ARCHAEOLOGICAL EVALUATION OF A PROPOSED TIPPING SITE AT BRAY VALLEY QUARRIES, BRAYFORD, DEVON

by

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DRAFT REPORT

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Contents

List of illustrations

1 INTRODUCTION

This report describes the results of an archaeological evaluation excavation undertaken by Exeter Archaeology (EA) for Hanson Aggregates (formerly ARC Ltd) at Bray Valley Quarries, Brayford. The evaluation was undertaken in advance of a planning application for the extension of existing quarrying activity in the area and only covers the area proposed for a quarry waste tipping area (Fig. 2). The remainder of the application area will be subject to future archaeological evaluation.

1.2 **The site** (Figs 1-2)

The proposed tipping site (centred at SS68863300) occupies three permanent pasture fields lying to the north-east of the village of Charles, immediately adjacent to Charlestown Barton. The ground level in all three fields falls away to the east, the greatest slope being that of the middle field directly to the east of Charlestown Barton. The eastern boundaries of the three fields mark the western extent of the quarrying operations of Bray Valley Quarries

2. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

The archaeological and historical background of the site was considered in the preliminary assessment of the consolidating planning application (Gent 1998). Charles was historically a parish of scattered farms and hamlets, forming a dispersed pattern of settlement. The village of Charles itself, lying in close proximity to the study area, consists of a small settlement formed around a nucleus provided by the church, the rectory and Charlestown Barton. Professor Hoskins (1992, 326) suggests that the place-name is indicative of a probable pre-Saxon community. Little modern development has taken place in or around the village and, apart from areas of recent quarrying, little change is evident in the field boundaries since the production of the Charles Tithe Map in 1842. By the time of the survey of the 1891 OS 6" (1:10560) map (surveyed in 1886-7), the boundaries stood largely as today. Only the gradual removal of some boundaries to produce larger fields has occurred in recent years.

The presence of prehistoric communities in the vicinity is demonstrated by the density of Bronze Age burial mounds on areas of surrounding high ground, particularly on Exmoor (Gent 1998, 3). A sandstone macehead of probable Neolithic manufacture has been found at SS688329 in the village of Charles itself (SMR SS63SE/7).

3. GEOPHYSICAL SURVEY (Figs 3-4)

Prior to the production of the initial assessment, no archaeological investigations had been undertaken in the immediate vicinity. However, a geophysical survey of the tipping area (areas 1-3) undertaken in March 1999 identified parts of two substantial superimposed enclosures (A and B) to the north of Charlestown Barton farm buildings (OAa). The results were clarified by further survey work in May 1999 (OAb), which included the field to the north-east of Charles (area 4) and additional surveying undertaken around areas 1-3.

The geophysical survey showed enclosure A, measuring 70m wide east-west and 75m north-south, enclosing an area to the north of Charlestown Barton. The shape of the enclosure was not regular; its east side (within area 2) was defined by angular changes in direction, giving the appearance of a hexagonal enclosure. In area 4, to the north-west of the farm buildings, the enclosure ditch was curvilinear, arcing south towards the farm. Also present within this

area was a possible ditched trackway, orientated north-east/south-west, leading to another apparent enclosure at the south-eastern edge of area 4. Superimposed over all these features were agricultural striations, also orientated north-east/south-west, caused by ploughing. In the field to the north-east of the farm (area 2), several other distinct features were identified that could not be directly associated with enclosure A. These included pit forms, linear features (e.g. ditches) and an area of burnt material.

On its eastern edge, enclosure A overlapped, or was overlapped by, another enclosure (B). Enclosure B occupied a break in slope, and its full extent downslope was not determined during the survey. The shape of the enclosure was not constant; it had a curved semi-circular shape to the north but was squared to the south, where a break in the alignment of the ditch suggested a possible entranceway. A V-shaped feature was apparent within enclosure B, and the enclosure itself was crossed by several other linear anomalies.

No geophysical anomalies were apparent in area 1 to the north. In area 3, at the southern end of the site, one curvilinear feature orientated approximately north-east/south-west was identified.

