# GeoArch

Report 2021/06

# Assessment of residues from Newyears Green (IS20NYGAR)

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25th February 2021

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**Dr T.P. Young**

## Abstract

*The submitted samples totalled approximately 64.5kg, of which 64.3kg were archaeometallurgical residues (397pieces), almost all derived from smithing, but a small proportion produced during the smelting of iron in a slag-tapping bloomery furnace.*

*The smithing material is a coherent assemblage and from a single source, despite having been transported from its origin and deposited into a variety of cut features and deposits. Most of the smithing slags (91% of the whole assemblage by weight) comprise intact or partial smithing hearth cakes (SHCs). The SHCs include a high proportion of large, dense examples. There are 93 examples of SHCs that are either effectively complete, or sufficiently so that a reasonable estimate of original weight may be made. The SHCs and related slag masses have a weight range of 46g to 1975g, with a mean of 472g. The large SHCs are typically well-formed, plano-convex and dense. The small SHCs range down into both small disc-like pucks of dense slag and more irregular lining slag-dominated bodies, sometimes with denser slag on lower faces (a form described as slag tongues). Such a range of SHCs suggests a site involved in the working of raw blooms (bloomsmithing) as well some working of finished iron into artefacts (blacksmithing). Very few, even reasonably, large assemblages of bloomsmithing slags have been investigated in Britain, making this collection exceptional.*

*Iron smelting slags provide just 3% of the overall collection by weight. They are indicative of smelting in a slag tapping furnace, with the majority of the material being tapped slags. The small quantity of the smelting slag indicates that the smelting activity was probably nearby but outside the immediate area of the archaeological investigation. The ore resource for the smelting is most likely to have been a bog iron ore within the Colne Valley – an area for which little iron smelting has been previously demonstrated, although the nearest significant known smelting site at Denham Park Farm, just 5km NW of the site. This evidence for a previously-unknown iron source is important on a regional basis.*

*If the iron-smelting slags are residual within the investigated features, then it raises the question of whether the smithing residues are similarly so. The occurrence of iron production in this area was previously unknown so the attribution of the residues from both stages of the production of iron to a single phase must be considered more likely than there being two separate periods of iron production.*

*Exploitation of bog iron ores in the river valleys of Southern England was locally common in the Iron Age and in the early medieval period, but is not generally a feature of the Roman (except in the Chilterns) or later medieval periods. The presence of tapped smelting slags suggests the smelting operation is of very late Iron Age date or later. Tapping was uncommon in most parts of southern Britain during much of the early medieval period, so tapped smelting assemblages of this type are most likely to be 1st to 7th century or 10th to 15th century in date. The morphology of the bloomsmithing slags is not particularly indicative of age at the current level of understanding, though a close comparison with Roman examples may be noted. If the material is all from a single phase, and represents exploitation of a bog iron ore, then the likely date for the assemblage would be Roman to Saxo-Norman most probably, given the regional comparative sites, of Roman age.*

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# Methods

All materials were examined visually, using a low-powered binocular microscope where required. As an assessment, the materials were not subjected to any high-magnification optical inspection, not to any form of instrumental analysis.

The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

This assessment was conducted in February 2021 and was commissioned for Archaeology Wales by Dr Rhiannon Philp.

# Distribution of the assemblage

The assemblage derives from work at Newyears Green (London Borough of Hillingdon in London, formerly Middlesex) under the site code IS20NYGAR.

The assemblage derives from 35 individual archaeological contexts (plus some unstratified material) from Area A (total 53.2kg), 14 individual archaeological contexts from Area B (total 9.6kg) and 1 archaeological context in Area C (total 0.1kg).

Archaeometallurgical residues were recovered from ditches, spreads, pits, postholes and other cut features as well some wider layered deposits. No actual metallurgical features (hearths, furnaces etc...) were identified during the archaeological works.

The two most productive contexts were spread (341), with 11.1kg of residues and fill (489) of pit [488] with 14.0kg of residues. No other context produced more than 5.5kg of residue.

The iron smelting slags within the assemblage were all from Area A and were derived from eight archaeological contexts (plus 1 unstratified piece). Of those eight contexts, four ((105), (131), (185), and (222)) produced no smithing slags, the others ((165), (177), (208) and (243)) contained both smelting and smithing slags.

# Description of the assemblage

*General*

The submitted material comprised approximately 64.5kg, of which 64.3kg were archaeometallurgical residues (397pieces), almost all deriving from smithing, but a small proportion produced during the smelting of iron in a slag-tapping bloomery furnace.

Preservation of the material was moderately good to moderately poor. There were examples of moderately highly leached specimens across the contexts, but in general any redistribution of iron had not resulted in significance concretion formation. There was an impression that the smelting slags might have been slightly less well-preserved than the smithing slags. The certain identification of physical abrasion in material with chemical weathering is always problematic, but this appeared to be present to a degree compatible with a degree of residuality.

Non-metallurgical materials present in the collection were very few. There were just two pieces of natural stone and three pieces of ceramic that may not necessarily have had a metallurgical origin (one piece of fired fine daub, one piece of sandy ceramic resembling mould material, but probably not, and one piece of highly fired ceramic, that whilst possibly embedded in a hearth wall, was most likely a kiln waster), plus a single tiny piece of coke (the organic residue of burnt coal). These items are listed in the catalogue (Table 1) and (apart from the natural stones and daub) present in the distributional table of residues (Table 2) in the category ‘other’.

*Iron smelting residues*

The smelting residues included 22 pieces (total 1461g) of examples of tapped slags. These were dominantly in rather small pieces (which is not unusual, given the rather brittle nature of tapped slags), Only context (131) produced a substantial piece of tapped slag, a 156g piece from a 40mm thick flow, featuring individual flows with transversely wrinkled upper surfaces. Other pieces showed a more conventional smooth surface for the individual flow lobes.

Two pieces were suggestive of having cooled within the smelting furnace, with various lobed and charcoal-mould bearing morphologies.

The small size of the fragments and the small overall assemblage preclude any comment on the particular variety of slag-tapping furnace employed.

*Iron smithing residues*

The smithing residues were dominantly in the form of smithing hearth cakes (SHCs) of various forms. The smaller cakes (those of less than about 110g) were broadly divisible into two forms:

- those dominated by slag derived from hearth lining, forming slightly irregular low-density masses. Where these are these are tabular and with slightly more iron-rich slags on their lower surfaces, they have been termed 'slag tongues'.
- those dominated by dense iron slag, typically forming small slag masses, sub-circular in plan of up to approximately 65mm in diameter and 25mm thick. These are here termed 'pucks', although the terms proto- or incipient SHC have been used elsewhere.

The medium-sized SHCs (from 100g up to about 400g) are mostly dense, plano-convex forms, increasing in size up to approximately 100mm across and 40mm deep. Many of these show a thin veneer of lining-influenced glassy slag across the upper face. Several show abundant clasts of flint. Having part of all of the upper face covered with a highly haematised (reddened) slag veneer is also very common in this size range.

With SHCs of a rather larger size (400g to 550g), the flow of melt from the hearth wall was often not able to spread across the entirety of the top of the SHC, but formed a wedge of sandy glass bridging from wall above the burr (where present; the burr is a bulbous zone of slag formed where the hot zone in the hearth impinged upon the hearth wall and there was a strong interaction between the slag and wall) down onto the top of the proximal end of the SHC. Where a burr was present it was sometimes a slightly separate element, connected via a narrow neck to the main slag mass. The neat, rounded form in plan of most of the SHCs shows the slag developed off the wall, perhaps suggesting a strong blast.

The largest SHCs (from 550g upwards) may resemble the medium sized examples, but the upper surfaces tend to have little coverage of lining-derived slag. The planar upper surfaces are often dimpled, occasionally so deeply enough to be clearly the imprints of charcoal fragments.

Several of the SHCs show ridges on the lower surface that can be interpreted as infills of voids created by the use of tools (presumably pokers) through the molten slag.

