Ancient Monuments Laboratory
Report 72/86

EXAMINATION OF SLAG AND OTHER MATERIAL FROM VARIOUS SITES EXCAVATED BY THE CENTRAL EXCAVATION UNIT

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Summary

Samples of slag and other material thought to be associated with metalworking processes from 14 sites excavated by the Central Excavation Unit were examined They are identified in the report and the significance of the results is discussed. The surfaces of a mould fragment and two possible crucibles were analysed elementally using energy dispersive x-ray fluoresence.

Author's address :-

Ancient Monuments Laboratory
Historic Buildings & Monuments Commission
23 Savile Row
London
W1X 2HE

01 734 6010

Examination of Slag and other Material from various Sites Excavated by the Central Excavation Unit

Introduction

The material reported on here consisted largely of slag and other possible waste products from ironworking activities found on recent excavations carried out by the Central Excavation Unit. A few items associated with non-ferrous metalworking were also present and several of these were analysed elementally using qualitative energy dispersive X-ray fluorescence (XRF). The results of the analyses are given in the discussion below.

Identifications of the samples examined are given in the appendix, although much of the material was of no apparent technological significance, and the results are discussed by site below.

Site 46 - Catterick/Catterick Bainesse Farm

This Roman site produced significant quantities of iron smithing slag (about 50kg of material likely to have been associated with iron smithing was examined), but no evidence for iron smelting. Iron smithing slag was found in a large number of contexts (about 55) but no archaeological information was available and the spatial or chronological significance of the slag distribution could not be assessed. However it was clear that contexts 2615, 2616, 2619, 2620, 2626, 2627, 2628, 2735, 2737, 2742, 2744, 2831, 2833 and 2849 produced about 80% of the iron smithing slag and all the hammer scale. It seems probable that some, at least, of these contexts contained material closely associated with blacksmithing but without more archaeological information it is not possible to say whether they represent the site of a smithy or a dump of waste. In the latter case the smithy itself was probably fairly close by. It is possible that the relatively small amounts of iron smithing slag found elsewhere on the site were simply a scatter of material from the same activity represented in these contexts.

Three fragments of a crucible (AM8111192) were also examined. It was a shallow, reduced fired, hand made crucible with a pinched out pouring lip, but was not typical of Roman copper alloy melting crucibles. The crucible fragments from Caistor-by-Norwich described by Tylecote (1969) may provide a possible parallel. XRF of the surfaces of each fragment and a drop of corroded metal from one fragment showed that a copper alloy containing zinc, tin and lead had been melted in the crucible. No indication of the concentrations of zinc, tin and lead in the original alloy could be obtained because of the condition of the metal.

Site 240 - Catterick Bridge

Most of the samples from this Roman site were fired clay which, although it could have been from a metalworking hearth or furnace, did not have any diagnostic features and could also have been from 'domestic' hearths or burnt material from a clay structure.

About 1kg of iron smithing slag was identified but as small quantities of this material are found on most Iron Age or later occupation sites its presence is not of any major significance. It does suggest that some blacksmithing took place in the vicinity of the site, but probably not on the site itself.

Site 238

One possible piece of iron smithing slag was identified, but such a small quantity is of no significance.

Site 242 - Lyddington Bead Works

A small quantity (about 1.5kg) of material (AM8312345-53) from Late Medieval contexts was examined. Most, or possibly all, of the material (except AM8312353) derived from iron smelting. The quantities involved do not, if the material examined included all the slag found on the site, suggest a major iron smelting operation on the site. The material may be waste from iron smelting activity close to the site, or it could have been reused, for example as hardcore. Again more archaeological information might resolve these questions.

Sites 274, 276, 408 (Belsay Castle) and 414 (Dainton)

The material from these sites was of no direct technological significance. None of the material examined provided evidence for metalworking.

Site 290 - Foston

The material examined was from both Medieval and Iron Age contexts, but most of the samples examined were fuel ash slag, ferruginous concretions or fired clay and were of no direct technological significance. About 400g of iron smithing slag was identified but as stated above small quantities of this material are not of major significance. Some blacksmithing probably took place in the vicinity of the site during the Medieval and/or the Iron Age periods (dates for individual contexts were not available), but probably only on a small scale.