4. ARCHAEOLOGICAL RECORDING

4.1 **Method**

In accordance with a method statement produced by EA for Hanson Aggregates Ltd in April 1999, ten trenches were excavated across the site. These were dug using a wheeled excavator with a 1.5m-wide toothless bucket to the surface of the *in situ* weathered shale bedrock (known locally as shillet). Where archaeological deposits were encountered, excavation continued by hand. At least 50% of the fills of all features were excavated and samples for possible radiocarbon dating and palaeoenvironmental analysis taken as appropriate.

Trenches 1-7 and 10 were laid out to investigate the archaeological features identified in the geophysical survey, while trenches 8 and 9 were intended to sample areas outside the original survey area.

4.2 **Results**

Trench 1 (15m long) (Fig. 3)
This was positioned to investigate the northern arc of enclosure B and a linear feature orientated north-east/south-west just to the north of the enclosure.

The easternmost ditch (511) was part of the eastern enclosure B. This was 1.55m wide and cut 0.72m into the subsoil, with an open V-shaped profile and a flattened base 0.2m wide. The fills (512, 578-9), which were very clean, became progressively stonier with depth. The lowest fills (578-9) probably derived from the slighting of an associated bank, but no remnants of any bank survived above the subsoil. No artefacts or charcoal were recovered.

Another ditch (509) lay 2.3m to the north-west of enclosure ditch 511. This had been identified in the geophysical survey as a possible field boundary not associated with either enclosure. The ditch was 0.8m wide and cut 0.35m into the subsoil, with an open V-shaped profile. Its single fill (510) contained no artefacts nor charcoal.

Trench 2 (L-shaped: 16.5m north-south, 16m east-west) (Figs 3, 5-6, Pls 1, 7-8)
This L-shaped trench was positioned to investigate the relationship between the two overlapping enclosure ditches and a possible area of burnt material identified in the geophysical survey. The excavations exposed two ditches and a spread of iron smelting debris.

The enclosure ditches (Figs 3 & 5)
Two ditches were exposed in the east-west portion of trench 2.

The easternmost ditch (527), part of enclosure A, was 2.82m wide and cut 1.65m into the weathered bedrock, with a steep-sided V-shaped profile and a flat base, 0.35m wide (Pl. 1). The primary fill (550) consisted exclusively of shale fragments and represented the initial slighting of a bank. This layer was partially sealed on the east side by washed-in soil (549), in turn sealed by a secondary slighting of the bank (548). No finds were recovered from the primary fills, but charcoal recovered from the initial slighting (550) has been dated from 20-230 AD at 2δ with 95.4% confidence (see Appendix 2). The upper soil fills yielded one sherd of Roman pottery (545) dating from the late 3rd/4th century AD, and fragments of iron tap slag and furnace lining (528).

The westernmost ditch (525), part of enclosure B, was 2.25m wide and cut 1.1m into the weathered shale bedrock. The ditch was an open V-shape and, like its continuation (511) in trench 1, possessed a flattened base, here 0.3m wide. The ditch fills suggested that the slighting of the associated bank occurred in three phases, with very stony fills 536, 543 and 542 representing the slighted bank material, interspersed with lenses of soil (537-41) washed into the ditch between the slighting episodes. No finds were recovered from the lower fills of the ditch.

Iron smelting debris (Fig. 6, Pls 7-8)
A dark layer (502) sealed just beneath the topsoil within the north-south portion of trench 2 was composed of soil, charcoal and iron slag along with partially fired and vitrified clay. This *c.* 0.25m thick layer (maximum thickness *c*. 2.8m) was exposed for a distance of 11.2m from the southern end of the trench before petering out towards the north, where it appeared to fill a shallow pit (565). Roman pottery sherds recovered from this deposit suggested a date of the late 3rd-4th century AD for its deposition. Between this slag-rich layer and the weathered shale subsoil, the lower horizon of a contemporary Roman soil (564) was preserved. This contained sherds of Roman pottery dating from the late 2nd century AD (or later), and an iron nail. The deposit is discussed more fully in Appendix 1.