There were very few residues attributable to smithing apart from the SHCs. The amount of hearth ceramic was extremely small (102g total), as was the amount of lining slag in fragments not identifiable as being parts of SHCs (188g). Some slags were not identifiable to process with any certainty (975g; 'indeterminate slag' column on Table 2) and a rather larger quantity (1692g) were classed as 'probably' from smithing. This latter group was probably mainly of fragments from SHCs that were too small to be positively identifiable.

# Interpretation

### *Iron smelting residues*

The iron smelting residues clearly indicate smelting in a slag tapping furnace. Unfortunately, the small size of the fragments precludes detailed interpretation of the type of furnace involved.

Tapping of the slag from bloomeries is only rarely encountered on Iron Age sites but was general during the Roman period and appears to continue in use in some areas of Britain after that. In much of southern England the tapping of slag appears to have been reintroduced in the ninth or tenth century (see review by Young in Smart *et al.* 2018), remaining the standard approach to the management of slag through to the demise of bloomeries (typically 15$^{th}$ or early 16$^{th}$ century in southern Britain, rather later in the north).

### *Iron smithing residues*

The interpretation of smithing residues at assessment stage, without any form of instrumental analysis, relies largely on consideration of the weight-frequency distribution.

The frequency distribution of the SHCs within the assemblage is illustrated on Figure 1a and the summary statistics (with comparative data from other sites) in Table 3. The cumulative frequency (both by weight and frequency) is illustrated in Figure 2.

Table 3 illustrates the summary statistics for SHC assemblages from southern Britain, ordered by mean SHC weight. For many of these assemblages, the number of measured SHCs is very small, so the statistics are of low quality, and for these assemblages the data in this table should be regarded as indicative only. In particular, very few assemblages from Britain with high mean weights have been examined (although more such assemblages have been examined from Ireland, see similar table presented as Young 2018, Table 5).

The assemblages in Table 3 fall into several groups: one group has mean weights of less than 200g (maximum weights of approximate 630g or less), the second has mean weights of 200g to 350g (maximum weights of 630g to 1000g) and the third has average weights of over 450g (maximum weights of over 1300g). The first group comprises waste from workshops, mostly in rural settings, undertaking blacksmithing tasks (perhaps discontinuously). The second group includes residues from early blacksmithing sites mostly in urban or high-status settings (perhaps with more continuous workloads). The third group, within which the Newyears Green assemblage falls, are assemblages from sites believed to be associated with the production of iron, so that bloomsmithing formed a significant element of their work.

Bloomsmithing sites are very poorly known in the archaeological record in Britain. Most such sites have produced only a small quantity of waste (the waste dumps presumably falling outside the investigated area).

The Newyears Green assemblage compares very closely with that from Burlescombe (Young 2018), which is of uncertain age, but the morphology of the SHCs and the location of the find at Burlescombe (one of the centres of iron production of the 8$^{th}$-10$^{th}$ centuries in eastern Devon), strongly suggests an early medieval age. There are slight differences between the weight-frequency bar charts for the two sites (Figure 1), but their cumulative frequency profiles are very similar. The Newyears Green statistics, in particular the cumulative diagrams, compare very closely with the smaller (n=29) assemblage reported by McDonnell from Mantles Green, Amersham (McDonnell 1985 and in Yeoman & Stewart 1992). The morphology of the heaviest SHC from Newyears Green bears a striking similarity to examples from a Roman bloomsmithing site at Miskin, Glamorgan (authors unpublished data;

which produced too few intact SHCs to be included in Table 3).

## Discussion

Both the iron smelting and bloomsmithing components of the assemblage from Newyears Green are thus closely interpretable to their originating processes, but less closely attributable to a particular date. The presence, somewhat unexpectedly, given the geographical location of the site, of material from both of the stages of early production suggests, however, that both those components would be likely to be of the same age. The local context is discussed below, since it suggests both the source ore and circumstantial evidence for date.

The two parts of iron production were commonly not co-located; through much of their history they tended to be separate. This was for several reasons, most commonly because iron smelting was often conducted close to the source of the charcoal being used as fuel – and thus tending to be more mobile operation, following the cycles of woodland management through the landscape. In contrast, the bloomsmithing operation was often focused on a fixed smithy, that would commonly be located near or in a settlement, typically the focus of the estate containing the woodland resources. This separation in location would also have had the advantage in spreading the demand for charcoal over a wider area. Situations where the two processes were located together are perhaps most common in the Roman period, during which smelting too was often conducted in and around settlements, as at Mantles Green, Amersham (Yeoman & Stewart 1992), but examples are known sporadically from right across the time of bloomery ironmaking.

In some cases where iron smelting was located close to woodland resources there might be a wide separation between the ore source and the location of the smelting. The classic example of an area exhibiting longer distance ore transportation is the hinterland of the Forest of Dean, in which ore was shipped out from the mines in Dean itself for several 10s of kilometres. Much more typical is a situation in which ore would only be moved very locally, or perhaps just a few kilometres. An example of this is the area around the Blackdown Hills in Devon. During a major phase of early medieval exploitation, ore was moved from sources on the top of the hills down to various (probably mostly Royal) estates around the foot of the hills for smelting. Recent work at Langford (Young 2021b) suggests that the ore smelted there had been moved a minimum of 7km, the ores smelted in the estate of Burlescombe would have had a similar journey of not less than 4km and even the smelting sites at the major centre of Hemyock would have had to have been moved at least 2km.

In the area surrounding Newyears Green there are no known ore sources within a comparable distance. Evidence for early iron smelting is becoming well-known within the Chiltern Hills (Morris, 2009, quotes 44 known sites in this region), with one of the nearest and best-known sites at Mantles Green Amersham 15km to the northwest of the present site (Yeoman & Stewart 1992), and from the area to the south of the Thames around Staines, some 15km to the south (at the eastern end of a cluster of sites, Young 2021a).

There are, however, some indications of iron resources much closer to the site. To the west of the Colne (approximately 5km NW of the site) a smelting furnace of Roman date was discovered at Denham Park Farm (Newton, 2020). A nearer example of a find of smelting residue is a tiny assemblage of just 250g of probable Iron Age date, from Plot 8 of the Harefield to Southall Gas Pipeline just 2km to the north of Newyears Green. (Mackenzie in Thorpe & Hounsell 2014). The locations of these two sites means they may have been exploiting ores in the Colne Valley, although the Denham Park Farm site lies on the spur between the Colne and Misbourne valleys (the Mantles Green site lies in the Misbourne Valley 12km upstream). Despite these occurrences, largely reported in grey literature and local journals, there is little wider appreciation of the potential of the region for early iron production.

A recent review of the evidence to the south of the Thames (in Young 2021a) has demonstrated the importance of bog iron ores as a resource both in the Iron Age and early medieval periods across much of southern England. The locations of the ores, as suggested by the location of the smelting sites, was closely associated with the distribution of peat deposits.

In the Newyears Green area, the BGS has mapped no deposits of peat (for a recent map of the superficial geology see HS2 2013, map WR-02-007), but peat has actually been recorded widely in the Colne Valley, even if not forming a mappable outcrop. The exploitation of peat is recorded historically at Croxley Moor (an area where the Rivers Gade and Chess join the Colne) approximately 6km to the north. Peat, albeit probably mostly early Holocene, has also been recorded from the Denham area just 2km southwest of the site down towards Uxbridge, in a series of aggregate workings and archaeological excavations (e.g. Lacaille 1963; Lewis & Rackam 2011).

It seems likely, therefore, that areas of impeded drainage with the potential to allow the formation of bog iron ores existed within the Colne Valley close to the site.

If the model of ore location developed for the area south of the Thames (Young 2021a) can be applied to the Colne and its tributaries to the North of the Thames, then it suggests the potential for the existence of such resources, not only within the Colne Valley, but also an analogue for the Chiltern localities might be sought, for instance, in the smelting site at Ramsbury, Wiltshire (Haslam 1980). The smelting residues from Mantles Green were examined in detail by McDonnell (1985 and in Yeoman & Stewart 1992) and he demonstrated that the smelting slags have an unusual composition, very high in manganese (up to 10% as MnO) and moderately high in phosphorus (up to 1% as $P_2O_5$). These relative proportions of Mn and P are similar to those recorded for the smelting of the bog iron ore in the valleys of southern England reported by Young (2021a).