Site 291 - Stanwick

The bulk of the material examined was fuel ash slag or fired clay of no direct technological significance. However it did include about 19kg of iron smithing slag from Roman contexts. The slag was from a large number of different contexts and was not, apparently, concentrated in particular areas. Given the size of the site and the widespread distribution of the slag, the evidence does not suggest that a major iron smithing area was excavated. Nevertheless blacksmithing certainly took place on or near the site during this period, but the scale of the activity could not be assessed on the evidence available. There was no evidence for iron smelting.

A mould fragment (AM8517091) was analysed by XRF but no significant traces of non-ferrous metals were found. A vessel (AM8517092) thought to be a crucible had been oxidised fired and had not been used as a crucible.

Site 296 - Chew Down

Again, small quantities of iron smithing slag were identified from this site indicating some blacksmithing activity on or near the site but probably only on a small scale. The area excavated probably did not include the site of a smithy.

Site 297 - Worberry Gate

The material from this site included only a small amount (about 1kg in total) of iron smithing slag from several contexts. This also suggests small scale blacksmithing in the vicinity of the site but probably not on the site itself.

Site 412 - Flannesford Priory

The material examined, which was from Medieval contexts, included both tap slag and iron smithing slag. Only about 3kg of slag was examined but this was apparently only a sample and it would be necessary to know the total quantity of each type of slag found on the site before a reasonable assessment of the scale of ironworking activity on or near the site could be made. No archaeological information was available, but assumming the slag had not been reused both iron smelting and iron smithing certainly took place either on or near the site. If more slag from this site is available for examination it should be identified and quantified. The evidence for ironworking should then be considered in the light of the broader archaeology of the site.

Site 418 - Castle Hill

One possible sample of tap slag was identified, but a single piece of slag is not significant.

Glossary of terms as used in this report

Iron smithing slag - The slag which collects in a blacksmith's hearth. This material is often inhomogeneous and may include charcoal, fuel ash slag or hearth lining.

Hearth bottom - A roughly plano-convex lump of iron smithing slag which has been allowed to accummulate in the bottom of a blacksmith's hearth. Hearth bottoms sometimes have a depression on the top surface which is probably caused by the stream of air from the bellows. In the discussion above the term iron smithing slag includes hearth bottoms.

Tap slag - Slag produced during iron smelting and which has been allowed to run out of the furnace while still molten.

Iron smelting slag - Slag produced during iron smelting but which has not been tapped from the furnace.

Fuel ash slag - An alkali-silicate slag produced by the reaction between ash and silica-rich material such as sand or clay. It is often associated with metalworking but could be produced in any sufficiently hot fire. It is not, in itself, evidence for any technological activity.

Hammer scale - Small magnetic flakes rich in iron oxides. They consist of iron oxides formed on the surface of iron when it is heated in the smithing hearth and which have splintered from the surface during working. The oxides may be slagged by the addition of sand and small magnetic spherical drops found associated with the hammer scale were probably the result of 'splashing' of this slagged material during smithing.

References

R.F.Tylecote (1969) Bronze melting remains and artifacts from Caistor-by-Norwich. Historical Metallurgy 3 (2), 46-47

Appendix - Identifications of the samples

Note :

The approximate total weight of the samples from Site 46 contexts which produced evidence for iron working are given in the identification column. The (relatively small) quantity of material from each of the other sites is indicated in the discussion above.

