The Examination of Ironworking Debris from the A1 Leeming to Barton Improvement:

Death, Burial and Identity Related Contexts

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Contents

Summary

Contexts associated with predominantly Roman burials and cremations in 13 of the fields excavated as part of the A1 Leeming to Barton Improvement very frequently contained hammerscale from the smithing of iron. It is suggested that this is most frequently due to intrusive contamination in an area where iron smithing was a major activity. Some associated contexts, such as enclosure ditches produced more balanced assemblages of smithing debris, and these appear to be contemporary with the features.

Introduction

The material assessed in this report derived from archaeological excavations in advance of the upgrading of the A1 between Leeming and Barton in North Yorkshire. Specifically this report covers ferrous industrial debris that was found in contexts and features associated with human burials within 13 of the Fields. Most of the 20kg of material had been hand-retrieved from relatively few contexts. However, debris recovered from processed soil samples swelled the numbers of bags of potential evidence examined to a total of 541. By far the majority of these contained relatively few flakes of hammerscale, perhaps representing a 'background count' of iron working that had taken place in the area, but for which the debris had been widely dispersed. However some contexts produced substantial quantities of hammerscale suggesting that areas used for burials had once also been associated with metal working.

Methodology

All bulk debris encountered during the excavation was saved and extensive soil samples taken. From the latter 'magnetic' residues were recovered for hammerscale identification and any further fragments of bulk metalworking debris were extracted.

The debris examined in this report was classified into standard categories based on those used by the former Ancient Monuments Laboratory of English Heritage. For bulk slags, visual observation of the exterior was backed up, where necessary, by the examination of fresh fracture surfaces and the use of a geological streak plate and magnet.

The breakdown of this material is presented in Table 1. It should be noted that the only metalworking activity identified in this study was *iron smithing*. The diagnostic bulk slag for this process is that classified as **smithing hearth bottoms**. These fayalitic (iron silicate) plano-convex blocks form in the base of a iron forging hearth as a result of the reaction between iron scale and a source of silica, either the clay lining or any sand used as flux. Although hearth bottoms are distinctive and provide good evidence of iron forging, they may not accurately indicate the location of any smithing activity as they are sometimes removed from the site of working for disposal, or use, elsewhere. In addition to the bulk slags, iron smithing also give rise to the microslags; **Flake and Spheroidal hammerscale** (Starley 1995). The difference between the two types relates to their origins: Flake hammerscale comprises fragments of the oxide skin that forms on iron during hot working but breaks away when the iron is hammered or quenched. Spheroidal hammerscale is slag from the interior of the metal which is squeezed out during hammering. Both are regarded as providing a better indication of the actual site of the smithing activity as they tend to remain in the immediate area of the hearth.

Table 1 Metalworking Debris: All Fields by type			
Activity	**Typology**	**Mass (g)**	**No. Contexts**
Iron smithing	Smithing hearth bottoms	4766	5
	Flake hammerscale	<1	90
	Spheroidal hammerscale	<1	20
	Flake and spheroidal hammerscale	499	159
Undiagnostic ironworking	Undiag. ironworking slag	2762	19
	Fayalitic run slag	1	1
	Ferruginous concretion	<1	1
	Iron-rich cinder	230	2
Non-ferrous metalworking	Copper alloy fragment	<1	1
Metalworking or other high-temp. process	Vitrified hearth/furnace lining	152	4
	Cinder	19	3
	Fired clay	11597	46
Fuel	Coal	19	12
	Coal/coke/clinker	16	6
	Clinker	4	13
	Fuel ash slag	<1	1
Iron	Fe artefact or working waste	102	4
Non- metallurgical	Unfired clay	<1	1
	Stone	101	2
Total		20268	

For both the hammerscale found within the bags of bulk debris, and those extracted from the sieve residues of the processed soil samples a similar assessment of quantity was made. Their high magnetite content allows them to be attracted to a bar magnet, but visual examination is also required to distinguish them from other, magnetic material such as flakes of mineralised iron, heat-transformed iron-rich stone and clay. In each case an estimation of the number of flakes present was made, as well as a record of the total mass of the sample, although when the latter was below the limits of the balance this was quoted only as <1g or for the tiniest amounts <<1g.

Whilst smithing hearth bottoms and hammerscale are considered *diagnostic* of ironsmithing, other materials could not be assigned to an activity with such a degree of certainty. Under the heading of *undiagnostic* evidence, is included a range of debris, predominantly of fayalitic composition, which would have required both extreme heat and the presence or iron or iron ore to form. In the absence of other evidence of smelting or historic processes, we can fairly safely assume that the materials examined in this report also derive from iron smithing. The categories include; the irregularly shaped **undiagnostic ironworking slag,** the more ferruginous **iron-rich cinder,** and the drip-like **fayalitic run slag.**

Amongst the waste products classified under *Undiagnostic – metalworking or other high temperature process* are various categories of heat-transformed clay, without significant iron content. Those most likely to derive from metalworking include **vitrified hearth lining**, for which the outer surface has been attacked by the alkali fuel ash or fayalitic slag at high temperatures but which may still have unmodified fired clay on its underside. **Cinder** is a related material, but forms when clay lining spalls away and allows it to become glazed on its entire surface. Also included in this category is **fired clay**, the origins of which may be far more diverse. Away from the higher temperature zones, even clay from hearths and furnaces may show no vitrification, so this material could have metallurgical origins. However, a wide range of other origins must be considered including industrial pottery and grain-drying kilns, domestic hearths, architectural ceramics and accidentally burned daub structures. Given the nature of DBI contexts, it should also be considered whether the procedure of cremation of human bodies could produce fired clay.

The remains of fuels, particularly **coal** and its waste product **clinker** were also recorded. Intermediate, between there categories, **part burned coal** may not be distinguishable from commercially produced coke. Whilst coal was used for smithing in the Roman period (Dearne & Branigan1995), it may relate to other heating activities. Such fuel waste is not an uncommon find on agricultural land due to the use of coal-fired agricultural machinery or the disposal of domestic hearth waste of more recent years.

Results

Field 145, Bowbridge Lane

Debris from contexts associated with cremated bone in Field 145 totalled 28 g. The bulk finds were entirely fired clay, and as none of this was associated with metalworking debris, it can be assumed not to be metallurgically significant. Other contexts, including pit fills from which cremated human remains were recovered, contained one and two flakes of hammerscale and a fragment of undiagnostic ironworking slag, all at the <<1g level. Whilst this material undoubtedly derives from iron smithing, the quantities are too low to suggest that the area was the immediate location of any metalworking.