Given the Roman age of most of the known Chiltern sites and of the smelting at Denham Park Farm, together with the morphology of the bloomsmithing slags so closely resembling known Roman examples, it is tentatively suggested that the residues from Newyears Green are of Roman age. They provide key evidence for the likely extension of the area of Roman iron production around the Chilterns further east into the Colne Valley, allowing for recognition of what might be a very significant resource in area with no currently known sources of iron ore.

## Further work

The assemblage from Newyears Green is highly significant both in terms of regional archaeology and of technological understanding.

The site provides the only substantive assemblage of early iron smelting residues from within the former county of Middlesex, It provides evidence for the potential exploitation of bog iron ores in the Colne Valley, with implications the possible existence of such resources elsewhere within the valley.

From a technological standpoint, very few bloomsmithing slag assemblages have been recognised and investigated in detail on a national basis. Even fewer contain sufficient material that the breadth of the process and the variation in the residues produced by it, can be investigated (as shown by the data included in Table 3). The assemblage from Mantles Green (McDonnell 1985) is larger, with a total of 124kg of smithing slags, but only 29 SHCs were individually measured and just one was analysed in detail. A significant gap exists in the understanding of the residues produced during bloomsmithing and thus in the ability to interpret smithing slag assemblages in general.

For these reasons, a programme of detailed analysis of the residues is recommended, in accordance with resource-related research themes associated with HS2 (documented under sections 5.2.33, 5.4.3 and 5.4.5 of HS2's Historic Environment Research and Delivery Strategy 2017). Investigation of iron production on this site ,as part of the London hinterland would also contribute to the 'Production, distribution and consumption' theme and the R13 objective of the 'Research Framework for London Archaeology'. The site lies immediately adjacent to the boundary of the Solent-Thames Region, for which the Roman period agenda (Fulford in Hey & Hind 2014) specifically mentions small scale Roman iron-making and has specific recommendations for research including:

> 12.11.6 Characterisation, including chemical analysis, and quantification of iron slag assemblages to ensure correct identification of both ironmaking and iron-working residues.
>
> 12.11.7 In the absence of good material culture evidence, dating slag assemblages may require radiocarbon dating to establish a chronology of local traditions.

Such a programme of work should address the assemblage through:

1 – confirming the age of the material. Unless the post-excavation analysis confirms a primary origin for any of the residue-containing deposits, and dates those deposits by other means, it is recommended that charcoal clasts are extracted from one or more of the smithing slags with the purpose of obtaining 14C date(s). The dating of charcoal extracted by these means is not ideal, but charcoal is usually obtained from managed woodlands and is therefore from young wood and any date obtained is likely to be adequate for the confirmation of the broad age of the material.

2 – analysis of examples of the smithing slags. These form a lesser component of the assemblage and acquisition of full elemental analyses (major and trace element compositions by WD-XRF and ICP-MS or equivalent) of two examples would be sufficient for the purposes of ore provenancing and of understanding the nature of the smelting slag composition to the subsequent bloomsmithing resides.

3 – analysis of examples of hearth lining. Determination of the contribution to the bloomsmithing slags of the melting of the hearth lining requires analysis of the hearth lining composition. Full elemental analyses (major and trace element compositions by WD-XRF and ICP-MS or equivalent) of two examples would be sufficient, although there is little of this material within the assemblage.

4 – analysis of a suite of the smithing slags to include a range of SHC sizes, and thus likely origins at different stages of the process. The SHCs span a weight range of 46g to 1975g. It is recommended that eight SHCs from across this range are investigated. Each SHC should have a bulk overall full elemental analysis (major and trace element compositions by WD-XRF and ICP-MS or equivalent) and for some similar analyses should be made of sub-samples (e.g. of the lining slag wedges on their proximal sides) in order to help determine the nature of inputs into the slag. This amounts to a total of twelve full elemental analyses.

5 – analysis of a subset of four examples from the suite of SHCs in (4) by using an analytical scanning electron microscope (aSEM) to examine the mineralogy and microstructure of the residues to provide evidence for mixing/cooling history and physical contributions (e.g. from oxide scale or iron fragments and from flint fragments) to the slag.

The above programme of archaeometallurgical work thus amounts to 16 bulk elemental analyses and 4 aSEM mounts, in addition to the recommendation for scientific dating.

Notwithstanding the programme of analytical work recommended above, the archaeometallurgical residues from Newyears Green form an important assemblage that should be deposited in its entirety in a suitable institution as part of the physical archive from the site.

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## Figure Captions

Figure 1. Bar chart illustrating the frequency (as a percentage of the assemblage) of SHCs (in 100g class intervals) for the assemblage from Newyears Green. Comparative diagrams for the assemblages from Mantles Green, Buckinghamshire (data from McDonnell 1985) and Burlescombe (data from Young 2018) are also shown.

Figure 2. Cumulative diagrams for the assemblages listed in Table 3. Upper diagram shows the cumulative weight, the lower diagram the cumulative number of examples.

*Table 1: summary catalogue of materials. Weights in g. Dimensions of SHCs expressed as L x W x D(depth of bowl).*

| C | area | s# | Item wt. | Item no. | Notes | SHC wt. |
|---|---|---|---|---|---|---|
| AREA A | | | | | | |
| 105 | a | | 286 | 1 | a complex and probably hot deformed slag fragment comprising a slag sheet, strongly haematised together with a mass of small-scale prilly slags, not certainly a smelting slag, but very probably so | |
| 125 | a | | 60 | 2 | indeterminate rounded slag lumps | |
| 128 | a | <3> | 1110 | 1 | 140x135x40mm, very well formed sub-circular SHC, plano-convex with slightly dimpled top, greenish glaze lining over small proximal area, base well formed, shows charcoal clasts and lining lumps | 1110 |
| 131 | a | | 18 | 2 | indeterminate slag fragments | |
| | | | 156 | 1 | fragment of thick tapslag block >40mm with transversely wrinkled flows | |
| 131 | a | | 16 | 1 | small tapslag fragment, dense | |
| 133 | a | | 148 | 1 | amalgamation of 2 or 3 crudely lobate mases above a lower? almost planar smooth crust. Very highly altered and now with soft green surface, resembles some cases of flowed slag into stone-based smithing hearth | |
| 133 | a | | 310 | 1 | probably very slightly incomplete SHC, top planar with upraised blebs, coated in gravelly glass, base irregular with central narrow ridge (tool mark), rotten to brown colour. Lining slightly variegated black/white, lots of sand and chert/flint to 25mm, 80x90x55mm (of which bowl 35mm + 15mm above) | 310 |
| | | | 46 | 1 | indeterminate slag fragment | |
| 165 | a | | 292 | 1 | 75x85x30mm, dense plano-convex just very slightly dished very dense SHC with slightly reddened top, with charcoal impressions, base neat well-formed, some charcoal impressions, broken off proximally | 292 |
| | | | 120 | 3 | SHC fragments | |
| | | | 12 | 1 | reduced hearth wall fragment, bloated, reddened on one side | |
| | | | 22 | 1 | complex flow-lobed slag fragment with reddened lobe surfaces and large voids within lobes - tapslag? | |
| | | | 50 | 1 | dense slag with almost planar upper haematised smooth surface, large voids internally, hint of lobes, base not preserved ?tapslag | |
| 169 | a | | 1435 | 1 | 130x150x60(50)mm, SHC with small burr attached - suggests shift of slag formation laterally over time, main area slightly dished, smooth indents, base well-formed with possible tool marks below extension on left side | 1435 |
| | | | 512 | 1 | 105x105x40mm, neat subcircular plano-convex SHC, finely dimpled base | 512 |

