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SLAGS FROM ANNETWELL STREET, CARLISLE, CUMBRIA.

Justine Bayley

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Summary

A total of about 100 kg of iron smithing debris came from mainly 1st and 2nd century contexts just within the Roman fort. It was not associated with the many "industrial" features noted in the course of the excavations but came mainly from dumps.

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Just over 100 kg of slag were collected from nearly 300 contexts in the course of the 1989 excavations. Half of the total came from just eight contexts (Table 1), most dating to period 5B which corresponds to the second quarter of the 2nd century. The summary of slag by period (Table 2) shows that over half the total came from contexts of this period with the next largest amount from period 5A which is the early 2nd century. Small amounts are present in late 1st century contexts just post-dating the construction of the fort, but only at "background" levels which are to be expected on almost any site of this period.

All the large concentrations of slag were carefully examined and the range of materials present recorded. The remainder of the bags were scanned less thoroughly but the slag was very similar in all cases. This suggests that much of the material in contexts later than period 5 may be residual.

The bulk of the slag was cindery smithing slag, some in the form of hearth bottoms but most was smaller, amorphous pieces. The hearth bottoms were elongated rather than circular in plan but retained the typical plano-convex cross-section. Weights varied considerably with a median of around 700 gm (see Table 3). Also present was some fuel ash slag, vitrified clay hearth lining and lumps of ferruginous concretions together with occasional fragments of vitrified stone and corroded iron objects. Some of the slag had considerable amounts of soil adhering but this contained very little hammer scale, suggesting the slag had been moved from the immediate vicinity of the workshops where it had The terms used here to describe the slag are been produced. defined and explained by Bayley (1985) and McDonnell (1983).

A few pieces of hearth lining showed traces of the tuyere, the hole where the air blast from the bellows entered the hearth. A good example of this was found in context 4141 which showed both a re-lining of the hearth and an attached accumulation of slag below the tuyere.

The appearance of the slag was not absolutely typical of that produced in a blacksmith's hearth, being less dense (lower in iron) than is often the case. Very similar material to that found here is however known from other Roman sites such as Ribchester (G McDonnell, pers comm), so its interpretation as debris from a smithy is fairly certain.

A number of ovens and other "industrial" features were found in the course of the excavations but none were directly associated with the concentrations of slag (which were mainly in dumps) and are thus unlikely to be the location of the smithy. Smith's hearths were often at waist level and so leave little if any trace in the archaeological record, a possible explanation for the lack of specific features. However, the smithy was probably close to, though not within, the excavated area as slags are not usually discarded very far from where they were produced.

References

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> Bayley, J (1985) What's what in ancient technology: an introduction to high temperature processes. In P Phillips (ed) The archaeologist and the laboratory. CBA Res Rep 58, 41-4.

McDonnell, G (1983) Tap slags and hearth bottoms, or, how to identify slags. Current Archaeology 8(3), 81-3.

Table 1:	Contexts with	largest concentrat	ions of slag
Context	Period	Weight(kg	7)
1585	5B/3	9.25	
1610	5B/3	5.39	
1631.2	5B/3	8.63	
1687	5B/3	7.64	
1723	5B/3	4.11	
1771	5B/3	4.68	
2574	5A/2	7.53	
5936	3B/1	3.63	
		Total 50.86	

Table 2: Quantity of slag in each period

No of Contex	ts Weight	Percentage
5	1.40	1.4
8	5.23	5.1
11	0.90	0.9
66	20.37	20.0
63	56.09	54.9
22	2.33	2.3
4.	0.09	<0.1
1	0.05	<0.1
19	1.15	1.1
3	0.31	0.3
9	2.57	2.5
55	8.65	8.5
23	2.96	2.9
ls 289	102.10	
	No of Contex 5 8 11 66 63 22 4 1 19 3 9 55 23 1s 289	No of Contexts Weight 5 1.40 8 5.23 11 0.90 66 20.37 63 56.09 22 2.33 4 0.09 1 0.05 19 1.15 3 0.31 9 2.57 55 8.65 23 2.96 1s 289 102.10

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Table 3: Typical	hearth bottoms	
Context	Dimensions (mm)	Weight (gm)
1631.2	140 x 90 x 70	800
1687	100 x 90 x 65 110 x 70 x 70 85 x 60 x 30	
1771	170 x 110 x 110 130 x 100 x 60 100 x 80 x 70 90 x 60 x 40	1300 750 700 250
1878 -	80 x 70 x 25	300
5936	130 x 130 x 50 130 x 100 x 50	1050 650

(Dimensions are major diameter x minor diameter x depth)

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