.
NP99	067		2	5.7	1	angular fragment of smoothed hematite
NP99	072	A	5	1.6	1	chip of orange igneous rock?

Table 2: catalogue of examined slag. Weight in g.

Year	C		find	Wt (g)	No.	Notes
NP96	001	A	34	39	1	somewhat tongue-like dark slag fragment
NP96	001	A	37	46	1	dense SHC fragment
NP96	001	A	71	128	1	now completely exploded fragment of iron
NP96	001	A	71	6	1	maroon surface dense flow slag descending through charcoal - could be smelting slag
NP96	001	A	79	119	1	fragment from SHC with smooth maroon top, dimpled base, probably medium sized
NP96	001	A	84	13	1	lobe of flowed slag with dark base and green lining slag on top
NP96	001	A	107	10	1	pebble of vesicular igneous rock
NP96	001	A	121	6	1	grey altered ceramic directly overlain by dense iron slag, 3mm thick, with smooth hematised surface
NP96	001	A	127	17	1	indeterminate iron slag nub, crude lobes and charcoal
NP96	002	A	50	43	1	cake margin piece with well-formed flow moulds, fine charcoal below and within, larger charcoal impression on top - could be a smelting slag
NP96	002	A	67	9	1	bleb of blebby gravelly lining slag
NP96	002	A	157	277	1	fragment from 50m thick SHC with smooth, gently dimpled, top that curves over down onto side, probable tubular vesicles, possibly hot deformed
NP96	002	A	171	116	1	dense SHC fragment
NP96	002	A	245	2	1	partially melted ceramic/soil? Possibly FAS
NP96	002	A	285	32	1	irregular fragment, probably from SHC
NP96	002	A	359	119	1	vesicular igneous rock
NP96	002	A	478	9	1	small water-worn pebble
NP96	002		561	165	1	fragment from thick lower crust with tubular vesicles passing up into highly vesicular layer, very incomplete
NP96	002	A	589	9	1	tiny puck of prilly slag
NP96	002		687	139	1	75x85x45(30)mm, neat small SHC, maroon dimpled planar top where clear, microprilly/ashy base
	002		931	1150	1	150x130x75mm; probably proximal part of deep multi-layer cake, lower part has fractured distally, large SHC with dense upper and lower layers and softer middle layer, but details obscured, base well-formed slightly finely dimpled
NP97	008	A	11	123	1	now completely exploded fragment of iron
NP97	008	A	13	161	1	highly vesicular medium/fine grained igneous rock
NP97	008	A	27	25	1	highly vesicular medium/fine grained igneous rock
NP97	008	A	33	1.2	1	tiny vesicular slag fragment, probably a lining slag on ceramic
NP97	008	A	39	203	1	fragment from dense SHC
NP97	008	A	95	28	1	dense SHC fragment
NP97	008	A	274	193	1	fragment of charcoal rich slag from lower part of a cake in a very irregular shape
NP97	008	A	331	150	1	SHC shaped lump of charcoal-rich finely prilly slag - unclear if this is complete SHC, or just the base of something larger
NP97	008	A	401	22	1	prilly slag with lobes of varying density and charcoal class
NP97	008	A	439	157	1	fragment from a medium size SHC
NP97	008	A	442	26	1	margin of SHC, weathered but very hard wustite-rich slag

