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Examination of Slags from Botolph Bridge, Peterborough, Cambridgeshire

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Summary

5.6kg of iron smithing slags was recovered during the excavations of a deserted medieval village near Peterborough. The small quantity of smithing slag indicates that smithing did not form a significant part of the site economy.

Keywords

Metal Working-fe

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Introduction

Cambridge County Council Archaeological Field Unit carried out excavations in 1999 and 2000 on the site of the deserted medieval village at Botolph Bridge (TL 1715 9735) on behalf of English Heritage. The earliest excavated medieval features were rectangular enclosures that were deliberately filled, probably in the thirteenth or fourteenth centuries. A series of masonry buildings, consisting of a farmhouse and ancillary buildings (including a dovecote), were constructed and maintained up to the seventeenth century.

Iron Working Slags

5.6kg of iron working slags was recovered during the excavation; this included 3.7kg of smithing hearth bottoms and 1.9kg of non-diagnostic iron working slag. In addition, 0.3kg of miscellaneous non-metalworking debris was identified. No smelting slags and no fragments of vitrified lining were identified. A series of soil samples was also examined to determine if hammerscale was present. In all but one case, the magnetic fraction recovered (after the soil samples had been sieved) proved to be fragments of corroded iron or pieces of naturally magnetic ironstone.

The presence of smithing hearth bottoms shows that iron smithing was carried out. The quantity of iron smithing debris is not great and is likely to have been produced by small scale smithing activity. The absence of vitrified linings indicates that the iron slags were probably not produced within the area excavated but were dumped there. The lack of substantial quantities of hammerscale also shows that very little smithing can have taken place within the area excavated. There was no evidence for iron smelting.

Explanation of terms used

Evidence for iron smithing may be recognised in two forms, as bulk slag and as micro slags. Of the bulk slags produced during smithing only the **smithing hearth bottoms (SHB)** are unlikely to be confused with the waste products of smelting and are therefore considered to be diagnostic of smithing. Hearth bottoms are recognisable by their characteristic plano-convex form, typically having a rough convex base and a smoother, vitrified upper surface which is flat, or even slightly hollowed as a result of the downwards pressure of the air blast from the tuyère. Compositionally, smithing hearth bottoms are predominantly fayalitic (iron silicate) and form as a result of high temperature reactions between the iron, iron-scale and silica from either the clay hearth lining or sand used as a flux by the smith.

Most assemblages of slag include **undiagnostic ironworking slag**, which is also of fayalitic composition and can be formed during iron smelting or iron smithing. However, in the absence of any clear evidence for the former it is probable that the undiagnostic slag also derives from iron smithing.

In addition to bulk slags, iron smithing also produces micro-slags of two types. **Flake hammerscale** consists of fish-scale like fragments of the oxide skin of the iron dislodged during working. **Spheroidal hammerscale** results from the solidification of small droplets of liquid slag expelled during working, particularly when two components are being fire welded together or when a slag-rich bloom of iron is first worked into a billet or bar. Hammerscale is considered important in interpreting a site because it is highly diagnostic of smithing. It often builds up in the immediate vicinity of the smithing hearth and anvil and may give a more precise location for smithing than the bulk slags that may be transported elsewhere for disposal (Mills & McDonnell 1992).

Conclusions

The iron working slags recovered all indicate that iron smithing took place. The range and quantities of slag are limited and indicate that the smithing was most probably a minor activity and took place outside the area excavated.

Recommendations

The small quantity of iron working slags recovered do not warrant further study.

The iron working slags should be retained. They have already been washed. Iron working slags are stable and do not require any special storage conditions.

References

Mills, A. & McDonnell, J.G. 1992. The identification and analysis of the hammerscale from Burton Dassett, Warwickshire. Ancient Monuments Laboratory Report 47/92.

Appendix

Weights (grammes) of slag recovered from each context

Context	Smithing Hearth Bottom	Non Diagnostic	Other	Comments
3			2	Stone
9		22		
10	222			
11	271			
25			37	Stone
52	489			
69		15		
76	143			
82		66		
83	412			
84	375			
99		39		
123		53		
171	285			
172	233	366		
177	68			
183	286			
186	363			
232	459	179	293	Brick
239		219		
336		70		
405		147		
443	133			
690		45		
924		668		
938		14		

List of contexts from which soil samples were processed to recover hammerscale:

Context	Enviro	Hammerscale
69	11	No
99	12	No
101	13	No
76	14	No
90	15	No
135	16	No
136	17	No
142	18	No
153	20	No
87	21	No
182	22	No
171	23	No
172	24	No
175	25	No
91	27	No
185	32	No
186	33	No
103	34	No
198	36	No
134	46	No
246	47	No
257	48	No
237	49	No
240	50	No
206	53	No
208	54	No
265	55	No
291	56	No
297	59	No
317	60	No
305	62	Yes
312	64	No
268	65	No
271	66	No
321	67	No
320	69	No
323	71	No
295	72	No
293	73	No
330	74	No
334	75	No
336	76	No
339	77	No
340	78	No
360	79	No
366	80	No
325	82	No