Site	Context	AM No.	Identification
46 Catterick	2	-	Iron smithing slag, hearth lining (total weight = 700g)
	4	-	Iron smithing slag, fired clay (110g)
	15	-	Iron smithing slag (300g)
	35	-	Iron smithing slag, fired clay (120g)
	51	-	Iron smithing slag, hearth lining (50g)
	54	-	Niedermendig Basalt
	58	-	Iron smithing slag (100g)
	122	-	Iron smithing slag (200g)
	172	-	Ferruginous material
	193	-	?small tuyere
	315	-	Fired clay
	337	-	Fuel ash slag, ferruginous material
	348	-	Nails
	361	-	Fired clay, iron smithing(?) slag (80g)
	682	-	Iron smithing slag, fuel ash slag (30g)
	713	-	Fuel ash slag, ironstone
	763	-	Iron smithing slag (60g)
	780	-	Iron smithing slag (130g)
	943	-	Iron smithing slag (90g)
	953	-	Fuel ash slag
	962	-	Iron smithing slag (250g)
	964	-	Iron smithing(?) slag (5g)
	978	-	Fuel ash slag, iron smithing slag (170g)
	997	-	Iron smithing(?) slag, hearth lining (140g)
	1222	-	Hearth lining
	1367	-	Fuel ash slag
	1491	-	Hearth lining
	1719	-	Fuel ash slag, iron smithing(?) slag, iron (30g)
	1722	-	Iron smithing(?) slag, hearth lining (250g)
	1819	-	Iron smithing slag (500g)

Site	Context	AM No.	Identification
46 Catterick	2074	-	Iron smithing(?) slag, fuel ash slag, hearth lining, fired clay (130g)
	2171	-	Iron smithing(?) slag, fuel ash slag (20g)
	2179	-	Iron
	2257	-	Fuel ash slag, fired clay
	2501	-	Iron smithing slag, hearth lining, fuel ash slag (1.1kg)
	2502	-	Fired clay
	2565	-	Iron smithing slag (470g)
	2578	-	Iron smithing slag (10g)
	2589	-	Iron smithing slag (75g)
	2614	-	Fired ferruginous clay
	2615	-	Iron smithing slag, hearth bottoms, fuel ash slag, fired clay, lead, hammer scale (4.1kg)
	2616	-	Iron smithing slag, hearth lining (2.4kg)
	2619	-	Lead, iron, fuel ash slag, hammer scale
	2620	-	Iron smithing slag, hearth bottoms, hearth lining, fired clay, hammer scale (4.4kg)
	2621	-	Fuel ash slag, fired clay
	2624	-	Iron smithing(?) slag, fuel ash slag (20g)
	2626	-	Iron smithing slag, hearth bottoms, hearth lining, fuel ash slag, hammer scale (13.9kg)
	2627	-	Iron smithing slag, fuel ash slag, fired clay, iron, bone, hammer scale (1kg)
	2628	-	Hearth bottoms, fuel ash slag, iron smithing slag (1kg)
	2630	-	Fuel ash slag
	2644	-	Fuel ash slag
	2663	-	Iron smithing slag, fuel ash slag (250g)
	2715	-	Iron smithing(?) slag, fuel ash slag, hearth lining, iron (220g)
	2724	-	Iron smithing(?) slag (10g)
	2725	-	Iron smithing slag, hearth bottoms (920g)
	2727	-	Iron smithing slag (40g)
	2735	-	Iron smithing slag, hearth bottoms, hearth lining (1.5kg)
	2737	-	Iron smithing slag, hearth bottoms, fuel ash slag, hammer scale (1.9kg)

