The iron smelting site at West Walk, Wickham, Hants.

Grid Ref. SU 595127; Site ref. 1974 WW.

This site was excavated in 1974 by Tim Schadla-Hall as the Forestry Commission wanted to open up the wood, which is part of the Forest of Bere, to the visitor and to make a car park. West Walk runs through the wood in an NE direction from road No. A32. The laying out of the car park and the widening of West Walk revealed two slag heaps, one of which was almost totally removed by the car park and which revealed most of the debris investigated here. The other still stands alongside West Walk.

1. Environment.

The site lies on the edge of the Meon valley on the Bracklesham Beds which are known to yield iron ore in several places. (Riseley is probably on the same horizon). It is almost certain that the wood itself was the source of the ore and should be searched for bell-pits. The London Clay and the Reading Beds have a narrow outcrop nearby and may be an alternative source.

2. Preliminary examination of the material at Winchester.

The heaps yielded several tonnes of slag and samples of the debris have been kept roughly divided into slag and furnace lining. The slag consisted of two types, large blocks typical of Roman tap slag such as that at Ashwicken. These weighed about 9 kg. But there were a lot of small pieces which had wood/charcoal impressions which tend to suggest an earlier date, although they could be furnace slag attached to the bloom. In either event they were not tap slag. Although the dating had been loosely classified as Roman, the finds research assistant, Charlotte Matthews, agreed that some of the pottery

was pre-Roman Iron Age. But there was at least one piece of Samian and a lot of Roman coarse ware.

3. Examination of the site.

An examination of the site showed that clearings had been made by the Forestry Commission for car parks. I could not find any sign of the remaining slag heap. The F.C. has made carefully indicated "walks" through the forest. Away from the walks and the car parks, the forest cover can be extremely dense and difficult to penetrate. I suspects that ore-pits (either bell- or trench-shaped) will be found in these areas which do not appear to have been recently touched.

4. Examination of the material.

Samples of the following were taken for laboratory examination (the numbering is mine):-

WWW 1. Furnace lining: one large piece 2.5 cm thick, 12.5 cm deep with a 20 cm chord indicating an inner diameter of about 45 cm.

WWW2. Small pieces of furnace or bloom slag. These contained charcoal impressions and had come from the bottom of the furnace and very likely had been in contact with the bloom.

WWW3. What appeared to be "furnace bottoms", i.e. the blocks mentioned above which weighed up to 9 kg.

Examination of this material with a low-power binocular microscope showed that WWW2 was a typical slag, wholly vitreous; WWW3 contained a large number of rounded quartz grains in a very vitreous matrix with some rounded pores; WWW1 was slag-coated with the slag looking very like WWW3 but the material of the lining was fritted quartz grains heated to give a red/yellow colour

(presumably under oxidising conditions) with a more friable backing. The matrix of the middle layer of WWW1 was partially vitreous but quite different from the inner slagged layer; none of this was ferro-magnetic.

WWW3 was most unusual. The fracture was bluish in colour, very suggestive of Mn, and much more like a baked clay than a slag. It was much less dense than a typical tap slag but had a fused surface and, from the difficulty of breaking it, there was no doubt that it contained much vitrified material.

5. Electron Probe analysis.

Metallographic sections were prepared in the usual way and these were subject to EPMA.

Bloom slag WWW2. The results are given in the table. 70% was in the form of columnar olivine-type crystals which, if one added the FeO and the MnO together, would have the composition 2 Fe(Mn)O.SiO_2. This phase is very pure and contains hardly any of the more basic oxides. The glass phase on the other hand contains all the alumina, some of the iron and manganese, and all the K and P. This is a very typical slag.

Ore or tap slag WWW3. This contains undissolved and rounded quartz grains of various sizes in a vitreous matrix. This matrix contains areas which have undergone reduction and which show very fine particles of metallic iron. Spheroidal pores are also present. The matrix is otherwise vitreous and slag-like.

The analysis given in the table shows the high silica expected in spite of the fact that it does not take into account most of the undissolved silica. The iron content

is not high, but this and the manganese are more typical of an ore than a slag. If the original material had been properly dressed it would have given a usable iron ore with an appreciable Mn and P content, and fully capable of giving the bloom slag, WWW2.

But one has the feeling that a large mass of undressed ore has been sintered to give undissolved quartz with a vitreous phase carrying most of the iron. This sintering was done under reducing conditions either due to carboneceous material being present in the ore or as a fuel.

It is possible that the poor ore was of a clayey consistency and could be made to serve as the furnace lining seen as WWW1. It has appreciable alumina which probably occurs as a clay-grade material.

6. Conclusions.

This material represents a smelting site with shaft furnaces of about 45 cm internal diameter. We do not have a proper tap slag so cannot decide whether the furnaces were tapped.

The furnace slag is of a very common type and indicates the use of an ore containing appreciable Mn and P. But the "furnace bottoms" are clearly not typical tap slag but low grade vitrified ore. It would seem that some of the undressed ore was used for the furnace lining and that it was normal practice to roast the ore before smelting. In this process vitrification (sintering) took place.

The problem of what this material is and what it was intended for can only be cleared up by obtaining some of the original ore from the forest. I recommend that a small excavation be undertaken in an untouched area of the forest

to find ore on the lines of my excavation in Norfolk[1] and that of Swift in the Weald.[2]

References.

1. R.F. Tylecote. The bloomery site at West Runton. Norfolk Arch. 1967, 34 (2), 187-214.

2. G. Swift. Excavation of two mine-pits in Minepit Wood Rotherfield. Wealden Iron 1982 (2), 15-19.

November 1984.

R.F. Tylecote.

Table.

Composition of material from West Walk, Wickham, Hants (%).

	WWW2 Bloom slag		WWW3 ore or tap slag	
	Glassy matrix	Olivine crystals	matrix	
SiO_2	49.06	28.54	48.6	44.7
FeO	13.00	49.26	33.7	44.1
Al_2O_3	15.62	0.01	7.1	6.4
CaO	6.31	0.23	1.3	0.8
MnO	2.76	11.47	2.5	2.1
MgO	0.0	0.66	0.5	0.0
K_2O	4.44	0.03	1.9	0.2
SO_2	0.29	0.0	0.5	0.0
P_2O_5	3.99	0.16	1.9	0.2
TiO_2	0.74	0.23	0.0	0.8
Total	96.20	90.58	95.6	99.3