Field 159, Bainesse

Table 2 . Metalworking Debris: Field 159 by activity

Activity	Typology	Mass (g)	No. Contexts
Iron smithing	Flake hammerscale	<1	6
	Spheroidal hammerscale	<<1	1
	Flake and spheroidal hammerscale	<1	8
Metalworking or other high-temp. process	Fired clay	719	7
Fuel	Coke/ clinker	<1	1
	Fuel ash slag	<1	1
Total		719	12

Fired clay, totalling 719g, was the only debris of significant weight from the grave fills in Field 159. Although this may not be metallurgically relevant, the presence of small quantities of hammerscale in the same contexts, including the fills of graves 13420, 13435, 13460, 13494, 13495 suggests iron working in the vicinity. However, such small amounts, particularly in the absence of bulk debris, are most probably residual or intrusive.

Field 163, Bainesse cemetery

Table 3. Metalworking Debris: Field 163 by activity

Activity	Typology	Mass (g)	No. Contexts
Iron smithing	Smithing hearth bottoms	4766	5
	Flake hammerscale	<1	71
	Spheroidal hammerscale	<<1	16
	Flake & spheroidal hammerscale	488	122
Undiagnostic ironworking	Undiag. ironworking slag	2758	15
	Iron-rich cinder	230	2
Non-ferrous	Copper alloy fragment	<1	1
Metalworking or high-temp. process	Vitrified hearth/furnace lining	145	3
	Cinder	10	1
	Fired clay	136	8
Fuel	Coal	14	8
	Coke/ clinker	<1	1
	Clinker	2	9
Iron	Fe artefact or working waste	53	1
Non- metallurgical	Unfired clay	<1	1
Total		8603	199

The cemetery of Field 163 produced the most significant debris assemblage, weighing 8.6kg which included all the components that might be expected of iron smithing, including the diagnostic hearth bottoms and hammerscale, together with debris such as undiagnostic fayalitic slag and iron-rich cinder. The fired clay and, more certainly, the vitrified hearth lining may be the only surviving structural elements of the hearths in which the iron was heated. The debris does, however, derive predominantly from ditch fills, rather than the graves themselves. In particular the upper fill (12444), of the inner enclosure ditch (12438) produced almost 7kg of debris. Bulkier waste is often known to have been put to use as hard core or track metalling. However, the processing of soil samples recovered very high levels of hammerscale from this deposit, which suggests that this context was indeed located in the immediate vicinity of a smithy. The lower fill (12443) of this ditch also contained hearth bottoms and undiagnostic slag, if in smaller quantities, inferring that it was open when iron was being worked on the site. Another ditch (12368) had bulk slag in its upper (12372) and lower (12371) fills, but no hammerscale. Presumably this feature lay at a greater distance from the smithy.

A total of 187 burial-related contexts in this field produced some form of hammerscale, generally only a few flakes or spheres, which might be intrusive. However a number of grave fills such as; (12291) the primary fill of grave (12289), (12318) the secondary fill of cremation cut (12317), (12648) the backfill of grave (12649) and more surprisingly (13593), the coffin fill from around skeleton 13592, gave greater quantities suggesting that the hammerscale could have been a component of the soil when it was used to backfill the graves.

Coal and its waste product, clinker were regularly found as tiny fragments in grave fills, generally along with hammerscale. A larger (10g) fragment was associated with the main metalworking debris deposit and this presence may well indicate its use as fuel in smithing.

Field 172, Cataractonium

Table 4. Metalworking Debris: Field 172 by activity

Activity	Typology	Mass (g)	No. Contexts
Iron smithing	Smithing hearth bottoms	4766	3
	Flake hammerscale	<<1	3
	Spheroidal hammerscale	<<1	1
Metalworking or other high-temp. process	Fired clay	10555	12
Fuel	Coal/coke/clinker	14	4
Iron	Fe artefact or working waste	1	1
Non- metallurgical	Stone	101	2
Total		10671	14

The fills of cremation pits in Field 172 yielded a total of 10.5 kg of fired clay, mostly, but not exclusively associated with the bustum burials. None of this showed the vitrification that might confirm a link to metalworking and none was associated with bulk metalworking waste. Four contexts including produced miniscule quantities of hammerscale. On balance it would appear that the working of iron was not directly associated with the locations of the burials in this area.

Field 174, Cataractonium

One context produced a single flake of hammerscale. This was inadequate evidence to suggest that metalworking was in any way linked to the burials in this area.

Field 175, Cataractonium

The very small amount of fired clay and cinder recovered from the topsoil in this field is insufficient to confirm metallurgical activity within its bounds.

Field 176, Cataractonium

Although Field 176 is known to contain extensive deposits of ironworking debris, little of this was recovered from the DBI contexts although an iron object was tentatively suggested to be manufacturing waste. Flake and spheroidal hammerscale were identified in three contexts in little more than 'background' quantities. The fill (21905) of burial cut (21904) gave the strongest concentration, but again the material is likely to be residual or intrusive.

Field 177, Cataractonium

The 73g of clay from DBI contexts were not matched by significant quantities of bulk ironsmithing debris, which would have added support for its origins being linked to iron working. Some contexts did however contain hammerscale, in quantities at the <1g level, that indicated ironworking was active within the area, if not immediate locality.

Field 178, Cataractonium

64 bags of material from 14 DBI contexts in Field 178 were examined, but the mass of debris totalled only 71 grams. This did include some undiagnostic ironworking slag, which, in the case of grave fills (20115) & (20533) was accompanied by fired clay and small quantities of flake and spheroidal hammerscale and in (20606) by clinker and hammerscale. A further grave fill (20341) included some metallic iron waste, fired clay and hammerscale. Ironworking, probably coal-fuelled smithing, in the general area would seem to have contributed small fragments of debris in a wide spread across the area, rather than a focus of this activity in the immediate vicinity of the graves.

Field 179, Cataractonium

One grave fill (9100) contained small quantities of fired clay and minimal amounts of flake and spheroidal hammerscale whilst further fired clay was found in pit fill (17713). The there is no strong evidence to link ironworking with the immediate locality of the inhumation.

Field 201, Gatherley

The very small quantity of coal from context (11814) cannot be linked directly to metalworking.

Field 209, Scurragh House

Tiny amounts of coal, clinker and a single flake of hammerscale, the latter associated with a coffin stain (108280) show no more than a 'background count' of industrial debris.