Site	Context	AM No.	Identification
46 Catterick	2742	-	Iron smithing slag, hearth bottoms, fuel ash slag, hearth lining, hammer scale (2.3kg)
	2743	-	Hearth lining
	2744	-	Iron smithing slag, fuel ash slag, hammer scale (1.5kg)
	2805	-	Fired clay
	2831	-	Iron smithing slag, hearth bottoms, fuel ash slag, hearth lining, hammer scale (3.2kg)
	2833	-	Iron smithing slag, hearth bottoms, fuel ash slag, hearth lining, fired clay (2.2kg)
	2849	-	Iron smithing slag, fuel ash slag (3.5kg)
	3025	-	Iron
	3329	-	Hearth lining, hearth bottom (540g)
	3352	-	Iron smithing slag (290g)
	3366	-	Iron smithing slag (60g)
	4403	-	Fuel ash slag
	4404	-	Iron smithing slag (760g)
	4405	-	Iron smithing slag, fuel ash slag, hearth lining, iron (520g)
	4406	-	Iron smithing slag (30g)
	4415	-	Iron smithing slag (100g)
	4428	-	Iron smithing slag (110g)
	4437	-	?Bone
	4445	-	Iron
	4474	-	Ferruginous material
	4534	-	Iron
	4549	-	Iron smithing slag, iron (330g)
46, 2nd batch Catterick Bainesse Farm	Various	-	Apart from the items listed below all the material examined was fired clay. There was no evidence that any of the fired clay was associated with any technological activity, although the possibility cannot be ruled out.
	174	-	Fuel ash slag
	307	-	Fuel ash slag
	323	-	Fuel ash slag
	359	-	Three fragments of a crucible used to melt copper-zinc-tin-lead alloy
	391	-	Iron smithing slag
	406	-	Fragment of iron
	642	-	Burnt soil
	950	-	Fired clay, iron
	967	-	Fuel ash slag, fired clay
	1819	-	Fired clay with wattle marks
	2501	-	Iron smithing slag, fired clay
	3505	-	Fuel ash slag, fired clay

Site	Context	AM No.	Identification
238	12	-	Fuel ash slag, ?iron smithing slag
	19	-	Fuel ash slag
	21	-	?
240 Catterick Bridge	81	-	Fired clay
	101	-	Fired clay
	106	-	Fired clay
	225	-	Fuel ash slag
	239	-	Fired clay
	263	-	Lead
	266	-	Fired clay
	301	-	Fuel ash slag
	361	-	Fuel ash slag
	409	-	Iron smithing slag
	445	-	Fired clay
	508	-	Iron smithing slag
	542	-	Fired clay
	544	-	Fired clay
	550	-	Fired clay
	599	-	Fired clay
	600	-	Fired clay
	601	-	Fuel ash slag
	626	-	Fired clay
	627	-	Fired clay
	724	-	Fired clay
	1046	-	Fired clay
	1309	-	Fired clay
242 Lyddington Bead Works	-	8312345	Tap slag
	-	8312346	Probably iron smelting slag
	-	8312347	Tap slag
	-	8312348	Tap slag
	-	8312249	Probably iron smelting slag
	-	8312350	Tap slag
	-	8312351	Probably smithing slag
	-	8312352	Probably smelting slag
	-	8312353	Burnt stone/clay

Site	Context	AM No.	Identification
274	507	-	Fuel ash slag, fired clay
	526	-	Ironstone
	527	-	Fuel ash slag
	528	-	Fuel ash slag
	541	-	Fuel ash slag
	553	-	(?Quern)stone
	559	-	Fired clay
	857	-	(?Quern)stone
	858	-	(?Quern)stone
	889	-	Probably ironstone
	902	-	(?Quern)stone
	910	-	Iron smithing(?) slag, fuel ash slag, ?ironstone
	1301	-	?Niedermendig basalt
276	Various	-	All material examined was fired clay or daub or fuel ash slag and was of no technological significance
290 Foston	1	8414578	Vitrified stone
	1	8414582	?Hearth lining
	1	8414630	Iron smithing slag
	2	8414751	Copper alloy deposits
	3	8414668	Iron smithing slag, fuel ash slag
	5	8414805	Iron smithing slag
	11?	8414818	Iron smithing slag
	24	8414811	Fired clay
	26	8414826	Fired clay
	42	8414840	Fuel ash slag
	44	8414810	Fuel ash slag
	77	8414883	Fuel ash slag
	130	8414898	Fuel ash slag
	197	8415020	Fuel ash slag
	470	8415433	Iron smithing slag
	498	8415410	Iron smithing slag
	560	8415424	Iron smithing slag
	4335	8415272	Fired clay
	4368	8415412	Ferruginous material
	4375	8415409	Iron smithing slag
	4376	8415404	Iron smithing slag