Trench 3 (12m long) (Figs 3 & 7 and Pl. 5)
This was positioned to investigate the V-shaped feature shown on the geophysical survey within enclosure B (see Fig. 4). Excavations revealed two archaeological features. The earliest was a shallow flat-bottomed pit (519) cut *c.* 0.35m into the weathered bedrock. This feature, while only partially exposed for a length of 1.75m, appeared to be oriented north-west to south-east. No datable material was recovered from its fill. The full extent of 519 could not be determined since only its northern side was exposed in the trench and its eastern extremity had been truncated by the construction of a substantial ditch (517). The latter had been dug 1.3m into the underlying shale and, where crossed by the trench, was oriented north-west to south-east. This ditch represents the V-shaped feature identified in the geophysical survey, or at least one component of it. The lower fills of the ditch (533-4) and

fill 518 consisted of shale fragments in a clay matrix. These probably derived from the slighting of an associated bank, although there was no evidence to indicate on which side of the ditch the bank lay. Two small sherds of Roman pottery were recovered from context 518.

Trench 4 (17.75m long) (Figs 3, 8; Pl. 4)
Located to investigate the possible entrance on the south side of enclosure B, the excavations exposed a ditch terminus (523) projecting 2.5m into the trench from the east. The terminus was 2m wide and 0.8m deep, cut into the shale bedrock. Unlike the other ditches excavated, the lower fill (532), rather than comprising redeposited shale fragments, consisted largely of clayey soil, suggesting that any associated bank had not been slighted into this stretch of ditch. This lower fill directly overlay a thin layer of weathered shale fragments (591). Finds recovered from the upper ditch fill (524) date from the 3rd/4th centuries AD, with Roman pottery sherds also retrieved from 532.

To the west of the ditch terminus, a cluster of three shallow pits (551-3) survived cut into the shale bedrock. Initially thought to be associated with an entranceway, these pits were far too shallow to have successfully held posts (being 0.2m, 0.15m and 0.1m deep respectively). Each pit was filled with yellowish-brown clay, and careful excavation did not find any evidence of packing or post-pipes.

To the south, a second ditch terminus (554) was exposed. This was orientated north-west to south-east, at right angles to ditch 523. Ditch 554 was 0.6m wide and 0.3m deep with a flat base. It was exposed for a distance of 2m before terminating 4.75m south-east of the larger ditch terminus (523). One sherd of Roman pottery was recovered from the fill (556). The geophysical survey suggested that 554 was part of an annexe associated with enclosure B; the plot of area 2 shows it running south-east for 20m then turning abruptly through 90° to the north-east (towards the break in slope) and continuing beyond the limits of the survey.

To the north of terminus 523, a buried soil (535) contained within a shallow terrace cut (593) continued northward beyond the extent of the excavations. This soil yielded pottery dating from after *c*. 270 AD and fragments of tap slag, together with charcoal and partially fired or burnt clay. Samples of the soil were taken for palynological analysis where it was sealed by the remnant of a bank (592), 2.7m north of ditch terminus 523 (on the inside of enclosure B). The bank itself survived as a lens of material, 1.4m wide and 0.2m thick, consisting of weathered shale fragments within a yellow clay matrix. Sealed beneath the buried soil was a pit (561), which survived as a cut feature in the weathered shale bedrock.

Trench 5 (17.6m long) (Figs 3 & 9; Pl. 5)
This was positioned to investigate the potential stratigraphic relationship between the two enclosures (A and B) where they overlapped, and at a point where the geophysical survey had suggested either a break in the ditch circuit of enclosure A, or that a slighted earthwork was masking the geophysical response of enclosure A's ditch in this area.

The excavations showed that there was indeed a break in the circuit of enclosure A. Only the western ditch (516) of enclosure B was exposed within the trench. This was 1.55m wide, with a V-shaped profile, and cut 1m into the bedrock. The nature of the lower fills (515, 594 and 531), like those of the other excavated ditches, suggested they were derived from the slighting of an associated bank. No finds were recovered from any of the lower fills, but Roman pottery dating to the latter part of the 3rd century AD, or later, was found in the upper

soil fill (503) along with one fragment of furnace bottom, and a piece of flat iron bar. A struck flint flake was recovered from the upper stony fill (515).

