H.B.M.C.E. FUNDED ARCHAEOMETALLURGY CONTRACT

MECHANICAL AND PRODUCTION ENGINEERING

METALLURGY RESEARCH DIVISION

ASTON UNIVERSITY

ASTON TRIANGLE, BIRMINGHAM B47ET

HALIFAX PLACE, NOTTINGHAM

SLAG REPORT

Site Summary

The excavations at Halifax Place, Nottingham revealed occupation debris extending from the Iron Age until the present day. The site had been subjected to large scale stripping and dumping in the Medieval and later Periods.

Introduction

The production of early iron artefacts from the ore was a two stage operation. Firstly, the smelting process extracted the metallic iron from the ore, and secondly, the artefacts were manufactured and subsequently repaired or altered in the smithing process. Both processes generated slag as a by-product. Ironworking structures, furnaces and hearths, are rarely recovered or identified on archaeological sites. The interpretation of ironworking activity therefore relies on the identification of the slags. The ironworking residues were waste products of the process and therefore, tend to be found in contexts contemporary with, rather than directly associated with. ironworking features. The nature of slags, notably their survivability, leads to problems of residuality on archaeological sites.

The Identification of the Residues.

The ironworking process generated residues as by-products, and these can be broadly divided into diagnostic and non-diagnostic residues. The classification has been discussed in more detail elsewhere (McDonnell 1983, and McDonnell forthcoming) The non-diagnostic residues may have derived from ironworking or other pyrotechnological processes, and comprise fuel ash slag and furnace/hearth lining. The diagnostic residues were direct by-products of the ironworking process.

A total of 60.9 kg. of residue were recovered from the excavation, and were classified, on their morphology, into the eight groups shown in Table 1. All the classes had typical morphologies, except the undefined group which could not be ascribed to either smelting slag or smithing slag with certainty.

TABLE 1 RESIDUE CLASSIFICATION (Weight in kg.)

Diagnostic Residues	kg.	% of Total
Smelting Slag	25.8	42.3
Tap Slag	18.1	29.7
Smithing Slag	7.0	11.5
Hearth Bottoms	2.0	3.3
Undefined Slag	6.9	11.3
Cinder	0.5	0.8
Non-Diagnostic Residues		
Furnace/Hearth Lining	0.6	1.0
Fuel Ash Slag	0.1	0.2
TOTAL	61.0	

Residue Distribution (TABLE 2)

A small quantity of the diagnostic slags occurred in Area A, the remainder was equally distributed between Areas B and C. There was no concentration of slags within B and C, but there were large deposits within individual pits e.g. Context 318 (Area B), and Context 328 (Area C).

TABLE 2 DIAGNOSTIC SLAGS BY AREA (Weight in kg.)

AREA	SMITHING + HEARTH BOTTOMS	SMELTING + TAP SLAG	UNDEFINED SLAG
A	0.4	0.5	0.0
B	4.2	22.0	3.8
C	4.4	21.3	3.1

The deposits of slag did not respect the property boundaries, and therefore, it is unlikely that they originated from one of the properties excavated.

The Phase Distribution (Table 3)

The slag occurred in contexts including and later than Phase IV.6 and was concentrated in two phases. The majority of smithing slag and smelting slag occurred in contexts that were disturbed and were unphased, perhaps the result of the levelling activity.

TABLE 2 DIAGNOSTIC SLAGS BY PHASE (Weight in kg)

PHASE	SMITHING SLAG + HEARTH BOTTOMS	SMELTING SLAG + TAP SLAG	UNDEFINED SLAG
Unphased	4.54	23.40	0.85
VI.2	1.37	2.10	1.31
VI.1	0.10	0.17	1.76
V.2	1.58	16.03	2.39
V.1	0.00	0.61	0.00
IV.6	1.40	1.62	0.57

The second large deposit was in Phase V.2, 11.5kg. of the smelting slag was deposited in Pit 318. Only Contexts 284, 317, and 345 (all Phase V.2) contained more than 1 kg. of slag.

Conclusion

The majority of the diagnostic slag occurred either in unphased contexts or appears to have been redeposited. It is therefore, probable that the slag was brought onto the site (e.g. for levelling), and does not represent ironworking activity on the site.

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FEBRUARY 1986

References

McDonnell J.G. (1983), 'Tap Slags and Hearth Bottoms'. Current Archaeology No86, Vol VIII No3, 81-83.

McDonnell J.G. (Forthcoming), 'The Amersham Mantles Green Slag Report' in The Excavation of a Villa Site at Amersham Mantles Green by P.A Yeoman. Records of Buckinghamshire.

