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Assessment of archaeometallurgical residue from Paulerspury LLP36

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Abstract

The submitted material comprises a single piece of dense, flow lobed iron slag, almost certainly a tapped bloomery iron smelting slag. The piece has a somewhat weathered surface and fractured corners have lost some of their angularity, so the piece may well have been residual within its depositional context.

It is unclear what the iron ore resource might have been at Paulerspury. The location lies outside the main distribution of iron smelting associated with the outcrops of the Northampton Ironstone and the Ironstone Junction Bed. The source is most likely to have been the Middle Jurassic Northampton Ironstone (part of the Northampton Sand Formation), although the Lower Jurassic Marlstone is also a possible source.

Bloomery iron smelting with slag tapping was a technology employed in the Roman period and again from the 9th to 16th centuries.

Methods

The materials were examined visually (with a low-powered hand lens). As an evaluation, the material was not subjected to any high-magnification optical inspection, not to any form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

This work was commissioned by Chris Caswell and Graham Cruse, of Network Archaeology.

Results

The material comprises a single piece of dense slag weighing 78g from context (3027).

The piece is the fractured margin from a sheet of slag in flow lobes. The outermost lobe appears to have a basal contact with sand, the inner ones with charcoal.

The slag has a slightly maroon (haematised) surface where this is preserved, but the surface has often been etched away by weathering and the body of the slag has a slightly greenish hue, that may also be the result of slight weathering. The sharp angles on the fracture surfaces have been rounded. These features suggest a degree of reworking for this piece and it may be residual within its depositional context

Interpretation

The material is almost certainly from the margin of a flow of tapped bloomery slag. Just occasionally smithing slags have margins that have flowed, but these rarely show such well-developed flow lobes or are haematised. Various post-medieval industrial processes may produce flow-lobed fayalitic slags (fining, puddling and copper smelting being the three commonest). The Walloon finery process of the sixteenth to eighteenth century, in particular, may produce slags similar to early bloomery smelting lags. None of these processes is, however, particularly likely to be encountered in rural Northamptonshire.

An interpretation as a bloomery slag appears fairly certain. The haematisation of the surface indicates contact with air, so the piece can be interpreted as a tapped smelting slag, rather than a morphological similar flow slag, from a non-slag tapping furnace.

Slag-tapping became the dominant mode of slag handling in iron smelting at around the time of the Roman invasion (though possibly rather earlier in some areas), but went out of use at the end of the Roman period. It was re-introduced in approximately the 9th century, and thereafter was employed, almost ubiquitously, until bloomery smelting passed out of use with the introduction of the blast furnace in the 16th/17th centuries.

Although early iron smelting was widespread in the East Midlands, Paulersbury is beyond the SW limit of the main area of exploitation of the Northants Sands Ironstone both during the 20th century (Hollingworth & Taylor 1950, Plate II) and in early periods (Schrüfer-Kolb 2004, maps 1-3). Farther to the SW (in N Oxfordshire), there has been some exploitation of the Marlstone Rock, somewhat lower in the geological succession. Although the Marlstone outcrops in the Paulerspury area, it is not recorded as being ferruginous and the nearest worked deposits of historical times are 20km to the W. A further ironstone horizon, the 'Ironstone Junction Bed' at the base of the Rutland Formation has also been locally worked in the East Midlands, but has not been recorded so far south.

Evaluation of potential

The piece might be able to yield chemical indicators of which of the various possible ore sources was being exploited, but very little comparative geological material from that area has been analysed previously. Given the isolated nature of the piece, further analysis can probably not be justified; therefore none is recommended.

References

Hollingworth, S.E. & Taylor, J.H. 1951. *The Northampton Sand Ironstone, Stratigraphy Structure and Reserves*, Memoirs of the Geological Survey of Great Britain.

Schrüfer-Kolb, I. 2004. *Roman Iron Production in Britain; Technological and socio-economic landscape development along the Jurassic Ridge*. BAR British Series, 380.

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