Field 211, Scurragh House

Two cremation fills produced debris. For (7684) this included fired clay and clinker whilst (7673) contained fired clay and a single flake of hammerscale. An apparent sphere of hammerscale in fill (7672) was magnetically weak and could have derived from the cremation process. There is no evidence of a link between iron working and the burying of cremated remains.

Overview of results

Visual analysis of the 20.3kg of possible industrial debris from contexts associated with the burial or cremated remains and inhumations in the 13 fields found evidence for iron smithing but not iron smelting. By weight, the biggest contributor to this assemblage was fired clay. This was generally fragmentary, exhibited no exterior surfaces and could have derived from a

number of processes, not least of which could have been the bustum cremations. It may be no coincidence that the greatest concentration of fired clay derived from Field 172, where this was a common rite. However, in other areas, such as Field 178, where fired clay was found along with fayalitic slags, in contexts associated with inhumations, a stronger case can be made for if deriving from the hearths used for iron smithing.

The fuel, coal, its part burned remains and waste clinker, were regular finds. There was enough co-location with metalworking debris to suggest that this fossil fuel was used for iron smithing and this is not uncommon on sites of Roman date (Dearne & Branigan 1985) However, given the frequency that any tiny fragments turned up in soil sample residues much may also be intrusive from later, historical use.

The strongest indication that iron working was a major activity across the area of excavation came from the hammerscale recovered from multiple soil samples from 187 contexts. Whilst ironsmithing was clearly an important activity, its association with the burial environment is much less easy to interpret, particularly until the assemblage distributions for the fields as a whole have been analysed. One context, the upper fill of the enclosure ditch (12438) gave what might be considered to be a 'normal' smithing assemblage, including diagnostic and undiagnostic slags, clay structural debris and large quantities of hammerscale. The latter in particular suggests that the forge was situated very close to the ditch and was certainly more than a short term activity. As is invariably the case for iron smithies at all dates, the work would have taken place in some form of covered building; a smith needs protection from daylight to judge the temperature of the glowing metal.

The very widespread distribution of hammerscale elsewhere, particularly where no 'bulk' slag is associated with it is less easily explained. One possibility is for the 'hammerscale' to derive not from the working of iron, but for the high temperature oxidation of ironwork during cremation of other funerary rituals. For pagan Saxon warrior burials, such 'killing' of weapons is well attested. In the DBI contexts under study, however, there seems to be no greater correlation between hammerscale and cremations rather than between hammerscale and inhumations.

Agricultural ploughing might soon distribute such fine material across an area to give what has been described as a background count. If the ironworking preceded use of the area for burials, then such material would certainly have been backfilled into grave cuts. This, however, fails to explain the lack of bulk slag. Perhaps a more feasible model is for the ironsmithing to postdate the burials and for the fine particles of hammerscale to percolate into these contexts intrusively through root or animal disturbance. Again, depending on their survival, analysis of non-DBI related contexts should shed light on this question. this will very much be a topic for examination forthcoming volumes. Until then the general conclusion, with respect to the burial archaeology is that many of the areas used for burials coincided, spatially, but not necessarily temporally with extensive ironsmithing. Perhaps, for the occupants of the Roman-British settlements both burial of the dead and the working of iron were activities to be kept just a little beyond ones immediate threshold.

Bibliography

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Appendix 1. Full listing of bulk metalworking debris by context

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
145		10006	AA	Fired clay	2			No discerning features
145		10013	AA	Fired clay	9			
145		10018	AA	Fired clay	2			
145		10018	AA	Fired clay	4			
145		10079	AA	Fired clay	<1			
145		10126	AA	Fired clay	24			
145		10064	AA	Flake hammerscale	<<1	2	0	
145		10116	AB	Flake hammerscale	<<1	1	0	
145		10015	AA	Undiag.Ironworking slag	<<1	0	0	Not hammerscale as listed
159	A	13436	AC	Coke/clinker	<1			
159	A	13436	AC	Fired clay	2			
159	A	13436		Fired clay	9			
159	A	13469		Fired clay	10			
159	A	13469	AA	Fired clay	1			Poorly fired ?daub
159	A	13495		Fired clay	3			
159	A	13502	AA	Fired clay	617			Poorly fired ?daub
159	A	13503		Fired clay	3			
159	A	13504	AA	Fired clay	7			
159	A	13504	AA	Fired clay	30			Poorly fired ?daub
159	A	13504		Fired clay	10			
159	A	13504		Fired clay	5			
159	A	13504		Fired clay	6			Some surfaces no colour graduation
159	A	13531	AA	Fired clay	16			
159	A	13436	AA	Flake& spher h'scale	<<1	8	1	
159	A	13436	AB	Flake& spher h'scale	<<1	2	1	
159	A	13438	AA	Flake& spher h'scale	<<1	6	1	
159	A	13438	AB	Flake& spher h'scale	<1	8	4	
159	A	13438	AB	Flake& spher h'scale	<<1	2	1	
159	A	13438	AC	Flake& spher h'scale	<1	7	2	
159	A	13459	AA<4	Flake& spher h'scale	<1	7	1	
159	A	13459	AB	Flake& spher h'scale	<<1	3	1	
159	A	13459	AC	Flake& spher h'scale	<1	5	2	
159	A	13495	AA	Flake& spher h'scale	<1	3	2	
159	A	13503	AA	Flake& spher h'scale	<1	12	1	
159	A	13504	AA	Flake& spher h'scale	<1	30+	6	
159	A	13531	AA	Flake& spher h'scale	<1	10	5	
159	A	13533	AA	Flake& spher h'scale	<<1	3	1	
159	A	13421	AB	Flake hammerscale	<<1	1	0	
159	A	13436	AC	Flake hammerscale	<1	6	0	
159	A	13438	AA	Flake hammerscale	<<1	2	0	
159	A	13459	AA	Flake hammerscale	<<1	1	0	
159	A	13459	AD	Flake hammerscale	<<1	6	0	
159	A	13469	AA	Flake hammerscale	<<1	3	0	
159	A	13502	AA	Flake hammerscale	<1	21	0	
159	A	13438	AC	Fuel Ash slag	<1	1		
159	A	13421	AA	Spheroidal hammerscale	<<1	0	1	