Site	Context	AM No.	Identification
290 Foston	6064	8513598	Ferruginous material
	6100	8513501	Ferruginous material
	6110	8513502	Fired iron rich clay
	6146	8513539	Fired clay
	6194	8513540	Iron rich clay
	6245	8513560	Fired iron rich clay
	6259	8513564	Fired daub
	6293	8513584	Fuel ash slag
	6433	-	Fired iron rich clay
	6447	-	Fired iron rich clay
	7104	8513755	Iron rich clay
	7171	8513848	Fuel ash slag
	7177	8513848	Iron smithing(?) slag
	7215	8513861	Iron smithing slag
	7217	8513859	Iron smithing slag
	7225	8513867	Fuel ash slag
	7229	8513870	Coal
291 Stanwick	2 sf1323	-	Oxidised fired sherd, not used as a crucible
	4680	8517091	Mould fragment, nothing significant detected by XRF
	4732	8517092	Vessel, oxidised fired and not used as a crucible
	Box 19 :		
	2	-	Fuel ash slag, iron smithing slag, hearth bottom
	3	-	Iron smithing slag, fuel ash slag
	Others		Fuel ash slag
	Box 33		Fired clay, fuel ash slag in 4529
	Box 53 :		
	2	-	Iron smithing slag, fuel ash slag, hearth lining, fired clay
	3060	-	Fuel ash slag
	3115	-	Iron smithing slag
	3118	-	Fuel ash slag
	3127	-	Fuel ash slag
	3130	-	Burnt clay/soil, fuel ash slag
	3131	-	Burnt clay/soil
	3529	-	Fuel ash slag
	3557	-	Fuel ash slag
	3562	-	Fuel ash slag
	3568	-	Fuel ash slag
	3684	-	Burnt clay/soil
	3685	-	Burnt clay/soil
	3709	-	Fuel ash slag

Site	Context	AM No.	Identification
291	4005	-	Fuel ash slag
Stanwick	4006	-	Iron smithing slag, fuel ash slag
	4008	-	Fuel ash slag
	4025	-	Iron smithing slag
	4034	-	Fuel ash slag
	4039	-	Fuel ash slag
	4043	-	Iron smithing slag
	4052	-	Fuel ash slag
	4054	-	Fuel ash slag
	4086	-	Fuel ash slag
	4088	-	Iron smithing slag
	4091	-	Iron smithing slag
	4093	-	Fuel ash slag
	4158	-	Fuel ash slag
	4159	-	Iron smithing slag
	4175	-	Fuel ash slag
	4185	-	Fuel ash slag
	4193	-	Iron smithing slag
	4199	-	Fuel ash slag
	4217	-	Fuel ash slag
	4501	-	Fuel ash slag, fired clay
	4502	-	Iron smithing slag, fuel ash slag
	4503	-	Iron smithing slag, fuel ash slag
	4505	-	Iron smithing slag
	4507	-	Fuel ash slag
	4541	-	Fuel ash slag
	4557	-	Fuel ash slag
	4564	-	Fuel ash slag
	4569	-	Fuel ash slag
	4570	-	Fuel ash slag
	4574	-	Fuel ash slag
	4576	-	Fuel ash slag
	4618	-	Fuel ash slag
	4619	-	Fuel ash slag
	4623	-	Fuel ash slag
	4627	-	Iron smithing slag
	4655	-	Burnt clay/soil
	4659	-	Fuel ash slag
	4661	-	Burnt clay/soil
	4692	-	Fuel ash slag
	4709	-	Fuel ash slag
	4713	-	Fuel ash slag
	4739	-	Fuel ash slag
	4766	-	Fuel ash slag
	4788	-	Iron smithing slag
	4801	-	Fuel ash slag
	4803	-	Fuel ash slag, fired clay
	4805	-	Fuel ash slag
	4809	-	Fuel ash slag
	4818	-	Fuel ash slag