Some 1.4m to the east of ditch 516, on the inside of enclosure B, a shallow linear feature (504) was cut into the shale bedrock. The fill of this feature was indistinguishable from the topsoil. However, the fact that it appeared to run parallel to the enclosure ditch might suggest it was contemporaneous.

Six metres west of ditch 516, the southern half of a pit (505), 1.5m in diameter, was exposed (Pl. 6). This contained two fills (506-7), which yielded several fragments of tap slag but no datable material.

Trenches 6 and 7 (12m and 32m long) (Fig. 3, Pl. 2)
Trenches 6 and 7 were positioned across the southern and northern ditches of enclosure A. The southern ditch (566) was 2.7m wide and cut 1.3m into the shale bedrock. It possessed a V-shaped profile. In this vicinity the bedrock was less weathered (and consequently more solid) and the ditch was slightly shallower than encountered elsewhere. On the northern side of the enclosure, the ditch (580) was 3.2m wide and cut 1.72m into the shale bedrock. It had a V-shaped profile with a flat base, 0.22m wide (Pl. 2).

Trench 8 30m long (Fig. 3)
Located at the north-west end of the site, excavation revealed no archaeological deposits beneath a thin, 0.1-2m thick layer of topsoil and turf.

Trench 9 12m long (Fig. 3)
Located to the south-east of enclosure A, excavation revealed that there were no archaeological deposits beneath 0.2-0.3m of topsoil and turf.

Trench 10 30m long (Fig. 3)
This trench was located to investigate the curvilinear feature identified by the geophysical survey at the far south-eastern end of the site, and the survival of any other unidentified archaeological deposits. Excavation showed the feature to be a shallow ditch, 0.7m wide and 0.3m deep, containing several sherds of post-medieval pottery. This feature probably represents a post-medieval field boundary or drainage ditch.

5. CONCLUSION

The geophysical survey and archaeological evaluation of the site have demonstrated the presence of at least two ditched enclosures (A and B, see 5.1), an industrial iron smelting site (see 5.2), and several other features. However, within the scope of this investigation, no stratigraphic relationship between these features could be determined.

5.1 **The enclosures**
The fact that the enclosures 'overlap' suggest that they were constructed independently of each other. No finds were recovered from the fills of enclosure ditch A, the bulk of the ditch appears to have been infilled with slighted rampart material and there was a noticeable lack of substantial weathering deposits in the base of the ditch, or any stabilisation and soil development within it. This indicates that enclosure A was abandoned and its rampart slighted not long after its construction. Charcoal from the slighted bank material within the

ditch has been radiocarbon dated to between 20 AD and 230 AD. At its earliest, therefore, the bank could have been slighted in the early Roman period - perhaps soon after the Roman conquest of the area. It seems likely that it was later superseded by the construction of enclosure B (below). Fragments of slag and furnace lining recovered from the upper soil fill of the ditch of enclosure A also indicate that it had been substantially infilled before the smelting site (see 5.2) had been disturbed.

Enclosure B has been securely dated to the Roman period from the pottery within its ditch. What is surprising is the location of this enclosure, which occupied the break in slope at the eastern edge of the site. It may have functioned as a satellite enclosure outside a larger enclosure occupying an unknown position on the hilltop. To the south, the ditch terminus (554) of the 'annexe' can also be dated broadly to the Roman period; it may have been contemporaneous with enclosure B, but there was no stratigraphic relationship between the two. Enclosure B appears to have post-dated enclosure A and was possibly contemporary with the iron smelting activity (see 5.2).

The V-shaped linear feature within enclosure B could not be associated with either enclosure A or B, due to the lack of finds or datable material from the lower fills of its ditch (517). It may indeed relate to an earlier or later series of earthworks on the site.

It seems likely that settlement at Charles has its origins at least in the Roman period (enclosure B), established on an earlier site of probable late Iron Age date (enclosure A). However, whether occupation at Charles has been continuous from the earliest period to the present is unknown. Currently, no date can be ascribed to the possible enclosure and track identified by geophysical survey to the north-west of the church.