| | | | | | |
|---|---|---|---|---|---|
| | | 406 | 1 | 90x80x55(40)mm, slightly incomplete dished SHC with haematised top with large extra lining influence lump, onto which the haematisation spreads on one side, lots of chert clasts | 406 |
| | | 364 | 1 | 70x110x40mm, rather irregular almost biconvex SHC with significant lining on top and some haematisation | 364 |
| | | 662 | 4 | fragments of SHCs, not estimatable to original size | |
| 169 | a | 446 | 1 | 90x85x60(40)mm, neatly circular iron rich bowl overlaid in front of burr by upward incline lining slag pad, reaching 20mm over centre of bowl | 446 |
| | | 322 | 1 | 80x85x35mm, plano-convex dense bowl, trace of chert, | 322 |
| | | 488 | 1 | 100x100x35mm, neat plano-convex dense circular SHC | 488 |
| | | 668 | 1 | cake broken, 3 pieces survive, estimate of remainder, 100x125x50mm, unusual cake with large central void, some lining slag on lower face at proximal end but no burr | 800 |
| | | 26 | 2 | small SHC frags | |
| 177 | a | 86 | 10 | small slag fragments, indeterminate | |
| | | 1085 | 13 | pieces of tapslags, from flows of various thicknesses, up to an example of 35mm lacking its original base, flow lobes commonly up to 30mm wide, but a few pieces have wide flat surfaces. Mostly smooth surfaced, some examples of transverse wrinkling, mostly fine grained, but some pieces include some lobes with coarse equant olivine. | |
| | | 338 | 9 | indeterminate dense slags, all with some evidence for haematisation so there is a possibility of these also being smelting slags, they lack clear textural features of SHCs | |
| | | 306 | 1 | slightly dished block of dense slags, charcoal impressions in top, probably a damaged incomplete SHC | |
| | | 408 | 1 | very complexly structured biconvex SHC, lots of lining influence, 75x110x60mm, upper half lining influenced, lower half very irregular rusty bowl with deep charcoal impressions | 408 |
| | | 178 | 1 | 65x70x30mm neat dense puck with various odd bits of lining slag beneath and thinly above on surface with broad dimples | 178 |
| | | 248 | 1 | elongate mass with round puck, dense, linked via neck to burr and oxidised-fired wall, with join and proximal part of puck overlain by lining slag; 100x65x54(30)mm | 248 |
| | | 108 | 1 | 55x70x25mm, small slightly dished puck overlain by lining slag on one side, irregular below | 108 |
| | | 2020 | 14 | substantial fragments of dense SHCs, but original size not estimatable | |
| | | 128 | 1 | small irregular somewhat prilly mass with lining slag on top, 50x70x40mm | 128 |
| | | 90 | 1 | small mass of low-density lining slag, probably a tongue-like mass, 55x55x35mm | 90 |
| | | 108 | 11 | variously intact to highly deformed pieces of slag and vitrified oxidised fired lining | |
| | | 280 | 6 | fragments of probable SHCs with a high lining influence | |
| | | 152 | 5 | probable fragments of SHCs formed of dense slags, but lacking certain characteristics | |
| | | 40 | 1 | small fragment of worn slag that has numerous deep charcoal moulds, quite possibly a furnace slag from smelting since this texture is otherwise lacking in the SHCs | |
| 185 | a | 36 | 2 | fragments of probable tapped slag | |
| 203 | a | 32 | 3 | fragment of attachment area of lining-rich mass | |

| | | | | | |
|---|---|---|---|---|---|
| 208 | a | 402 | 1 | 80x105x60(40), SHC with small mound on otherwise planar top, base is well-formed and almost sub-pyramidal, finely dimpled with a well-developed dark oxide skin | 402 |
| | | 50 | 1 | small fragment of what appears to be a pale grey tap slag, several well-formed flows, with a prominent one with transverse wrinkles on the upper surface | |
| | | 108 | 1 | probably 70% of small dense plano-convex SHC | |
| | | 20 | 2 | rather vesicular lining slags | |
| | | 90 | 3 | fragments of thin crust | |
| | | 28 | 1 | thin layer with several peripheral lobes of maroon-surfaced flow slag | |
| | | 514 | 8 | fragments of SHCs, many/most rich in lining material, some with a few hints of hot deformation | |
| 210 | a | 716 | 1 | 90x115x65mm, SHC of unusual appearance, thin dark altered glass and lining lies on a very dense material that has generated an angular fracture on the proximal side - unclear if this dense layer is homogeneous slag or a large stone, below this is an irregular later down to the dimpled base. | 716 |
| | | 114 | 1 | fragment of an SHC with a strongly haematised top in front of the small burr, but this is overlain by a thick lining slag sheet, base irregular dimpled | |
| | | 134 | 1 | irregular mass, broken in two, part of SHC, possibly almost all, with haematised top over very gravelly lower part with large flint lumps, 60x70x35mm | 134 |
| 222 | a | 26 | 1 | fragment from a highly porous slag flow, planar top with vertical vesicles, dimpled base, 30mm thick; probable smelting slag | |
| 234 | a | 468 | 1 | 95x110x60(45)mm, neat plano-convex SHC with upstanding lining slag in one proximal corner, broad dimples in smooth top, base well-formed, lower part of bowl showing as rusty, upper finely dimpled | 468 |
| | | 16 | 1 | vitrified reduced lining with organic temper in mostly silty fabric, strongly bloated below outer black glaze | |
| | | 24 | 1 | flap of lining slag | |
| | | 8 | 1 | lining slag fragment | |
| | | 46 | 1 | small lining slag tongue with pendent prills, 45x60x20mm | 46 |
| | | 12 | 1 | indeterminate lag nub | |
| | | 70 | 4 | fragment of thin slag sheet | |
| | | 8 | 1 | small piece of oxidised fired ceramic, rather mould like, but fabric probably too coarse, so may be pottery fragment | |
| | | 178 | 2 | indeterminate slags probably SHC fragments | |
| 240 | a | 148 | 1 | approximately half of a rather irregular SHC | |
| | | 74 | 1 | small fragment of irregular slag sheet | |
| 243 | a | 80 | 1 | small piece of a SHC, slightly gravelly base and lining layer on top | |
| | | 26 | 1 | surface layer from a slightly glassy, very vesicular tapslag | |
| 258 | a | 8 | 1 | slightly pyramidal fired clay piece, highly bloated and glazed, black glaze with derived quartz grains, could be lining, but could be external coat from crucible | |

| | | | | | |
|---|---|---|---|---|---|
| 325 | a | 16 | 1 | indeterminate slag scrap | |
| 341 | a | 612 | 1 | neat plano-convex SHC, deeply dimpled top towards margins, very neat base, 90x125x50mm, charcoal on base | 612 |
| | | 618 | 1 | 125x115x45mm, SHC subcircular in plan with attachment area c65mm wide, deeply dimpled flat top, base rough but well formed with very fine charcoal | 618 |
| | | 600 | 1 | 90x125x75mm, SHC, top has locally smooth maroon surface, lower parts porous and charcoal rich, base shows possible tool mark | 600 |
| | | 446 | 1 | 100x85x45mm, slightly biconvex SHC, top partly obscured but includes lateral maroon surface flow lobes, some pale lining slag on top, base has multiple lobes, overall the piece is very dense | 446 |
| | | 156 | 2 | fragments of small dense neat SHCs | |
| | | 38 | 1 | flint | |
| | | 30 | 1 | slab of lining slag, fragment | |
| | | 106 | 1 | possible small irregular SHC, 50x75x45mm, could be interpreted as small triangular plano-convex SHC with blob of slag on upper surface - but not certain | 106 |
| | | 80 | 1 | crescentic rounded mass, possible SHC fragment | |
| 341 | a | 1345 | 1 | 160x150x70(55), very neatly formed SHC, mostly plano-convex but with raised lip around distal margin, slightly flow away from distal margin, base neat, rounded, smooth, internally appears to have fine charcoal, coarser charcoal impressions in upper surface | 1345 |
| | | 890 | 1 | SHC with edges missing, dished top, gravelly contact on base, 100x110x55mm, upper dense sheet has dished top, filled with dark material rich in fine charcoal | 890 |
| | | 244 | 1 | 70x95x50mm, small wedge-profile mass with large wall attachment area, probably gravelly, has very lumpy shape, contact to oxidised-fired wall 85mm wide and 55mm tall, crudely semi-circular | 244 |
| | | 782 | 1 | 120x115x50mm, very slightly biconvex SHC, some green glaze on upper surface, base finely dimpled, but otherwise smooth | 782 |
| | | 1125 | 1 | 105x145x60mm, very dense SHC with dished dense upper plate, sides show angular blebs - unclear if these are stone inclusions, base well-formed, top shows localised glaze proximally | 1125 |
| | | 214 | 1 | 70x70x40mm, sub-circular dense puck overlain laterally at wall by pale lining slags and centrally proximally by small amount of haematised flowed material, base very irregular with lumps and charcoal impressions | 214 |
| | | 286 | 1 | 85x90x40mm, sub-circular in plan, wedge in section, thick lining layer on upper face, overlies neater dense disc, thickening to 20mm or more at wall, base well-formed but slightly irregular | 286 |
| | | 674 | 1 | 95x100x70mm, unusual deep heavy SHC with very large burr that is strongly reddened, top only 50x70mm, haematised slightly lobate, lower bowl obscure, slight hint of lobate layering, so slag cake may have been depressed during formation | 674 |
| | | 286 | 1 | probably only a fragment of a deep bowl from SHC with internal voids and gravelly base; appears possibly worn | |
| | | 458 | 1 | elongate SHC, plano-convex with probable flint embedded in top in large lumps, black ?glass covers flint, base rather irregular, 105x95x40mm | 458 |
| | | 344 | 1 | 100x105x35mm, broad shallow SHC, main disk smooth, some green glass proximally on top, base well formed with upstanding blebby prills of lining proximally | 344 |
| | | 530 | 4 | SHC fragments, two with large flint clasts | |
| | | 442 | 1 | very irregular mass, probably 80x80x85mm with up to 25mm lining wedge above haematised disc; buttressed by other dense slag including a burr, haematised surface 30mm above top of burr- so may be displaced | 442 |
| | | 554 | 1 | slightly incomplete dense SHC split in 4 (1 part missing), 90x110x35mm, top dished with edges possibly folded or flowing into hollow, base rather flat, rough but even | 585 |