Site	Context	AM No.	Identification
291 Stanwick	Box 130 :		
	3100	-	Fuel ash slag
	3196	-	Fuel ash slag
	3201	-	Iron smithing slag
	3206	-	Fuel ash slag
	3217	-	Iron smithing slag
	3226	-	Burnt clay/soil
	3301	-	Burnt clay, fuel ash slag
	3568	-	Iron smithing slag
	3576	-	Burnt clay/soil
	3584	-	Iron smithing slag
	3586	-	Iron smithing slag
	3609	-	Fuel ash slag
	3619	-	Iron smithing slag, fuel ash slag, hearth lining
	3711	-	Iron smithing slag
	3822	-	Fuel ash slag
	4025	-	Burnt clay, hearth lining, iron smithing slag
	4176	-	Iron smithing slag
	4181	-	Iron smithing slag, fuel ash slag
	4194	-	Fuel ash slag
	4205	-	Iron smithing slag
	4213	-	Fuel ash slag
	4215	-	Fuel ash slag
	4223	-	Burnt clay/soil
	4233	-	Burnt clay, fuel ash slag
	4238	-	Iron smithing(?) slag
	4247	-	Fuel ash slag
	4261	-	Fuel ash slag
	4262	-	Fuel ash slag
	4264	-	Iron smithing slag
	4272	-	Fuel ash slag
	4282	-	Fuel ash slag
	4284	-	Iron smithing slag
	4289	-	Fuel ash slag
	4313	-	Fuel ash slag
	4318	-	Iron smithing(?) slag
	4327	-	Fuel ash slag
	4331	-	Fuel ash slag
	4409	-	Burnt clay/soil
	4440	-	Burnt clay/soil
	4487	-	Fuel ash slag
	4573	-	Fuel ash slag
	4668	-	Burnt clay/soil
	4706	-	Fuel ash slag
	4709	-	Fuel ash slag
	4723	-	Fuel ash slag
	4724	-	Fuel ash slag
	4735	-	Hearth lining

Site	Context	AM No.	Identification
291	4803	-	Fuel ash slag
Stanwick	4809	-	Burnt clay, fuel ash slag
	4810	-	Fuel ash slag
	4822	-	Fuel ash slag
	4830	-	Iron smithing(?) slag
	4839	-	Fuel ash slag
	4866	-	Fuel ash slag
	4873	-	Fuel ash slag
	4876	-	Burnt clay, fuel ash slag
	4878	-	Burnt clay/soil
	4890	-	Fuel ash slag
	4939	-	Fuel ash slag
	4946	-	Fuel ash slag
	4955	-	Fuel ash slag
	4957	-	Fuel ash slag
	4972	-	Fuel ash slag
	4994	-	Burnt clay/soil
	4998	-	Fuel ash slag
	Box 131		Fired clay, including perforated blocks (?from floor of kiln)
	Box 145		Soil with fired clay
	Box 146		Soil with fired clay
	Box 204		Burnt soil
	Box 225 :		
	8005	-	Iron smithing slag
	8009	-	Iron smithing slag
	8011	-	Iron
	8012	-	Iron smithing slag
	8014	-	Iron smithing slag
	8015	-	Fuel ash slag
	8016	-	Iron smithing slag
	8033	-	Fuel ash slag
	8039	-	Fuel ash slag
	8045	-	Iron smithing slag
	8047	-	Fuel ash slag
	8063	-	Fuel ash slag
	8070	-	Iron smithing slag
	8080	-	Iron smithing slag
	8081	-	Fuel ash slag
	8082	-	Fuel ash slag
	8084	-	Iron smithing slag
	8085	-	Hearth bottom