5.2 **Iron smelting site**

The excavation of trench 2 showed that the 'burnt' anomaly detected by the geophysical survey was an area of debris (502) derived from iron smelting. Within a soil matrix, this deposit consisted of:

i) tap slag that had flowed from a furnace in a molten state (Pl. 8);
ii) furnace slag removed from the interior of a furnace itself;
iii) fragments of the clay-built furnace superstructure itself that had become vitrified with the heat (Pl. 7);
iv) charcoal fuel fragments.

The size of the slag and furnace lining fragments suggest that the deposit had suffered some disturbance, such as ploughing, which had broken up the larger fragments and dispersed them across the site. The location(s) of the furnaces was not determined within the scope of this investigation. However, the recovery of late 2nd century AD Roman pottery from the buried soil sealed beneath the slag spread, and of finds from the slag deposit itself dating from the late 3rd/4th century AD, securely date the deposit to the early-middle Roman period.

There is no evidence of smithing debris on the site in the form of hammerscale. The iron nails and an iron bar recovered from the buried soil (564), the upper fill (524) of ditch terminus 523, and the upper fill (503) of ditch 516 are therefore unlikely to have been manufactured on the site.

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BIBLIOGRAPHY

EA Exeter Archaeology April 1999 *Bray Valley Quarries, Brayford North Devon District: proposals for further archaeological evaluation*.

Gent, T.H. 1998 *Bray Valley Quarries, Brayford Consolidating Planning Application Archaeological Assessment Prepared for ARC Ltd*, Exeter Archaeology Report No **98.08**.

OAa Oxford Archaeotechnics April 1999 *Land at Charlestown Barton Farm, Charles, Brayford, Devon* (Ref: 1830399/BRD/HAN).

OAb Oxford Archaeotechnics June 1999 *Land at Charlestown Barton Farm, Charles, Brayford, Devon (2)* (Ref: 1880599/BRD/HAN).

APPENDIX 1: FIELD EXAMINATION OF METALWORKING DEBRIS DEPOSIT
by G. Juleff

Introduction

The site lies to the north-east of the settlement of Charles at the top of the steep east-facing slope of the valley of the River Bray. It comprises two overlapping enclosures with an extensive buried deposit of metallurgical slag within the larger of the enclosures (A), although this is probably associated with the occupation of the smaller, sub-rectangular enclosure (B). The deposit was first identified by geophysical survey and subsequently revealed in section by excavation. This report describes the nature and appearance of the deposit in the field and considers its potential significance in the light of other similar metallurgical sites in the vicinity. The site lies approximately 4km from the large iron smelting site at Sherracombe Ford which is being investigated by the Exmoor Early Iron-working Project (Juleff 1997, unpublished report for ENPA).

Description of deposit

The metal-working debris deposit was revealed as a lens of material extending over *c.* 11.2m, with a maximum depth of *c*. 0.28m. It consists primarily of iron smelting slag. The material was examined in very wet, muddy conditions of poor visibility.

Slags

In general the slag is fractured to give medium and small fragments, with no large or 'complete' examples visible either in the section or in the excavation spoil heap. Two types of slag are readily identifiable: tapped slag, which has cooled and solidified after being allowed to flow out of the furnace, and furnace slag, which solidified within the furnace. The former is clearly recognisable from its external flow texture, with numerous individual runnels of slag combined into blocks of tapped slag reminiscent of 'elephants' feet' (Pl. 8). These blocks show an element of vertical as well as horizontal flow suggesting tapping from an elevated tapping hole or arch. Very few thin plates or puddles of tapped slag are present, indicating high slag viscosity.

The furnace slag fragments show no obvious consistent morphological form or orientation, i.e. they are not readily identifiable as plano-convex furnace bottoms. Many have convex external surfaces which preserve adhering furnace lining that has ripped away from the internal surface of the furnace. Both the tapped slag and the furnace slags are dense, with the latter often being very dense, suggesting a high retention of iron in the slag and, consequently, less than optimum retrieval of metallic iron. Overall, the proportion of furnace to tapped slag seems high, although this was not quantified, again suggesting low technological efficiency. Despite these indicators, both types of slag are consistent in density, texture, porosity and homogeneity.