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|---|---|---|---|---|---|
| | | 110 | 1 | 70x75x25mm, lining slag tongue, triangular, just possibly a vitrified wall fragment rather than a true tongue | 110 |
| | | 124 | 1 | 70x65x35mm, burr attached to small mass with glazed top, wall contains flint clast, small mass possibly incomplete, bit if so broken hot, top and base parallel and 20mm thick | 124 |
| 351 | a | 106 | 3 | fragments of lining-rich slag, probably from low density SHCs | |
| | | 162 | 1 | fragment of large SHC in vesicular slag | |
| | | 18 | 1 | slightly slagged and vitrified laminated quartz-rich material, probably a vitrified sandstone | |
| 355 | a | 578 | 1 | 80x110x50mm, dense slightly double-layered SHC, with lower layer probably amalgamated toolmarks in various directions, top planar with some slightly raised edges | 578 |
| | | 302 | 1 | 75x85x35mm, neat small subcircular SHC that has grown slightly obliquely, base a little irregular | 302 |
| | | 270 | 1 | 65x90x35mm slightly concavo-convex semi-circular SHC, highly weathered | 270 |
| | | 236 | 1 | 75x90x30mm, irregular small SHC, essentially a sightly dished puck with a lateral extension | 236 |
| | | 135 | 3 | fragmented piece from probably small SHC | |
| | | 250 | 1 | large part of small dense plano-convex SHC of c.400g? | |
| 382 | | 1055 | 1 | 125x140x70(50)mm plano-convex SHC dimpled top, base well-formed rough, burr 60x20mm, but slightly damaged, raised 20mm above bowl with small area of sloping glass in front | 1055 |
| | | 512 | 1 | 105x120(100 bowl)x50(30), subcircular dense SHC, plano-convex, unroofed void on otherwise flat top, base neat well formed, with 20mm toolmark extending from left side (viewed with blast), burr top raised above level of top of bowl by 20mm, burr 70mm wide and 20mm deep, smooths down onto bowl top via wedge of dark grey-green glass | 512 |
| | | 196 | 1 | brown chert | |
| 382 | a | 562 | 1 | irregular SHC, deepest near wall, very deeply impressed charcoal surviving on top and possibly charcoal bearing throughout, base finely dimpled, base shows apparent vertical inclusion as a very sharp-edged piece of slag 100mm across - could be clast or just possibly a tool impression, 100x120x70mm | 562 |
| | | 508 | 1 | dense well-formed plano-convex SHC with flat top with traces of dimples, but with a haematised, probably very fluid skin, 110x115x40mm | 508 |
| | | 206 | 1 | neat discoidal thin SHC forming bowl with inclined wedge of lining-influenced material right across top; 75x80x45(10)mm | 206 |
| | | 304 | 1 | 80x90x40(30)mm, dense well-formed SHC, with thin lining influenced layer across upper surface | 304 |
| | | 98 | 1 | irregular lobate mass, probably gravelly, with some haematised flowage, but mostly lining, could be discrete tongue, perhaps hot deformed? | |
| 392 | a | 8 | 1 | tiny fragment of indeterminate charcoal-bearing slag | |
| 410 | a | 18 | 1 | lining slag in concretion | |
| | | 18 | 1 | indeterminate scrap of slightly lobed slag | |
| | | 86 | 1 | fragment of SHC with basal toolmarks | |
| | | 208 | 1 | approximately half a well-formed SHC with 12mm approximately basal crust, flow lobed slags fill bowl; slightly biconvex | |

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|---|---|---|---|---|---|
| 418 | a | 4 | 1 | small piece of grey vitrified lining | |
| | | 174 | 13 | small scraps of indeterminate slag | |
| | | 776 | 12 | fragments of SHCs varying in density and size, but none estimatable to original size | |
| | | 58 | 1 | piece with irregular haematised flow lobes - unclear if smelting slag or from margin of haematised SHC | |
| | | 134 | 1 | irregular lobate dense piece - possibly a small dense irregular tongue, but unclear and weathered | |
| | | 42 | 1 | small flap of lining slag with chert, possibly an incipient tongue, but may be a part of a larger mass | |
| | | 1060 | 1 | large bulbous mass, essentially a two-layered SHC with a substantial void between the two layers, the top is glassy and full of chert fragments but is obscured by an concretionary layer with moulds of ?straw 115x140x105(80)mm | 1060 |
| | | 308 | 1 | rather irregular SHC, possibly with iron inclusion near base, top wispy with both lining and haematised components, base irregular and starting to explode on proximal side, 80x105x45mm, plano-convex | 308 |
| | | 516 | 1 | 120x100x55(30)mm, well-formed plano-convex SHC with substantial pile on upper surface at proximal side, weathered | 516 |
| | | 72 | 1 | small lining dominated mass, probably a discrete SHC equivalent, 50x75x30mm, glassy top, lining throughout but haematised surface trickles down proximal end | 72 |
| | | 112 | 1 | 55x65x35mm, slightly concavo-convex SHC, with arcuate concentric lines of lining slag on upper face, base irregular and perhaps slightly gravelly | 112 |
| 447 | a | 448 | 1 | very unusual piece, lower part is a ?transverse mass of dimpled slag, terminating to one side in a lump of vitrified lining ceramic, this is overlain by an approximately pentagonal piece of probable sandstone, 80x50x8mm, which is itself coated by small blebs of lining slag and a strange black (devitrified?) slag layer | |
| 450 | a | 70 | 1 | neat puck in vesicular slag, plano-convex, 47x60x22mm | 70 |
| | | 6 | 1 | probable decomposed slag fragment | |
| | | 38 | 1 | reduced lining with dimpled slag attached | |
| 454 | a | 26 | 1 | weathered dense flow of slag bearing a chert grain | |
| 489 | a | 824 | 1 | 110x100x55(45)mm, exceptionally dense neat SHC, flat top except for 10mm high areas of lining slag either side of blow, blow area itself has black glassy top; distally is somewhat rusty with chert lumps visible; base neatly rounded with some lining slag on proximal side | 824 |
| | | 420 | 1 | 85x100x45mm, crudely plano-convex lump with very slightly dished top and hint of two layers, oblique to wall | 420 |
| | | 564 | 1 | 75x110x50mm, oddly-shaped SHC, several rounded lumps possibly burr on presumed proximal side, but thins to nothing where widest distally | 564 |
| | | 424 | 1 | neat dense SHC broken to possibly 70%, plano-convex, slightly irregular | |
| | | 382 | 1 | 90x105x40mm, plano-convex SHC, some chert, weathered | 382 |
| | | 592 | 19 | smaller fragments of slag | |
| | | 492 | 1 | 100x80x50mm, dense plano-convex bowl, with lining slag pad 50x60mm rising onto bowl top, extending to about midpoint | 492 |
| | | 434 | 1 | wide SHC, broken into 3 (small part missing), 100x100x35mm, flat top has some fuel dimples, smoothest proximally, base hard neat | 460 |
| | | 212 | 1 | 95x(60)x30mm, 60% of small very neat SHC, top flat with peripheral line of lining slag | 350 |