Site	Context	AM No.	Identification
291	8115	-	Fuel ash slag
Stanwick	8121	-	Iron smithing slag
	8123	-	Iron smithing slag
	8124	-	Iron smithing slag
	8244	-	Iron smithing slag
	8258	-	Iron smithing slag
	8284	-	Iron smithing slag
	8335	-	Fuel ash slag
	8358	-	Iron smithing slag
	8615	-	Fuel ash slag
	8725	-	Fuel ash slag
	8745	-	Iron smithing slag
	8759	-	Fuel ash slag
	8932	-	Iron smithing slag
	9143	-	Fuel ash slag
	9320	-	Iron smithing slag
	9322	-	Iron smithing slag
	9323	-	Iron smithing slag
	9331	-	Fuel ash slag
	9336	-	Iron smithing slag
	9346	-	Iron smithing slag
	9351	-	Iron smithing slag
	9426	-	Fuel ash slag
	Box 240		Fired clay
	Box 319		Fired clay
	Box 383 :		
	8073	-	Fuel ash slag
	8076	-	Iron smithing slag, fuel ash slag
	8204	-	Iron smithing slag
	8273	-	Iron smithing slag
	8277	-	Iron smithing slag
	8283	-	Fuel ash slag
	8702	-	Iron smithing slag
	8732	-	Fuel ash slag
	8741	-	Fuel ash slag
	8742	-	Fuel ash slag, iron
	8772	-	Iron smithing slag
	8773	-	Fuel ash slag
	8793	-	Iron smithing slag
	8813	-	Iron smithing slag
	8859	-	Fuel ash slag
	8864	-	Iron smithing slag
	8888	-	Fuel ash slag
	8890	-	Iron smithing slag
	8998	-	Fuel ash slag
	9004	-	Fuel ash slag
	9017	-	Fuel ash slag
	9019	-	Fuel ash slag
	9021	-	Fuel ash slag
	9023	-	Fuel ash slag
	9032	-	Fuel ash slag

Site	Context	AM No.	Identification
291 Stanwick	9035	-	Iron smithing slag
	9048	-	Fuel ash slag
	9050	-	Fuel ash slag
	9078	-	Fuel ash slag
	9085	-	Fuel ash slag
	9242	-	Fuel ash slag
	9245	-	Iron smithing slag
	9255	-	Iron smithing slag
	9289	-	Iron smithing slag
	9477	-	Fuel ash slag
	9810	-	Fuel ash slag
	9811	-	Iron smithing slag
	9825	-	Fuel ash slag
	9828	-	Iron smithing slag
	Box 389		Fired clay
296 Chew Down	1	8510016	Iron smithing slag, fired clay, fuel ash slag, iron
	1	8510017	Iron object
	1	8510019	Fuel ash slag, iron smithing slag
	1	8510020	Fuel ash slag, iron, iron smithing slag
	1	8510021?	Iron smithing slag, fuel ash slag
	1	8510028	Ferruginous material
	1	8510032	Hearth lining, fuel ash slag, fired clay
	1	8510036	Fired clay, fuel ash slag
	1	8510038	Burnt stone, fuel ash slag, iron smithing slag
	2	8510002	Burnt stone, fuel ash slag
	2	8510012	Burnt stone
	3	8510018	Fuel ash slag, ferruginous material
	3	8510029	Vitrified stone
	3	8510030	Fuel ash slag, ferruginous material, ?iron object
	3	8510069	Vitrified clay and stone
	3	8510090	Fuel ash slag
	4	8510041	Fuel ash slag, ironstone, fired clay
	4	8510057	Fired clay
	5	8510063	Fuel ash slag
	5	8510244	?Ironstone
	25	8510070	Iron smithing slag, hearth lining, fuel ash slag
	25	8510071	Fuel ash slag, ironstone
	25	8510073	Fired clay, fuel ash slag, ?iron smithing slag
	25	8510094	Fuel ash slag
	27	8510065	Iron smithing slag, ferruginous material

