

ART. VII. – *Romano-British Iron Extraction in North Lancashire.*

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SINCE its excavation by Dr J. W. Jackson between 1909-13 the nature of the Romano-British deposits in Dog Holes cave (SD 4833 7303) on Warton Crag in north Lancashire has been a matter of speculation; Jackson saw the deposits as being wholly domestic in nature,¹ whilst others have tended to interpret the site as being sepulchral or votive in character.² The material includes coarse and Samian pottery, bone items, iron objects (including a reaping hook), enamelled bronzework, a bronze balance with scale pans and a textile impression on a corroded piece of iron; all can be dated to the first-third centuries A.D.

Stratified with the Romano-British finds were several objects described in the excavation report as 'irregular lumps of iron with charred timber attached to their surfaces'³; examination by the writer, of these four nodules suggested they were iron slag. Accordingly two of the samples were submitted to Dr J. H. Cleland of Cambridge University for analysis and comment.

Sample A comprised a roughly circular 105 mm diameter concave cindery block with solidified charcoal at centre; weight 12 oz. Sample B comprised an irregular concretion with charcoal embedded; weight 13.5 oz.

Dr. Cleland's analyses were as follows:

<i>Sample Mark</i>	<i>A</i>	<i>B</i>
FeO	68.4	70.5
Fe ₂ O ₃	18.1	12.7
SiO ₂	10.9	13.5
CaO	0.5	1.7
MnO	—	tr
Al ₂ O ₃	2.4	1.8
MgO	tr.	tr.

analyses in weight %, tr=trace.

He writes – 'The appearance of slag sample A suggested that this came from the bottom part of a bloomery where it was formed by the accretion of drops of molten slag onto part of the furnace lining, the pieces of charcoal being entrapped on the addition of a fresh charge of fuel. Sample B was magnetic in parts and similar in appearance to sample A. Closer examination disclosed pieces of partially-reduced ore close to the furnace lining. The outer surface of these had been reduced to FeO, possibly even to iron with subsequent reoxidation to FeO, but the interior had been reduced to the intermediate stage of magnetite, Fe₃O₄. The reddy-magenta colour of magnetite could be seen on exposing a fresh surface. This sample came from slightly higher up the bloomery than sample A.

The silica content of both these slags is low, especially so since the possibility of some silica pick-up from the furnace lining must be considered. My thoughts tend to Romano-British, although the high FeO and low alumina figures are more typical of an earlier date.⁴ On balance I believe that the physical form of these slags indicate that they originated in a furnace of Cleere's Group A, sub-group 2 classification,⁵ and that their