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|---|---|---|---|---|---|
| | | 1990 | 18 | fragments of SHCs for which original size not estimatable | |
| | | 232 | 1 | 90x65x30mm, small tongue-like lining-dominated disc, with dense basal flow extending distally, disc 65x65mm, semi-elliptical | 232 |
| | | 686 | 7 | fragments of lining influenced SHCs with size not estimatable | |
| 489 | a | 58 | 1 | probably almost intact small dense rounded puck with bleb of lining slag on top in one corner, 50x50x15mm | 58 |
| 489 | a | 30 | 1 | probably about half of a small dense puck, well dimpled on base, cherty fragments on top | |
| | | 8 | 1 | fired daub with moderately large organic moulds | |
| 489 | a | 416 | 1 | 95x115x40(25)mm, well formed SHC, flat dimpled top to plano-convex bowl, raising very slightly on proximal side, base smoothly rounded | 416 |
| | | 362 | 1 | slightly biconvex SHC, 75x100x40mm | 362 |
| | | 406 | 1 | 105x70x65(35)mm, 40x30mm burr, wall standing 20mm above top of bowl of plano-convex SHC. Centre of flat top has pinnacle of dense slag 30mm high and 50mm diameter at base | 406 |
| | | 870 | 1 | 100x135x70mm, biconvex SHC, well-formed lower bowl with thick charcoal-bearing upward continuation | 870 |
| | | 524 | 1 | 100x110x40mm, triangular SHC, oblique, small burr 45x20mm, top smooth, base charcoal-rich | 524 |
| | | 560 | 1 | dense neat SHC, 100x95x55(50)mm; flat smooth top; to 40mm in from contact is 5mm lining slag layer; base well-formed, hemispherical, charcoal; one edge slightly broken | 600 |
| | | 238 | 1 | lining-rich SHC, 115x70x30mm, chert-rich top rusty base | 238 |
| | | 1685 | 12 | fragments of dense SHCs | |
| | | 66 | 1 | over-fired pottery with additional similar material against concave face | |
| | | 24 | 1 | fired and glazed hearth lining, just possibly stone | |
| | | 158 | 1 | part of dense tongue with probable burr at one end | |
| | | 220 | 1 | complex mass, possibly a very hot deformed SHC? | |
| | | 142 | 1 | small dense SHC with proximal end broken off, 60x65x30mm, plano-convex | 142 |
| | | 86 | 1 | tongue-like slab of lining slag, smooth top, irregular base with charcoal, 65x60x25mm | 86 |
| | | 128 | 1 | concavo-convex lump of lining slag, probably incomplete low-density SHC | |
| | | 86 | 1 | dense somewhat lobate slag piece, either a strange elongate puck or a flowed slag | |
| | | 202 | 6 | fragments of lining-dominated slag in various nubs and fragments | |
| | | 502 | 13 | lumps of dense slag, probably some are individual irregular pucks, but most are fragments of larger pieces | |
| 491 | a | 162 | 1 | 70x70x30mm, small dense SHC with upper lining layer | 162 |
| | | 54 | 6 | exploded SHC fragment containing charcoal | |
| 493 | a | 402 | 1 | 95x90x40mm, plano-convex dense SHC with well-formed burr with lining attached at approximately 70 degrees to top of bowl | 402 |
| | | 134 | 2 | SHC fragments | |
| 495 | a | 100 | 3 | 2 pieces of low density SHC/tongue (1 broken) | |

| | | | | | |
|---|---|---|---|---|---|
| 503 | a | 196 | 1 | small SHC, apparently folded in half hot on extraction | 196 |
| 509 | a | 116 | 1 | small, slightly incomplete SHC, tongue-like - lining top slightly irregular base 50x60x25mm | 116 |
| | | 26 | 1 | slag fragment mainly formed of lining slag | |
| 518 | a | 154 | 1 | detached fragment from base of large cake bearing two parallel curving toolmarks | |
| | | 32 | 1 | lining slag fragment | |
| u/s | a | 90 | 1 | small fragment from dense SHC, well worn | |
| u/s | a | 24 | 2 | probably highly weathered fine slag bearing quartz grains, although texture resembles some imported lava querns | |
| u/s | a | 66 | 1 | irregular rounded lump - probably part of an SHC with a strongly haematised upper surface, with haematised layer flowing over lip and onto dimpled base | |
| | | 20 | 1 | probably an isolated single lobe of a flowed slag, deeply weathered to a green colour | |
| u/s | a | 1275 | 1 | 130x130x75mm, very dense neat plano-convex SHC, slag bears fine charcoal, upper surface shows pair of small hollow proximally, possibly from blast, some lining debris on upper surface but not substantial, base neat, possibly slightly truncated distally | 1275 |
| | | 132 | | small plano-convex mass, irregular in shape, but possibly a proto-SHC, 75x55x30mm | 132 |
| | | 52 | 1 | small fragment of curved crust | |
| AREA B | | | | | |
| 1001 | b | 268 | 1 | half of a very dense deep SHC with a prilly base | |
| 1028 | b | 30 | 1 | small fragment probably from SHC crust | |
| 1032 | b | 152 | 1 | small irregular SHC, 65x75x25mm, plano-convex, base irregular top coated in lining slag | 152 |
| 1154 | b | 7 | 1 | slightly vesicular fine slag fragment | |
| 1252 | b | 2 | 1 | grey bloated lining with dark slag coating | |
| 1317 | b | 4 | 1 | vitrified oxidised-fired lining | |
| | | <1 | 1 | coke | |
| 1324 | b | 16 | 1 | indeterminate slag fragment | |

| | | | | | |
|---|---|---|---|---|---|
| 1338 | b | 538 | 1 | very unusual, rounded mass of inflated slag, 100x130x85mm, presumed base strongly vesicular with some surface oxides around edge, upper part largely missing, could be hot deformed and top ripped to one side, but uncertain | |
| 1356 | b | 70 | 2 | indeterminate dense slag fragments, most likely SHC fragments but not certain | |
| 1538 | b | 632 | 1 | 105x135x65mm, plano-convex SHC with slightly dimpled top, base round but asymmetric | 632 |
| | | 994 | 1 | 135x125x65mm, neatly biconvex SHC, top weathered but dimpled with fine charcoal and some lining slag, base neat, bears charcoal and a large chert pebble | 994 |
| | | 404 | 1 | block of grey lobate slag, rather weathered, could be a prilly SHC, but unlike anything inthis assemblage; could be a lobate non-tapped smelting slag or furnace slag | |
| 1666 | b | 58 | 1 | SHC fragment | |
| 1700 | b | 16 | 1 | small fragment of prilly slag | |
| | | 10 | 1 | lining slag | |
| 1709 | b | 1975 | 1 | 160x200x65(50)mm, very large dense SHC, top planar base slightly lobed and oblique, entire proximal half shows burr like attachment on base 165mm wide extending 90mm into hearth, top with charcoal impressions | 1975 |
| | | 626 | 1 | 105x100x50mm, well-formed hemi-spherical SHC, with burr material at a tangent on proximal side, top dimpled and overlain proximally by lining-related slag | 626 |
| | | 346 | 1 | 75x90x45mm, neat well-formed dense plano-convex SHC; skin of lining slag across entire upper planar surface, base well defined, proximal side lost | 346 |
| 1709 | b | 494 | 1 | 80x115x40mm, plano-convex SHC; distal edge raised slightly, possibly because of hot deformation, otherwise flat dimpled top, possibly broad burr? | 494 |
| | | 186 | 1 | 70x75x40mm, small weathered plano-convex SHC; abundant lining material on upper surface | 186 |
| 1710 | b | 466 | 1 | 95x110x65(40)mm, dense plano-convex cake with upstanding spike on one proximal corner, top coated in fine charcoal-bearing material, base well-formed with similar fine charcoal and a few bits of gravel on apex | 466 |
| | | 810 | 1 | 100x120x60mm, dense stout SHC with slightly dished top, horseshoe of lining slag on top and traces of oxidised lining on proximal end, thickest at wall; base well-formed | 810 |
| | | 454 | 1 | 100x100x40mm, slightly irregular plano-convex cake, top coated in fine charcoal bearing material bottom irregular, very small amount of lining slag on top | 454 |
| | | 998 | 1 | 140x120x45mm, dense plano-convex cake with well-formed dimples in upper surface, base neat, small amount of lining proximally suggesting only small area of contact | 998 |
| AREA C | | | | | |
| 431 | c | 106 | 1 | irregular slag lump, possibly rolled tongue | |