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
163	C	12380		Cinder	10			
163	C	12314		Clinker	2			
163	C	12444		Clinker	<1			
163	C	12631	AA	Clinker	<1			
163	C	12631	AB	Clinker	<1			
163	C	12736	AA	Clinker	<<1			
163	C	12805	AC	Clinker	<1			
163	C	12810	AA	Clinker	<1			
163	C	13098	AA	Clinker	<<1			
163	C	13122	AA	Clinker	<<1			
163	C	12290		Coal	<1			
163	C	12314		Coal	2			
163	C	12339		Coal	<1			
163	C	12363		Coal	2			
163	C	12444		Coal	10			
163	C	12534	AA	Coal	<1			
163	C	12660	AA	Coal	<1			
163		13190	AA<4	Coal	<1			
163	C	13326	AA	Coal				
163	C	13151	AB	Coke/clinker	1	0	0	
163	C	12798	11147	Cu alloy	<1			Tiny frag. mineralised
163	C	12444		Fe object/ waste	15			
163	C	12444		Fe object/ waste	38			
163	C	12371		Fired clay	7			Surface of 1 frag. grey
163	C	12417	AA	Fired clay	<<1			
163	C	12424		Fired clay	<1			
163	C	12444		Fired clay	83			
163		12444		Fired clay	20			
163	C	12444		Fired clay	26			
163	C	12538	AE>4	Fired clay	<1			Yellow/orange
163	C	12671	AA	Fired clay	<<1			
163	C	12692	AC>4	Fired clay	>1			Yellow/orange
163	C	12732	AB>4	Fired clay	<1			Yellow/orange
163		12282	AA	Flake& spher h'scale	<1	25	17	
163	C	12282	AA	Flake& spher h'scale	0.6	10	10	
163	C	12285	AA	Flake& spher h'scale	<<1	5	1	
163		12290	AA	Flake& spher h'scale	<1	21	10	
163	C	12290	AA	Flake& spher h'scale	<1	10	5	
163	C	12290	AA	Flake& spher h'scale	1.3	30	30	
163	C	12291	AA	Flake& spher h'scale	4.6	100	40	
163	C	12293	AA	Flake& spher h'scale	<<1	3	5	
163	C	12306	AA	Flake& spher h'scale	<<1	2	1	
163	C	12314	AA	Flake& spher h'scale	<<1	20	20	
163	C	12318	AA	Flake& spher h'scale	<<1	6	1	
163	C	12320	AA	Flake& spher h'scale	<<1	5	3	
163	C	12339	AA	Flake& spher h'scale	<<1	40	30	Plus fired clay
163	C	12343	AA	Flake& spher h'scale	<<1	10	4	
163	C	12358	AA	Flake& spher h'scale	<<1	3	1	
163	C	12362	AA	Flake& spher h'scale	<<1	20	10	
163	C	12363	AA	Flake& spher h'scale	<<1	40	10	
163	C	12365	AA	Flake& spher h'scale	<1	50	15	

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
163	C	12400	AA	Flake& spher h'scale	<<1	5	5	
163	C	12414	AA	Flake& spher h'scale	<<1	2	1	
163		12417	AA	Flake& spher h'scale	<<1	20	5	
163	C	12422	AA	Flake& spher h'scale	<<1	30	10	
163	C	12424	AA	Flake& spher h'scale	<<1	40	10	
163	C	12429	AA	Flake& spher h'scale	<<1	12	2	
163	C	12444	AA	Flake& spher h'scale	478	10000	1000	
163	C	12453	AA	Flake& spher h'scale	<<1	10	0	
163	C	12467	AA	Flake& spher h'scale	<<1	15	5	
163	C	12468	AB	Flake& spher h'scale	<<1	2	1	
163	C	12470	AA	Flake& spher h'scale	<<1	6	2	
163	C	12473	AA	Flake& spher h'scale	<<1	7	1	
163	C	12482	AA	Flake& spher h'scale	<<1	20	4	
163	C	12484	AA	Flake& spher h'scale	<<1	10	3	
163		12486	AA	Flake& spher h'scale	<<1	20	2	
163		12488	AA	Flake& spher h'scale	<<1	8	8	
163	C	12492	AA	Flake& spher h'scale	<1	30	3	
163	C	12516	AA	Flake& spher h'scale	<<1	15	3	
163	C	12516	AB	Flake& spher h'scale	<<1	20	2	
163	C	12519	AA	Flake& spher h'scale	<<1	30	10	
163	C	12526	AA	Flake& spher h'scale	<<1	10	2	
163	C	12526	AB	Flake& spher h'scale	<<1	3	1	
163	C	12530	AA	Flake& spher h'scale	<<1	5	1	
163	C	12534	AB	Flake& spher h'scale	<<1	6	1	
163	C	12540	AA	Flake& spher h'scale	<<1	2	2	
163	C	12569	AA	Flake& spher h'scale	<<1	5	2	
163	C	12581	AD	Flake& spher h'scale	<<1	1	1	
163	C	12583	AC	Flake& spher h'scale	<<1	1	1	
163	C	12586	AF	Flake& spher h'scale	<<1	2	3	
163	C	12587	AD	Flake& spher h'scale	<<1	1	1	
163	C	12601	AA	Flake& spher h'scale	<<1	3	1	
163		12603	AA	Flake& spher h'scale	1.4	60	10	
163	C	12619	AE	Flake& spher h'scale	<<1	2	0	
163	C	12631	AA	Flake& spher h'scale	<<1	4	0	
163	C	12631	AB	Flake& spher h'scale	<<1	4	1	
163	C	12642	AA	Flake& spher h'scale	<<1	6	1	
163	C	12648	AB	Flake& spher h'scale	2.2	50	10	
163	C	12658	AA	Flake& spher h'scale	<<1	3	2	
163	C	12660	AA	Flake& spher h'scale	<<1	3	1	
163	C	12666	AG	Flake& spher h'scale	<<1	6	2	
163	C	12671	AA	Flake& spher h'scale	<<1	3	1	
163	C	12683	AA	Flake& spher h'scale	<<1	10	3	
163	C	12692	AA	Flake& spher h'scale	<<1	10	3	
163	C	12699	AA	Flake& spher h'scale	<<1	15	2	
163	C	12711	AA	Flake& spher h'scale	<<1	20	10	
163	C	12727	AA	Flake& spher h'scale	<<1	4	2	
163	C	12736	AA	Flake& spher h'scale	<<1	15	2	
163	C	12742	AA	Flake& spher h'scale	<<1	5	3	
163	C	12752	AC	Flake& spher h'scale	<<1	6	1	
163	C	12757	AA	Flake& spher h'scale	<<1	8	2	
163	C	12763	AA	Flake& spher h'scale	<<1	10	1	
163	C	12769	AA	Flake& spher h'scale	<<1	6	1	