NP97	008	A	473	528	1	large piece of curved basal crust, c-c, 140x110x35mm, margins are largely fractured, unclear how much is missing
NP97	008	A	497	381	1	strongly concavo-convex SHC, deeply hollowed top has smooth surface with dimples over much of the area, 90x120x40mm
NP97	008	A	526	34	1	fragment from SHC margin
NP97	008	A	651	11	1	low density slag attached to green glazed stone
NP97	008	A	656	486	1	large piece from centre of very large dense SHC, lower 30mm bladed olivine, very coarse, upper part 25mm more porous, with some charcoal moulds near very top
NP97	008	A	692	2	1	broken ball of sandy lining/FAS
NP97	008	A	736	9	1	highly vesicular FAS
NP97	008	A	753	60	1	small semicircular mass, ashy on top slightly prilly below, could be whole proto SHC
	008		54	646	1	very dense but vesicular gey slag of slightly plastic appearance, from base of SHC and asymmetry suggests a base of wall location
	008		758	537	1	rounded lump of iron, now corroded and exploding - billet fragment
NP98	009	A	46	106	1	variable vesicular slag, probably SHC fragment
NP98	009		48			pieces from fragmented 18m diameter blowhole on slightly raised section of wall
NP98	009	A	49	254	1	semicircular SHC (just possibly part of larger mass), 65x100x35mm, slightly lobate top, base rich in fine charcoal
NP98	009	A	119	121	1	slag (or just possibly concretion) adhering to stone
NP98	009	A	197	117	1	ball of slag with lots of charcoal, top planar, dimpled, possibly entire SHC but uncertain
NP98	009	A	238	319	1	twisted piece of granular slag, probably part of an SHC rather than a whole one, but uncertain
NP98	009	A	241	229	1	large piece of thick SHC, substantial basal crust with very large and abundant tubular vesicles,
NP98	009		249	60	1	dense SHC fragment
NP98	009	A	260	333	1	prilly SHC, 85x85x50mm; dimpled pad on top, very prilly base with charcoal moulds, completeness hard to assess
NP98	009	A	277	121	1	fragment of dense SHC
NP98	009	A	314	145	1	complex amalgamated flow slag with moulds of moderately large wood/charcoal, unclear if smithing or smeltng
NP98	009	A	322	248	4	one small piece(22g) of blebby/prilly flow slag, the other three pieces are strange agglomerates of prills and other material -base of smithing hearth debris perhaps (one may be consolidated?)
NP98	009	A	323	140	1	rounded microprilly mass, could be crude SHC or perhaps more likely just part of one
NP98	009	A	327	286	1	fragment from the margin of a very large charcoal-rich cake, charcoal of up to 20mm
NP98	009	A	328	67	1	very granular, rusty slag, in complex shape
NP98	009	A	330	59	1	dimpled ball of smithing slag
NP98	009		550	157	1	now exploded, small slag mass bearing iron that has decomposed, unclear if this was a complete SHC
NP98	009		558	26	1	Thin puck-like sheet of iron slag
NP98	009	A	595	78	1	ashy, prilly mass with wall contact
NP98	009	A	612	154	1	SHC, 75x90x30mm; plano-convex, smooth top slightly prilly base
NP98	009	A	612	33	1	lump of porous smithing slag
NP99	009	A	326	377	1	prilly mass including charcoal of up to 30mm, probably not a discrete SHC, but part of a larger complex mass
NP99	009	A	575	1886	1	essentially complete SHC, has lower basal bowl 185x185x50mm, roundedly triangular, flat topped, basal crust plus fine charcoal rich fill, then 95x60x30 raised similar fine charcoal-rich slag topped by very smooth topped upper puddle, slightly lobate on proximal side

	009		325	921	1	weathered and porous; neat conventional elongate SHC, 160x130x40mm, plano-convex, flat top with slight dimpled, hole in uppers urface is possible tool mark, top is smooth, base well-formed but with fuel moulds, resembles bloomsmithing/remelting cake
	009		336	2659	1	180x180x100(80)mm; large SHC, triangular in plan, rusty top with some lining material microprilly base
	009		569	1652	1	120x140x150mm; well-formed upper SHC overlying thick layer of charcoal-rich slag down to prilly base (neatly curved but not forming a real sheet). Top of cake slightly dished and rather weathered
NP99	066	A	16	243	1	fragment from centre of medium sized SHC
NP99	067	A	1	117	1	SHC fragment
	091		31	1622	1	core of large SHC, basal crust poorly developed, then thick layer of slag with fine charcoal, slight development of an internal upper sheet, slag continues upwards but fractured away; piece 140x160x95mm
NP00	098		3	29	1	highly decomposed porous slag, possibly concretion
NP00	098		13	100	1	fragment probably from a dense SHC, but rolled into almost rod-like form
NP00	098		19	257	1	section from centre of large SHC, with tubular vesicles in dense lower crust, more variable and vesicular above
NP00	098		22	91	1	dense SHC fragment

Table 3: distribution (weight in g) of archaeometallurgical materials (and selected other materials) by class and context based on material examined to date. SHC = smithing hearth cake, FAS = fuel ash slag.

Context	SHC	other smithing	Indet. Iron slag	Iron	FAS	Hearth wall	Iron ore
001	204	30	6	128		6	204
002	1931	9			2		617
008	2912	22		660		3	65
009	9797	528	145			82	64
066	243						
067	117						6
091	1622						
098	448	29					

Table 4. Comparison of the summary weight-frequency statistics for smithing hearth cakes (SHCs) from New Pieces with those of other selected sites. Weight in g.

Site:	**Hen Gastell**	**Tidworth**	**Llantwit Major**	**Worcester: MillSt/ Willow St**	**Llanbedrgoch**	**Burlescombe**	**Widecombe**	**New Pieces**	
Source:	Young 2016b	Young 2016a	unpublished 2024 season	Young 2007 & 2009	author's unpublished study	Young 2018	Young 2019	Young, this report	
Site age	C11-C12	C10-C12?	C7-C8	C11-C12	C5-C10?	E Med?	E Med/Med?	E Med.	
								(all)	(certain only)
count	7	12	154	51	35	103	7	17	11
min. wt	72	80	38	74	41	68	98	60	139
max. wt	1000	680	2315	782	715	3115	2215	2659	2659
mean wt	260	265	265	285	275	510	772	717	1004
% <150g	57%	33%	40%	24%	24%	15%	14%	35%	18%
% <500g	86%	75%	90%	86%	88%	65%	43%	65%	45%
% >1000g	0%	0%	2%	0%	0%	11%	14%	29%	45%
% >3000g	0%	0%	0%	0%	0%	2%	0%	0%	0%
modal 100g class	0-100	100-200	100-200	100-200	100-200	200-300	300-400	100-200	100-200

.

GeoArch

geoarchaeological, archaeometallurgical & geophysical investigations

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