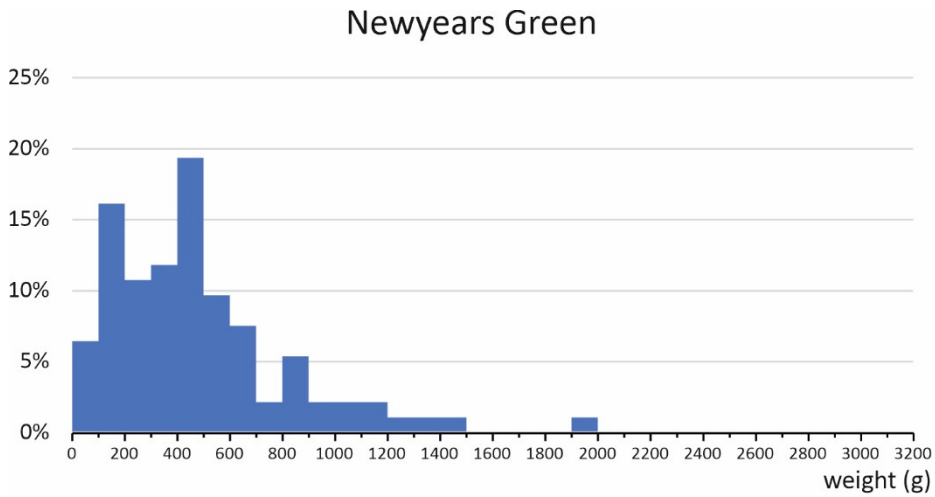
*Table 2. distribution of residue facies by context. All weights in g.*

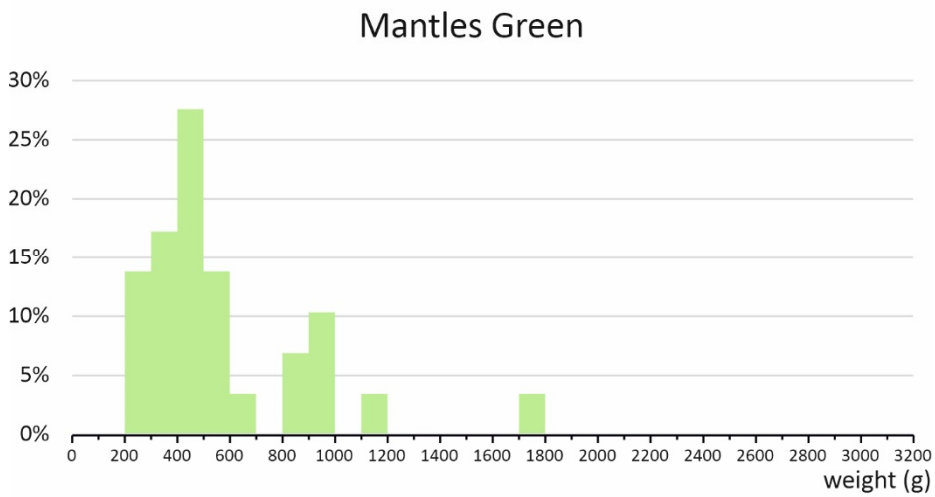
| context | SHCs | tongues | probable smithing | indet. slag | wall ceramic | lining slag | tapslag | probable smelting | other | *total* |
|---|---|---|---|---|---|---|---|---|---|---|
| AREA A | | | | | | | | | | |
| 105 | | | | | | | | 286 | | *286* |
| 125 | | | | 60 | | | | | | *60* |
| 128 | 1110 | | | | | | | | | *1110* |
| 131 | | | | 18 | | | 172 | | | *190* |
| 133 | 458 | | | 46 | | | | | | *504* |
| 165 | 412 | | | | 12 | | 72 | | | *496* |
| 169 | 5329 | | | | | | | | | *5329* |
| 177 | 3090 | 90 | 738 | 532 | | | 1085 | 40 | | *5575* |
| 185 | | | | | | | 36 | | | *36* |
| 203 | 32 | | | | | | | | | *32* |
| 208 | 1024 | | 138 | | | | 50 | | | *1212* |
| 210 | 964 | | | | | | | | | *964* |
| 222 | | | | | | | | 26 | | *26* |
| 234 | 646 | 46 | | 82 | 16 | 32 | | | 8 | *830* |
| 240 | 148 | | | 74 | | | | | | *222* |
| 243 | 80 | | | | | | 26 | | | *106* |
| 258 | | | | | 8 | | | | | *8* |
| 325 | | | | 16 | | | | | | *16* |
| 341 | 10840 | | 186 | | | 30 | | | | *11056* |
| 351 | 268 | | | | | 18 | | | | *286* |
| 355 | 1771 | | | | | | | | | *1771* |
| 382 | 3147 | | 98 | | | | | | | *3245* |
| 392 | | | | 8 | | | | | | *8* |
| 410 | 294 | | | 18 | | 18 | | | | *330* |
| 418 | 3018 | 134 | 58 | | 4 | 42 | | | | *3256* |
| 447 | 448 | | | | | | | | | *448* |
| 450 | 70 | | | 6 | 38 | | | | | *114* |
| 454 | | | | 26 | | | | | | *26* |
| 489 | 13681 | 244 | | | 24 | | | | 74 | *14023* |
| 491 | 216 | | | | | | | | | *216* |
| 493 | 536 | | | | | | | | | *536* |
| 495 | | 100 | | | | | | | | *100* |
| 503 | 196 | | | | | | | | | *196* |
| 509 | 116 | | | 26 | | | | | | *142* |
| 518 | 154 | | | | | 32 | | | | *186* |
| u/s | 1615 | | | 24 | | | 20 | | | *1659* |
| AREA B | | | | | | | | | | |
| 1001 | 268 | | | | | | | | | *268* |
| 1028 | 30 | | | | | | | | | *30* |
| 1032 | 152 | | | | | | | | | *152* |
| 1154 | | | | 7 | | | | | | *7* |
| 1252 | | | | | | 2 | | | | *2* |
| 1317 | | | | | | 4 | | | <1 | *4* |
| 1324 | | | | 16 | | | | | | *16* |
| 1338 | 538 | | | | | | | | | *538* |
| 1356 | | | 70 | | | | | | | *70* |
| 1538 | 1626 | | 404 | | | | | | | *2030* |
| 1666 | 58 | | | | | | | | | *58* |
| 1700 | | | | 16 | | 10 | | | | *26* |
| 1709 | 3627 | | | | | | | | | *3627* |
| 1710 | 2728 | | | | | | | | | *2728* |
| AREA C | | | | | | | | | | |
| 431 | 106 | | | | | | | | | *106* |
| *total* | *58796* | *614* | *1692* | *975* | *102* | *188* | *1461* | *352* | *82* | 64262 |