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
163	C	12804	AA	Flake& spher h'scale	<<1	10	3	
163	C	12805	AB	Flake& spher h'scale	<<1	1	3	
163	C	12816	AA	Flake& spher h'scale	<<1	1	1	
163	C	12816	AB	Flake& spher h'scale	<<1	3	1	
163	C	12816	AC	Flake& spher h'scale	<<1	2	5	
163	C	12837	AA	Flake& spher h'scale	<<1	3	1	
163	C	12850	AA	Flake& spher h'scale	<<1	4	1	
163	C	12860	AA	Flake& spher h'scale	<<1	10	1	
163	C	12861	AE	Flake& spher h'scale	<<1	10	0	
163	C	12887	AA	Flake& spher h'scale	<<1	4	2	
163	C	12887	AB	Flake& spher h'scale	<<1	3	4	
163	C	12892	AA	Flake& spher h'scale	<<1	2	1	
163	C	12898	AA	Flake& spher h'scale	<<1	5	5	
163	C	12910	AA	Flake& spher h'scale	<<1	6	3	
163	C	12912	AA	Flake& spher h'scale	<<1	15	6	
163	C	12923	AA	Flake& spher h'scale	<<1	20	4	
163	C	12927	AA	Flake& spher h'scale	<<1	3	3	
163	C	12927	AA	Flake& spher h'scale	<<1	4	1	
163	C	12939	AA	Flake& spher h'scale	<<1	2	2	
163	C	12953	AA	Flake& spher h'scale	<<1	2	2	
163	C	12956	AA	Flake& spher h'scale	<<1	10	2	
163	C	12960	AA	Flake& spher h'scale	<<1	4	1	
163	C	12963	AA	Flake& spher h'scale	<<1	10	3	
163	C	12965	AA	Flake& spher h'scale	<<1	2	3	
163	C	12973	AA	Flake& spher h'scale	<<1	5	5	
163	C	12979	AB	Flake& spher h'scale	<<1	10	3	
163	C	12982	AA	Flake& spher h'scale	<<1	10	1	
163	C	12992	AA	Flake& spher h'scale	<<1	10	1	
163	C	13036	AA	Flake& spher h'scale	<<1	5	1	
163	C	13066	AA	Flake& spher h'scale	<<1	1	1	
163	C	13070	AA	Flake& spher h'scale	<<1	4	1	
163	C	13073	AB	Flake& spher h'scale	<<1	15	1	
163	C	13098	AA	Flake& spher h'scale	<<1	10	4	
163	C	13110	AA	Flake& spher h'scale	<<1	10	10	
163	C	13122	AA	Flake& spher h'scale	<<1	20	2	
163	C	13130	AA	Flake& spher h'scale	<<1	10	1	
163	C	13148	AA	Flake& spher h'scale	<<1	6	1	
163	C	13148	AB	Flake& spher h'scale	<<1	6	1	
163	C	13158	AA	Flake& spher h'scale	<<1	15	10	
163	C	13171	AA	Flake& spher h'scale	<<1	2	4	
163	C	13174	AA	Flake& spher h'scale	<<1	4	1	
163	C	13179	AA	Flake& spher h'scale	<<1	30	10	
163	C	13182	AA	Flake& spher h'scale	<<1	8	2	
163	C	13182	AC	Flake& spher h'scale	<<1	2	1	
163	C	13184	AA	Flake& spher h'scale	<<1	5	1	
163	C	13184	AA	Flake& spher h'scale	<<1	1	1	
163	C	13196	AA	Flake& spher h'scale	<<1	10	2	
163	C	13235	AA	Flake& spher h'scale	<<1	15	15	
163	C	13239	AA	Flake& spher h'scale	<<1	3	2	
163	C	13243	AA	Flake& spher h'scale	<<1	1	2	
163	C	13246	AA	Flake& spher h'scale	<<1	6	4	
163	C	13254	AA	Flake& spher h'scale	<<1	6	2	

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
163	C	13259	AA	Flake& spher h'scale	<<1	4	1	
163	C	13259	AA	Flake& spher h'scale	<<1	15	2	
163	C	13273	AA	Flake& spher h'scale	<<1	6	0	
163	C	13273	AD	Flake& spher h'scale	<<1	4	2	
163	C	13273		Flake& spher h'scale	<<1	3	1	
163	C	13275	AB	Flake& spher h'scale	<<1	4	2	
163	C	13284	AA	Flake& spher h'scale	<<1	4	1	
163	C	13287	AA	Flake& spher h'scale	<<1	2	2	
163	C	13290	AA	Flake& spher h'scale	<<1	15	2	
163	C	13292	AA	Flake& spher h'scale	<<1	10	1	
163	C	13299	AA	Flake& spher h'scale	<<1	3	3	
163	C	13309	AA	Flake& spher h'scale	<<1	10	1	
163	C	13323	AA	Flake& spher h'scale	<<1	4	1	
163	C	13335	AA	Flake& spher h'scale	<<1	10	2	
163	C	13338	AA	Flake& spher h'scale	<<1	6	1	
163	C	13338	AB	Flake& spher h'scale	<<1	3	2	
163	C	13338	AF	Flake& spher h'scale	<<1	2	1	
163	E	13593	AA	Flake& spher h'scale	<1	c40	c20	
163	E	13593	AB	Flake& spher h'scale	<<1	c20	3	
163	E	13593	AC	Flake& spher h'scale	<<1	c20	7	
163	E	13593	AE	Flake& spher h'scale	<<1	c15	2	
163	S	4977	AA	Flake hammerscale	<<1	2	0	
163	C	12290	AA flot	Flake hammerscale	<<1	1	0	
163	C	12294		Flake hammerscale	<<1	1	0	
163	C	12300	AA	Flake hammerscale	<<1	2	0	
163	C	12304	AA	Flake hammerscale	<<1	1	0	
163	C	12308	AA	Flake hammerscale	<<1	1	0	
163	C	12311	AA	Flake hammerscale	<<1	3	0	
163	C	12348	AA	Flake hammerscale	<<1	2	0	
163	C	12361	AA	Flake hammerscale	<<1	4	0	
163	C	12444		Flake hammerscale	no			
163	C	12444		Flake hammerscale	<1			
163	C	12491	AA	Flake hammerscale	<<1	6	0	
163	C	12516	AD	Flake hammerscale	<<1	3	0	
163	C	12528	AA	Flake hammerscale	<<1	1		
163		12529	AA	Flake hammerscale	<<1	1	0	
163	C	12552	AA	Flake hammerscale	<<1	2	0	
163	C	12583	AA	Flake hammerscale	<<1	6	0	
163	C	12587	AA	Flake hammerscale	<<1	1	0	
163	C	12589	AA	Flake hammerscale	<<1	10	0	
163	C	12589	AD	Flake hammerscale	<<1	2	0	
163	C	12597	AC	Flake hammerscale	<<1	3	0	
163	C	12610	AA	Flake hammerscale	<<1	1	0	
163		12620	AF	Flake hammerscale	<<1	1		
163	C	12623	AC	Flake hammerscale	<<1	3	0	
163	C	12642	AB	Flake hammerscale	<<1	2	0	
163	C	12642	AD	Flake hammerscale	<<1	2	0	
163	C	12685	AA	Flake hammerscale	<<1	2	0	
163	C	12692	AE	Flake hammerscale	<<1	2	0	
163	C	12744	AA	Flake hammerscale	<<1	3	0	
163	C	12747	AC	Flake hammerscale	<<1	1	0	
163	C	12752	AB	Flake hammerscale	<<1	2	0	