Other components: furnace lining

The deposit also contains frequent fragments of furnace lining. While most of these are highly fractured, many preserve the curvature of the wall and indicate a furnace diameter of less than 0.50 m. All have highly vitrified internal surfaces, occasionally with adhering metallurgical slag, and show a succession of reduction/oxidation colours through their thicknesses. No external furnace surfaces survive. The fabric of the clay of the walls is very coarse and is heavily tempered with shillet-gravel (possibly of river-bed origin).

One exceptional fragment of furnace lining preserved faint indications of a circular hole, of *c.* 80mm diameter, through its wall thickness, which had been subsequently plugged with clay (Pl. 7). The internal surface of this find showed uniform vitrification sealing the hole. Whether this represents a tuyere/blowing-hole or an inspection hole will require further investigation, but it is noteworthy that a similar find has been made at another, undated, iron smelting site on Exmoor, at Blacklake Wood near Dulverton.

Stone
The deposit also contained small- to medium-sized fragments of shillet. While these may derive from dismantled furnace structures, it is more likely, given their infrequency and small size, that they are intrusive inclusions.

Charcoal
The few fragments of charcoal which were identifiable in the deposit were all small diameter roundwood suggesting the consistent use of coppice wood for charcoal fuel.

Quantitative sampling in the field
To further characterise the deposit and quantify the different components, a rapid quantitative sample was extracted and recorded.

Method
A $1m^2$ area was excavated through the deposit at a location where the depth varied between 0.10m and 0.20m, giving a sample volume of $0.15m^3$. All the excavated material from this sample was weighed. It was then sorted and weighed by component and size, i.e. stone and small, medium and large slags, leaving the remainder as 'matrix'. Given the muddy conditions and time limitations, it was not possible to separate furnace lining from slag. From the remaining matrix a smaller sample was extracted for washing and sieving through a 10mm sieve. This gave weights and percentages for the small slag, stone and charcoal fragments from which adjusted totals for the entire sample could be extrapolated.

Results
The results of the quantitative sampling procedure are given in the following table.

TOTAL SAMPLE			**SLAGS**		
Volume	0.15 m^3				
Total weight	316.4 kg				
Hand-sorted			**Hand-sorted**		
Slag	96.0 kg	30.0 %	Large (>100mm^3)	4.4 kg	4.5 %
Stone	9.0 kg	2.8 %	Medium (30mm^3-100mm^3)	62.2 kg	65 %
Matrix	211.4 kg	66.8 %	Small (<30mm^3)	29.4 kg	30.5 %
Washed matrix sample	13.4 kg				
Slag	1.36 kg	10 %			
Stone	0.57 kg	4.2 %			
Charcoal	0.113 kg	0.8 %			
Matrix	11.36 kg	85 %			

Adjusted totals			**Adjusted totals**		
Slag	117.1 kg	37 %	Large	4.4 kg	3.7 %
Stone	17.8 kg	5.6 %	Medium	62.2 kg	53.1 %
Charcoal	1.7 kg	0.5 %	Small	50.5 kg	43.1 %
Matrix	179.7 kg	56.8 %			

Discussion and preliminary interpretation

Quantitative sampling

The adjusted totals for the $1m^2$ sample at the bottom of the table above demonstrate clearly a number of the features observed in the qualitative description of the deposit. The size distribution of the slag sample indicates a high degree of fracture probably caused by secondary deposition and/or subsequent disturbance by ploughing and cultivation. A relatively undisturbed deposit would have preserved a much higher percentage of large slags. The size distribution also underlines the value of this exercise. In most situations slag samples retained for further studies would be drawn from the large and the upper end of the medium range, which, while being most useful from a technological point of view, would not be representative of the deposit in general.