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NOTTINGHAM HALIFAX PLACE

CONTEXT	AREA	PERIOD	SMITH	HB	SMELT	SMELT?	TAP	HL	CINDER
021	A		30	0	0	0	0	0	0
034	C		10	0	0	0	0	0	0
036	C		70	0	0	0	0	0	0
039	C		0	0	0	0	40	0	0
040	B		140	0	0	0	0	0	0
041	C		0	0	120	0	0	0	0
042	C		0	0	210	0	0	0	0
043	C		0	0	0	0	10	0	0
045	B		60	0	220	0	0	0	0
049	A		0	0	0	0	0	10	0
050	C		0	0	170	70	0	0	0
054	B		0	0	0	0	40	0	0
055	C		0	0	100	0	210	0	0
056	B		0	0	0	0	10	0	0
060	A		0	0	0	0	10	0	0
068	B		0	0	0	0	20	0	0
085	B		380	0	0	0	0	0	0
086	B		410	0	0	0	0	0	0
088	B		100	0	1670	0	0	0	0
091	B		45	0	0	0	50	0	0
092	B		20	0	0	0	0	0	0
094	B		0	0	220	0	0	0	0
108	A		20	0	410	0	80	0	0
142	A		360	0	0	0	50	30	0
197	B		0	0	0	0	30	0	0
290	B		0	0	250	0	280	0	70
300	B		5	0	0	180	190	0	5
301	B		50	0	250	0	50	0	0
304	C		70	0	0	0	0	0	0
307	C		130	0	0	0	0	0	0
311	C		0	0	810	0	0	0	0
327	C		30	0	0	600	0	0	0
328	B		0	0	10030	0	160	0	40
329	C		0	0	460	0	0	0	0
383	C		50	0	0	0	0	0	0
386	C		0	0	200	0	0	0	0
388	C		0	0	700	0	0	0	0
405	C		0	0	820	0	10	0	0
406	C		0	0	0	0	0	0	20
409	C		0	0	0	0	10	0	0
431	C		0	0	0	0	30	0	0
455	C		0	0	0	0	20	0	0
468	C		0	0	0	0	25	0	0
469	C		590	0	0	0	0	0	0
471	C		0	0	0	0	30	0	0
475	C		580	0	0	0	160	40	0
477	C		10	0	0	0	0	0	0
489	C		0	0	70	0	0	0	0
497	C		0	0	630	0	0	40	0
502	C		20	0	1375	0	0	0	0
506	C		320	0	310	0	50	0	30

NOTTINGHAM HALIFAX PLACE

CONTEXT	AREA	PERIOD	SMITH	HB	SMELT	SMELT?	TAP	HL	CINDER
508	C		0	0	480	0	0	0	0
512	C		20	0	0	0	0	0	0
519	C		0	160	0	0	15	0	0
520	C		260	0	0	0	0	0	0
527	C		90	0	0	0	0	0	0
540	C		180	0	0	0	0	0	0
548	C		150	0	0	0	0	0	0
631	C		0	0	0	0	20	0	0
639	C		0	0	0	0	10	0	0
645	C		110	0	0	0	0	0	0
651	C		0	0	2260	0	0	0	0
652	C		0	0	0	0	0	0	25
655	C		70	0	0	0	0	0	0
413	C	IV.6	760	640	510	570	20	0	0
625	C	IV.6	0	0	1090	0	0	0	0
289	B	V.1	0	0	610	0	0	30	0
146	B	V.2	0	60	0	0	0	0	0
284	B	V.2	100	0	0	0	1215	30	130
317	B	V.2	200	0	180	1360	1385	90	0
318	B	V.2	0	0	0	0	11500	200	0
320	B	V.2	0	0	0	220	770	0	0
324	B	V.2	20	0	0	390	130	0	0
345	B	V.2	840	260	110	420	695	5	45
395	B	V.2	100	0	0	0	45	0	0
371	B	VI.1	0	0	0	35	20	0	0
444	C	VI.1	0	0	0	1730	110	0	0
521	C	VI.1	100	0	40	0	0	80	0
239	B	VI.2	30	350	0	0	0	0	100
309	B	VI.2	70	0	0	90	170	0	0
316	B	VI.2	0	0	1500	0	0	10	0
323	B	VI.2	210	0	0	210	80	0	0
326	B	VI.2	60	0	0	470	40	0	0
342	B	VI.2	0	0	0	0	20	0	0
363	B	VI.2	0	0	0	0	35	10	0
365	B	VI.2	100	400	0	430	25	10	10
398	B	VI.2	10	0	0	0	210	0	0
423	B	VI.2	15	120	0	0	15	0	0
437	C	VI.2	5	0	0	110	0	0	0
** Total **			7000	1990	25805	6885	18095	585	475

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