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
163	C	12770	AA	Flake hammerscale	<<1	2	0	
163	C	12770	AA	Flake hammerscale	<<1	1	0	
163	C	12789	AD	Flake hammerscale	<<1	4	0	
163	C	12798	AA	Flake hammerscale	<<1	3	0	
163	C	12805	AA	Flake hammerscale	<<1	1	0	
163	C	12830	AB	Flake hammerscale	<<1	4	0	
163	C	12846	AB	Flake hammerscale	<<1	2	0	
163	C	12858	AA	Flake hammerscale	<<1	2	0	
163	C	12874	AA	Flake hammerscale	<<1	2	0	
163	C	12876	AA	Flake hammerscale	<<1	8	0	
163	C	12896	AB	Flake hammerscale	<<1	2	0	
163	C	12900	AA	Flake hammerscale	<<1	3	0	
163	C	12930	AA	Flake hammerscale	<<1	1	0	
163	C	12930	AC	Flake hammerscale	<<1	1	0	
163	C	12931	AA	Flake hammerscale	<<1	1	0	
163	C	12938	AA	Flake hammerscale	<<1	5	0	
163	C	12976	AB	Flake hammerscale	<<1	15	0	
163	C	12979	AD	Flake hammerscale	<<1	6	0	
163	C	12997	AA	Flake hammerscale	<<1	1	0	
163	C	13003	AA	Flake hammerscale	<<1	6	0	
163	C	13011	AA	Flake hammerscale	<<1	8	0	
163	C	13024	AA	Flake hammerscale	<<1	1	0	
163	C	13044	AA	Flake hammerscale	<<1	2	0	
163	C	13059	AA	Flake hammerscale	<<1	3	0	
163	C	13065	AA	Flake hammerscale	<<1	3	0	
163	C	13065	AE	Flake hammerscale	<<1	2	0	
163	C	13087	AA	Flake hammerscale	<<1	5	0	
163	C	13107	AA	Flake hammerscale	<<1	1	0	
163	C	13109	AA	Flake hammerscale	<<1	4	0	
163	C	13112	AF	Flake hammerscale	<<1	6	0	
163	C	13117	AB	Flake hammerscale	<<1	3	0	
163	C	13139	AE	Flake hammerscale	<<1	3	0	
163	C	13145	AA	Flake hammerscale	<<1	3	0	
163	C	13154	AA	Flake hammerscale	<<1	8	0	
163	C	13156	AA	Flake hammerscale	<<1	20	0	
163	C	13156	AB	Flake hammerscale	<<1	6	0	
163	C	13158	AE	Flake hammerscale	<<1	6	0	
163	C	13190	AA	Flake hammerscale	<<1	4	0	
163	C	13263	AA	Flake hammerscale	<<1	2	0	
163	C	13264	AA	Flake hammerscale	<<1	10	0	
163	C	13267	AA	Flake hammerscale	<<1	1	0	
163	C	13282	AB	Flake hammerscale	<<1	1	0	
163	C	13326	AA	Flake hammerscale	<<1	4	0	
163	C	13329	AA	Flake hammerscale	<<1	8	0	
163	C	13337	AA	Flake hammerscale	<<1	3	0	
163	C	13338	AC	Flake hammerscale	<<1	4	0	
163	C	13338	AE	Flake hammerscale	<<1	1	0	
163	E	13593	AD	Flake hammerscale	<<1	c10	0	
163	C	12443		Iron rich cinder	9			
163	C	12444		Iron rich cinder	221			
163	C	12371		Smithing hearth bottom	322			70x70x50mm
163	C	12372		Smithing hearth bottom	87			80x65x30mm