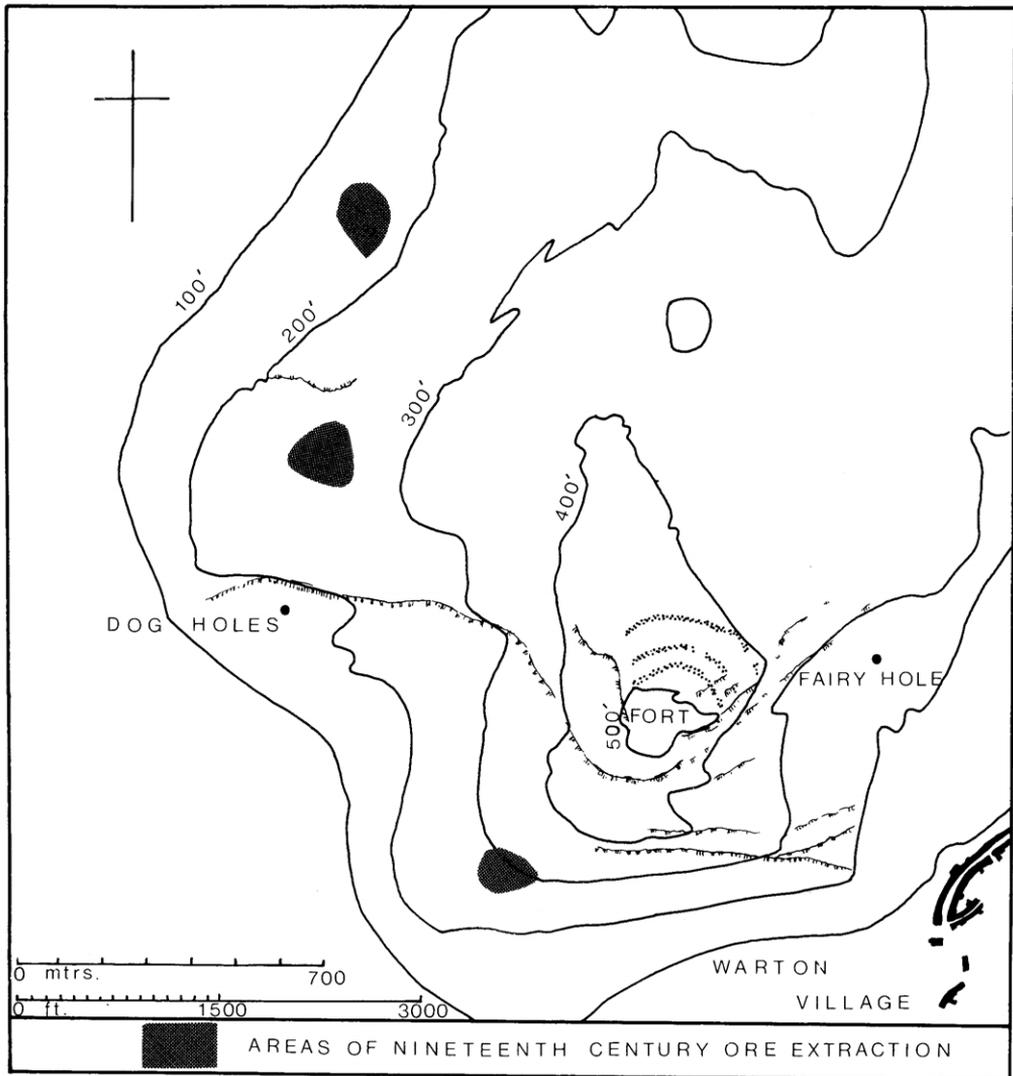


FIG. 1. – Dog Holes Cave in relation to other early sites on Warton Crag and to the Nineteenth Century iron workings.

composition supports this.’ Dr Cleland tentatively suggests a date in the first century A.D. for the slags.

The source of the iron ore represented by the Dog Holes slag is almost certainly to be found in close proximity to the cave. During the nineteenth century several areas on the western side of Warton Crag were mined for iron ore, which occurs near the surface mainly in the form of haematite in this faulted limestone outcrop.⁶ Dog Holes cave lies approximately mid-way between two of the three principal areas of nineteenth century workings. It is interesting to note that amongst the scattering of Romano-British material excavated by Jackson in Fairy Hole, a fissure cave on the eastern side of Warton Crag, was a fragment of haematite.⁷

No workings or smelting sites which could be attributed to the Romano-British period have so far been located on Warton Crag; their destruction during nineteenth century activity must be a strong possibility. There is as yet no evidence to suggest that the Warton Crag iron workings were other than small scale.

Whilst the scale of the workings would suggest that any direct military supervision is unlikely, the siting of three Roman forts within twelve miles of Warton Crag (Lancaster, Overborough, and Watercrock) could have provided a commercial boost to local exploitation of the ore. The other nearest iron ore sources are the haematite ores of south and west Cumbria (of which Warton Crag is an outlier) and the carbonate ores of north-east Cheshire and south Lancashire.

Not only does the extent of the iron working on Warton Crag during the Romano-British period remain to be established, but so does the commencement of the workings. It may be significant that Warton Crag is crowned by a pre-Roman hill-fort⁸ and that during the early nineteenth century a 'Brigantian' sword was found beneath an apparent cairn burial on the flanks of the Crag.⁹

References

- ¹ J. W. Jackson, 'Further Report on the Explorations at Dog Holes, Warton Crag, Lancs., with Remarks on the Contents of Two Adjacent Caves', *Trans. Lancashire Cheshire Antiq. Soc.*, 28 (1910), 80.
- ² D. C. A. Shotton, *Romans in Lancashire*, (1973), 80. A. King, 'A Review of Archaeological Work in the Caves of North-West England', in A. C. Waltham (Ed.), *Limestones and Caves in North-West England*, (1974), 199-200.
- ³ J. W. Jackson, 'Third Report on the Exploration of Dog Holes, Warton Crag, Lancs.', *Trans. Lancashire Cheshire Antiq. Soc.* 30 (1912), 107.
- ⁴ See R. F. Tylecote, *Metallurgy in Archaeology* (1962) for comparative analyses of Iron Age (Table 68) and Roman (Table 81) slag and cinder.
- ⁵ H. F. Cleere, 'The Classification of Early Iron-Smelting Furnaces', *Antiq. Journ.*, 52 (1972), 8-23.
- ⁶ C. M. Moseley, *The Metalliferous Mines of the Arnsdale-Carnforth Districts of Lancashire and Westmorland* (1969).
- ⁷ J. W. Jackson (1910), *op. cit.*, 68.
- ⁸ J. Forde-Johnson, 'The Iron Age Hillforts of Lancashire and Cheshire', *Trans Lancashire Cheshire Antiq. Soc.*, 72 (1962), 29-32.
- ⁹ S. Piggott, 'Swords and Scabbards of the British Early Iron Age', *Proc. Prehist. Soc.*, 16 (1950), 17.