*Table 3: Comparison of the SHC weight-frequency distribution with that of other assemblages from southern Britain, ordered by mean weight. Weights in gram.*

| Site: | Cleevelands | Exminster | Uffington | Ebrington | Neath | Ware | Tidworth | Worcester 35 Mill St/ Willow St | Marsh Leys Farm | Newyears Green | Burlescombe | Mantles Green | Kingstone | Widecombe | Dymock | Hartshill Copse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source: | Young 2016a | Young 2014b | Young 2015 | Young 2016c | Young 2013, 2014a | Young 2014c | Young 2016b | Young 2007, 2009 | Young 2005, 2011 | This report | Young 2018 | McDonnell 1985 | Young 2012 | Young 2019 | Young & Kearns 2010 | Young 2021a |
| | RB | RB | RB | RB | RB | RB | EM | 12th | RB | | EM? | RB | RB | ? | RB | EIA |
| *count* | 176 | 107 | 57 | 37 | 47 | 70 | 12 | 51 | 30 | 93 | 103 | 29 | 15 | 6 | 10 | 7 |
| *min. wt* | 44 | 32 | 36 | 53 | 74 | 36 | 80 | 74 | 60 | 46 | 68 | 200 | 230 | 354 | 112 | 448 |
| *max. wt* | 530 | 482 | 614 | 628 | 630 | 952 | 680 | 782 | 824 | 1975 | 3115 | 1700 | 1035 | 2215 | 3885 | 2350 |
| *mean wt* | 125 | 127 | 137 | 180 | 244 | 246 | 265 | 285 | 333 | 472 | 510 | 550 | 565 | 884 | 1032 | 1160 |
| *% <150g* | 73% | 77% | 72% | 46% | 32% | 44% | 33 | 24% | 23% | 17% | 15% | - | - | - | 20% | - |
| *% <500g* | 99% | 100% | 98% | 97% | 89% | 82% | 75 | 86% | 77% | 65% | 65% | 59% | 47% | 33% | 60% | 29% |
| *% >1000g* | - | - | - | - | - | - | - | - | - | 9% | 11% | 7% | 7% | 17% | 20% | 57% |
| *% >3000g* | - | - | - | - | - | - | - | - | - | - | 2% | - | - | - | 10% | - |

Figure 1


Newyears Green
25%
20%
15%
10%
5%
0%
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200
weight (g)


Mantles Green
30%
25%
20%
15%
10%
5%
0%
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200
weight (g)

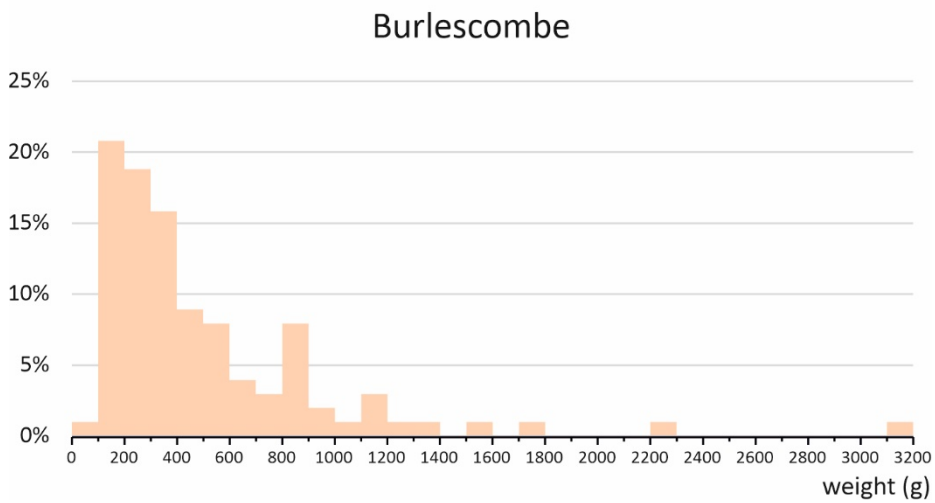
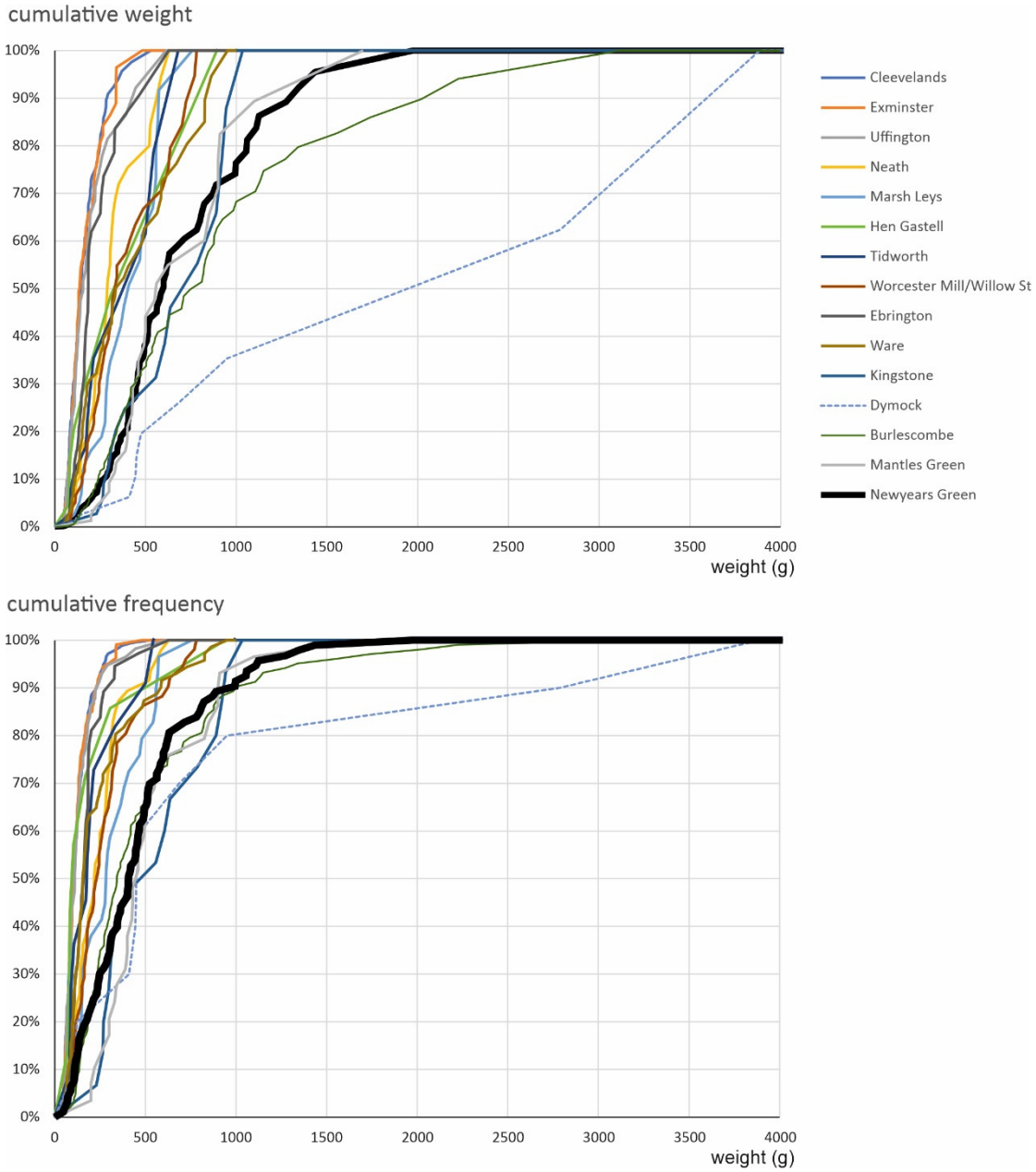

Burlescombe
25%
20%
15%
10%
5%
0%
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200
weight (g)

Figure 2


cumulative weight
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
500
1000
1500
2000
2500
3000
3500
4000
weight (g)
Cleevelands
Exminster
Uffington
Neath
Marsh Leys
Hen Gastell
Tidworth
Worcester Mill/Willow St
Ebrington
Ware
Kingstone
Dymock
Burlescombe
Mantles Green
Newyears Green
cumulative frequency
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
500
1000
1500
2000
2500
3000
3500
4000
weight (g)

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