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
163	C	12443		Smithing hearth bottom	207			
163	C	12443		Smithing hearth bottom	292			100x70x30mm
163	C	12443		Smithing hearth bottom	113			100x80x30mm
163	C	12444		Smithing hearth bottom	359			115x85x40mm
163	C	12444		Smithing hearth bottom	242			95x70x40mm
163	C	12444		Smithing hearth bottom	70			70x45x20mm
163	C	12444		Smithing hearth bottom	250			90x70x50mm
163	C	12444		Smithing hearth bottom	278			90x75x40mm
163	C	12444		Smithing hearth bottom	374			80x80x45mm
163	C	12444		Smithing hearth bottom	296			100x80x40mm
163	C	12444		Smithing hearth bottom	217			100x70x35mm
163	C	12444		Smithing hearth bottom	217			80x70x45mm
163	C	12444		Smithing hearth bottom	191			80x60x40mm
163	C	12444		Smithing hearth bottom	95			75x50x25mm
163	C	12444		Smithing hearth bottom	96			70x55x25mm
163	C	12444		Smithing hearth bottom	407			100x80x45mm
163	C	12444		Smithing hearth bottom	109			70x60x40mm
163	C	12444		Smithing hearth bottom	119			70x60x30mm
163	C	12444		Smithing hearth bottom	103			80x60x20mm
163	C	12444		Smithing hearth bottom	194			105x70x30mm
163	C	12515		Smithing hearth bottom	128			70x55x30mm
163	C	12282	AA<4	Spheroidal hammerscale	<<1	0	1	
163		12282	AB<4	Spheroidal hammerscale	<<1	0	1	
163	C	12417	AA<4	Spheroidal hammerscale	<<1	0	1	
163	C	12513	AA	Spheroidal hammerscale	<<1	0	1	
163	C	12530	AA<4	Spheroidal hammerscale	<<1	0	1	
163	C	12562	rf755	Spheroidal hammerscale	<<1	0	1	
163	C	12589	AE	Spheroidal hammerscale	<<1	0	1	
163	C	12601	AA	Spheroidal hammerscale	<<1	0	1	
163	C	12620	AI	Spheroidal hammerscale	<<1	0	1	
163	C	12664	AA	Spheroidal hammerscale	<<1	0	1	
163	C	12690	AA	Spheroidal hammerscale	<<1	0	1	
163	C	12692	AC	Spheroidal hammerscale	<<1	0	1	
163	C	12861	AA	Spheroidal hammerscale	<<1	0	3	
163	C	13142	AA	Spheroidal hammerscale	<<1	0	2	
163	C	13158	AA	Spheroidal hammerscale	<<1	0	2	
163	C	13210	AA	Spheroidal hammerscale	<<1	0	3	
163	C	13289	AA	Spheroidal hammerscale	<<1	0	1	
163	C	4926		Undiag. ironworking slag	1			
163	C	12282		Undiag. ironworking slag	17			
163	C	12293		Undiag. ironworking slag	<1			
163	C	12363		Undiag. ironworking slag	96			
163	C	12371		Undiag. ironworking slag	14			
163	C	12372		Undiag. ironworking slag	28			
163	C	12400		Undiag. ironworking slag	<<1			
163	C	12424		Undiag. ironworking slag	11			
163	C	12443		Undiag. ironworking slag	84			
163	C	12444		Undiag. ironworking slag	104			
163	C	12444		Undiag. ironworking slag	697			
163	C	12444		Undiag. ironworking slag	738			
163	C	12444		Undiag. ironworking slag	761			
163	C	12444		Undiag. ironworking slag	32			

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
163	C	12467		Undiag. ironworking slag	7			
163		12504	AA	Undiag. ironworking slag	12			
163	C	12515		Undiag. ironworking slag	60			
163	C	12519		Undiag. ironworking slag	96			
163	C	12654	AE	Undiag. ironworking slag	<1			
163	C	12732	AB<4	Unfired clay	<1			
163	C	12371		Vitrified heath lining	7			
163	C	12443		Vitrified heath lining	11			
163	C	12444		Vitrified heath lining	83			
163	C	12444		Vitrified heath lining	44			
163	C	12443						not seen by specialist
163	C	12976	AB		0			nothing in this bag
164	S	13195	AA	Flake& spher h'scale	<<1	3	1	
172		6791	AF	coke/clinker	5			
172		6791	AD	coke/clinker	6			
172		25003	AC	coke/clinker	2			
172		25007	AC	coke/clinker	1			
172		25003	AA	Fe object/ waste	1			Probable nail shaft
172		6724	AA	Fired clay	10			Pale orange
172		6724	AA	Fired clay	173			Pale orange
172		6725	AA	Fired clay	542			Orange
172		6725	AA	Fired clay	1954			Orange
172		6725	AA	Fired clay	2082			Orange
172		6726	AA	Fired clay	1340			Orange
172		6730	AB	Fired clay	10			Orange
172		6779	AA	Fired clay	4			Orange
172		6791	AA	Fired clay	12			Orange
172		6791	AB	Fired clay	47			Orange
172		6791	AG	Fired clay	131			Orange
172		6791	AH	Fired clay	51			Orange
172		6791	AF	Fired clay	93			Orange
172		6791	AC	Fired clay	7			Orange
172		6796	AA	Fired clay	5			Orange
172		25003	AC	Fired clay	92			Orange
172		25003	AB	Fired clay	24			Orange
172		25003	AD	Fired clay	630			Orange
172		25003	AA	Fired clay	272			Orange
172		25004	AG	Fired clay	45			Some surface frags
172		25004	AA	Fired clay	130			Some surface frags. Charcoal discolouration
172		25004	AF	Fired clay	19			
172		25004	AC	Fired clay	5			
172		25004	AD	Fired clay	6			
172		25004	?AG	Fired clay	45			
172		25004	AB>4	Fired clay	347			
172		25004	AE	Fired clay	38			
172		25005	AE	Fired clay	216			Pale orange/grey
172		25005	AG	Fired clay	126			Pale orange
172		25005	AB	Fired clay	110			Pale orange
172		25005	AH	Fired clay	238			Pale orange

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
172		25005	AF	Fired clay	839			Pale orange
172		25005	AA	Fired clay	461			Pale orange
172		25005	AC	Fired clay	7			Pale orange
172		25007	AB>4	Fired clay	35			Pale orange
172		25007	AC	Fired clay	180			Pale orange. 1 surface frag.
172		25009	AA	Fired clay	32			Surface frag.
172		25009	AA	Fired clay	197			Pale orange
172		6744	AA	Flake hammerscale	<<1	3	0	
172		6784	AB	Flake hammerscale	<<1	3	0	
172		25007	AB	Flake hammerscale	<<1	1	0	
172		25005		Polyurethane foam	<<1			From artefact lifting
172		25003	AD	Spheroidal hammerscale	<<1	0	1	
172		25003	AC	Stone	34			
172		25005	AA	Stone	49	83		
172		25005	AF	Stone	18			
174	FB	18025	AA	Flake hammerscale	<<1	1	0	
175		31882		Cinder	4			With liverish red glaze
175		31882		Fired clay	2			Grey, reduced fired
175		31882		Fired clay	8			
176	FB A4	21880		Fe object / waste	21			mineralised
176	FB	21150		Fired clay	1.4			
176	FB	18754	AA	Flake& spher h'scale	<<1	8	1	
176	FB	21880	AA	Flake& spher h'scale	<<1	7	3	
176	FB	21905	AA	Flake& spher h'scale	0.2	c30	c7	
177		20961		Coal	<<1			
177		20829		Fayalitic run	1			
177		20158		Ferruginous concretion	<<1			
177		20572		Fired clay	21			
177		20613		Fired clay	3			
177		20841		Fired clay	<<1			
177		20956		Fired clay	49			
177		20565	AA	Flake& spher h'scale	<<1	10	2	
177		20572	AB	Flake& spher h'scale	<<1	6	6	
177		20572	AC	Flake& spher h'scale	<<1	19	4	
177		20572	AD	Flake& spher h'scale	<<1	c20	14	
177		20605	AA	Flake& spher h'scale	<<1	11	3	
177		20605	AB	Flake& spher h'scale	<<1	8	1	
177		20613	AB	Flake& spher h'scale	<<1	12	3	
177		20663	AA	Flake& spher h'scale	<<1	c40	c20	
177		20663	AB	Flake& spher h'scale	<<1	4	1	
177		20814	AA	Flake& spher h'scale	<1	c30	c10	
177		20814	AB	Flake& spher h'scale	<1	c20	4	
177		20814	AC	Flake& spher h'scale	<<1	c20	7	
177		20814	AD	Flake& spher h'scale	<<1	c50	c10	
177		20829	AA	Flake& spher h'scale	<<1	c10	4	
177		20829	AB	Flake& spher h'scale	2	c100	c20	
177		20841	AA	Flake& spher h'scale	<<1	c20	c20	