Site	Context	AM No.	Identification
296 Chew Down	31	8510049	Fuel ash slag
	31	8510050	Fuel ash slag, iron smithing slag
	37	8510051	Fuel ash slag
	37	8510052	Iron smithing slag, fuel ash slag, hearth lining
	39	8510056	Fuel ash slag, ferruginous material
	39	8510064	Fired clay, iron smithing slag
	41	8510088	Iron smithing slag
	41	8510106	Ferruginous material, fuel ash slag, ?iron smithing slag
	43	8510089	Fuel ash slag, iron smithing slag
	45	8510055	Fired clay, fuel ash slag, iron smithing slag
	49	8510066	Fuel ash slag, fired clay
	59	8510083	Fuel ash slag
	59	8510087	Fired clay
	62	8510091	Burnt clay/stone
	64	8510093	Fuel ash slag, burnt stone
	65	8510092	Fuel ash slag, iron smithing slag
	66	8510085	Fuel ash slag
	66	8510105	Fuel ash slag
	74	8510084	Fuel ash slag, ironstone
	76	8510086	Burnt stone
297 Worberry Gate	?	8510267	Burnt stone
	?	8510223	Ferruginous material, iron smithing slag
	102	8510203	Fired clay
	107	-	Fuel ash slag
	109	8510209	Ferruginous material
	109	8510212	Ironstone, ferruginous material
	109	8510214	Fuel ash slag, fired clay
	109	8510216	ferruginous material
	109	8510228	Ironstone, ferruginous material, fuel, ash slag
	109	8510233	Ferruginous material, iron smithing slag, burnt stone
	109	8510243	Ironstone, iron smithing slag
	118	8510260	Fired clay, ironstone
	118	8510239	Fuel ash slag
	124	8510219	Iron smithing slag, ironstone
	124	8510238	Fuel ash slag, ferruginous material, ironstone
	127	8510225	?Ironstone
	131	8510292	Ferruginous material, ironstone
	132	8510236	Fuel ash slag

Site	Context	AM No.	Identification
297 Worberry Gate	133	8510270	Fuel ash slag
	133	8510271	Fuel ash slag
	133	8510277	Fuel ash slag
	134	8510273	Fuel ash slag, ?ironstone
	135	8510248	Fuel ash slag
	135	8510249	Fuel ash slag, ferruginous material
	135	8510279	Fuel ash slag, burnt stone
	135	8510312	Fuel ash slag, iron smithing slag
	135	8510323	Fuel ash slag
	136	8510294	Fuel ash slag, ferruginous material
	137	8510255	Fuel ash slag
	137	8510265	Fired clay, ironstone
	138	8510262	Burnt stone
	139	8510346	Fuel ash slag
	142	8510284	Ferruginous material, ironstone
	147	8510306	Fuel ash slag, ferruginous material
	147	8510321	Ironstone
	150	8510300	Iron smithing slag, ironstone
	153	8510337	Fuel ash slag
	156	8510286	Ferruginous material, ironstone
	?157	8510293	Ferruginous material, burnt stone
	159	8510350	Fuel ash slag
	161	8510324	Fuel ash slag, fired clay
	165	8510303	Fuel ash slag
	168	8510301	Fuel ash slag
	169	8510296	Iron smithing slag
	180	8510331	?Ironstone
	185	8510315	Fuel ash slag, fired clay, ferruginous material
	186	8510313	Fuel ash slag, ironstone
	190	8510329	Fuel ash slag
	190	8510342	Fuel ash slag
	195	8510322	Fuel ash slag
	196	8510124	Fuel ash slag
	197	8510120	Fuel ash slag
	201	8510125	Fuel ash slag
	202	8510126	Fuel ash slag
	208	8510121	Fuel ash slag
	218	8510339	Fuel ash slag
	219	8510349	Fuel ash slag
	221	8510338	Fuel ash slag
	223	8510345	Fuel ash slag
	226	8510347	Burnt stone, fired clay, fuel ash slag
	227	8510123	Fuel ash slag
	230	8510348	Fuel ash slag
	242	8510343	Fuel ash slag
	254	8510122	Fuel ash slag
	254	8510344	Fuel ash slag

Site	Context	AM No.	Identification
408 Belsay Castle	19	8518804	Partly vitrified lining of kiln, oven or furnace. Coal appeared to be the fuel. No evidence of the function of the structure was found.
412 Flannes-ford	101	-	Tap slag, iron smithing slag
	Sample 691	-	Hearth bottom, iron smithing slag, tap slag
Priory	-	8610069	Tap slag
414 Dainton	Various	-	As reported verbally, the material examined was almost certainly not connected with metalworking but may have been associated with pottery production
418 Castle Hill	9	-	Ironstone, small fragment of possible tap slag, sherds
	34	-	Fired clay