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
177		20841	AB	Flake& spher h'scale	<1	c30	c10	
177		20956	AA	Flake& spher h'scale	<<1	c10	1	
177		20956	AA<4	Flake& spher h'scale	1	c10	3	
177		20956	AB	Flake& spher h'scale	<1	c15	2	
177		20956	AD	Flake& spher h'scale	<1	8	3	
177		20961	AC	Flake& spher h'scale	<<1	5	4	
177		20961		Flake& spher h'scale	<<1	10	5	
177		20572	AA	Flake hammerscale	<<1	3	0	
177		20613	AA	Flake hammerscale	<<1	3	0	
177		20613	AC	Flake hammerscale	<<1	1	0	
177		20814		Flake hammerscale	<<1	1	0	
178		20177	AA	Cinder	5			
178		20429	AA	Clinker	<<1			
178		20479	AA	Clinker	<1			
178		20533	AB	Clinker	<1			
178		20602	AA	Clinker	1			
178		20341		Fe object /waste	27			
178		20115		Fired clay	7			
178		20115	AC	Fired clay	0			
178		20115	AA	Fired clay	5			
178		20115	AA	Fired clay	2			
178		20177	AA	Fired clay	1			
178		20341		Fired clay	<1			
178		20533	AB	Fired clay	5			
178		20107	AA	Flake& spher h'scale	<<1	3	3	
178		20109	AA	Flake& spher h'scale	<<1	11	5	
178		20115	AA<4	Flake& spher h'scale	<<1	3	0	
178		20115	AB	Flake& spher h'scale	<<1	8	2	
178		20115	AC	Flake& spher h'scale	<1	16	4	
178		20115	AD	Flake& spher h'scale	<<1	6	1	
178		20177	AA	Flake& spher h'scale	1.9	c100	c20	
178		20196	AA	Flake& spher h'scale	<1	c25	5	
178		20341	AA	Flake& spher h'scale	<<1	20	5	
178		20341	AA	Flake& spher h'scale	2.8	c200	c20	
178		20341	AA	Flake& spher h'scale	<<1	7	1	
178		20341	AA	Flake& spher h'scale	<<1	8	1	
178		20405	AA	Flake& spher h'scale	<<1	5	1	
178		20415	AA	Flake& spher h'scale	<<1	7	1	
178		20419	AA	Flake& spher h'scale	<1	c15	3	
178		20419	AA	Flake& spher h'scale	<<1	c10	4	
178		20419	AA	Flake& spher h'scale	<<1	5	5	
178		20419	AA	Flake& spher h'scale	<<1	c10	c10	
178		20419	AA	Flake& spher h'scale	<<1	4	1	
178		20429	AA	Flake& spher h'scale	0.2	c40	c10	
178		20429	AA	Flake& spher h'scale	<<1	2	1	Some undiag. Ironworking slag
178		20478	AA	Flake& spher h'scale	0.7	c30	3	
178		20478	AB	Flake& spher h'scale	<<1	12	c	
178		20478	AC	Flake& spher h'scale	<<1	c10	10	
178		20479	AA	Flake& spher h'scale	0.4	c20	c15	
178		20479	AB	Flake& spher h'scale	0.6	c20	c5	

Field	Area	Cont-ext	Sample No.	Slag type	Mass (g)	Flake count	Spher count	Comment
178		20479	AC	Flake& spher h'scale	0.3	c30	c5	
178		20533	AA	Flake& spher h'scale	<1	c20	c15	
178		20533	AA<4	Flake& spher h'scale	<<1	c15	c5	
178		20533	AC	Flake& spher h'scale	<<1	2	2	
178		20533	AD	Flake& spher h'scale	<<1	2	1	
178		20533	AE	Flake& spher h'scale	<<1	c10	c5	
178		20602	AA	Flake& spher h'scale	<1	2	1	
178		20602	AA	Flake& spher h'scale	0.2	c20	c10	
178		20602	AB	Flake& spher h'scale	<<1	12	3	
178		20602	AC	Flake& spher h'scale	<1	13	1	
178		20602	AD	Flake& spher h'scale	<<1	c10	c10	
178		20602	AE	Flake& spher h'scale	0.3	c30	c10	
178		20602	AF	Flake& spher h'scale	<<1	5	6	
178		20115	AA	Flake hammerscale	<1	4	2	
178		20479	AA<4	Flake hammerscale	<<1	5	0	
178		20479	AA>4	Flake hammerscale	<<1	2	0	
178		20479	AB>4	Flake hammerscale	<<1	1	0	
178		20479	AA>4	Flake hammerscale	<<1	1	0	
178		20341	AA	Spheroidal hammerscale	<<1	0	1	
178		20115	AB	Undiag. Ironworking slag	4			
178		20533	AA	Undiag. Ironworking slag	<<1			
178		20602	AA	Undiag. Ironworking slag	<1			
178		20177	AA	Vitrified hearth lining	7			
179		9100		Fired Clay	8			
179		17713		Fired Clay	6			
179		9100	AA	Flake& spher h'scale	0.2	c10	3	
179		17713		Not in box				
179		7860		Not seen by specialist				
201		11814		Coal	5			
209		10871	AA	Coal	<1			
209		10826	AC	coke/clinker	1			
209		10826	AC	Flake hammerscale	<<1	1	0	
211		7684	AA	Clinker	1			
211		7673	AA	Fired Clay	7			Orange fired fabric, no surfaces
211		7684	AA	Fired Clay	21			Grey/brown frags. No surfaces
211		7673	AA	Flake hammerscale	<<1	1	0	
211		7684		Not seen by specialist				
211		7672	AA	Spheroidal hammerscale	<1	0	2	