The relatively low percentage of stone and its predominantly small size demonstrates that this is probably not structural material derived from dismantled furnaces. Alternatively, although the charcoal sample does not appear large in percentage terms, the possibility of retrieving over 1.5kg of charcoal greater than 10mm in size from this sample alone is significant. It is also important to note that no fragments of iron ore were identified during either examination of the deposit or quantitative sampling.

Associated sites

The debris that makes up this deposit is very similar to that found at the large smelting site at Sherracombe Ford, which is dated by radiocarbon to between 160 BC and AD 90 and has also yielded samian pottery. The assemblages at both sites include very dense furnace slags, tapped slags of uniform texture and fragments of heavily tempered furnace lining. At Sherracombe the proportion of tapped slag is greater and appears to be of lower viscosity (more free-flowing). The slags at Sherracombe are also less fractured, reflecting the undisturbed nature of the site and the overall the amount of material at Sherracombe is far greater, with two very large extant slags heaps.

The similarities between the material at the two sites and their comparable dating strongly suggests that they are both part of the same technological tradition. It has been postulated by the author that the ore smelted at Sherracombe derived from the large linear openwork, known as Roman Lode, at Burcombe near Simonsbath. Although there are other closer possible sources of iron ore, it is quite plausible that if high grade ore was extracted in large quantities from Roman Lode and successfully smelted at Sherracombe that it was also transported as far as the Bray Valley site. The consistency of the material and the scale of operations represented at Sherracombe, and reflected at Bray Valley, suggests a structured and organised industry.

Summary

The material examined indicates a successful iron smelting site with no evidence to suggest smithing of raw metal or manufacture of finished artefacts. The quantity of debris present

suggests several furnaces and the frequent occurrence of furnace lining and furnace slags indicates a structure type that required regular repair and rebuilding.

Recommendations

Using the quantitative data already collected, in conjunction with information from both the geophysical survey and the excavation, it may be possible to estimate the full extent of the debris deposit at Bray Valley and thus the level of metal output that it represents. Detailed excavation would be required to locate and identify furnace structures, although geophysical survey may give some indication of their presence.

Technological and compositional analysis of the slag and associated material from Bray Valley would be most informative if carried out in conjunction with similar analysis of material from Sherracombe Ford. This site, along with Sherracombe and several others of similar date, is potentially very significant as part of a Greater Exmoor Late Iron Age/Roman tradition of primary iron exploitation.

APPENDIX 2: RADIOCARBON DATING

Charcoal recovered from ditch fill 550 (enclosure A) was identified to species by Rowena Gale. The charcoal consisted mostly of *Quercus* (oak) heartwood along with smaller amounts of *Fraxinus* (ash), *Ulex*/*Cytisus* (gorse/broom), and *Corylus* (hazel). Samples of *Ulex*/*Cytisus* were submitted to Beta Analytic Inc. Radiocarbon Dating Services, Miami, USA. for accelerator mass spectrometry, the results of which are displayed in the table below.

Exeter Archaeology sample no.	Beta Analytic sample no.	Measured C14 age.	Calibrated date of sample at 2σ (95.4% confidence).	Calibrated date of sample at 1σ (68.2% confidence).
906550	Beta-131708	1890±40BP	20-230AD	70-200AD

APPENDIX 3: FINDS CATALOGUE

The following is an alphabetical finds listing for the evaluation at Bray Quarry, North Devon 1999 (site code BQ 99). All weights given are in grams (to the nearest 2 grams). SF denotes small finds number and qty denotes quantity.

Industrial Material

context	*qty*	*weight*	*comments*
500	1	12	?furnace lining
502	10	2994	furnace bottom
503	1	192	furnace bottom
506	2	128	furnace bottom
528	3	1200	furnace bottom
528	2	90	furnace lining
532	1	4	furnace lining
564	1	16	?furnace bottom
568	2	796	?burnt natural stone/?furnace bottom
unstrat	1	270	furnace bottom

Ironwork

context	*SF*	*qty*	*comments*
503	400	1	flat bar fragment
524	401	1	?nail
564	402	1	nail

Lithics

context	*qty*	*comments*
500	1	flint: struck flake
515	1	flint: struck flake
524	1	flint: struck flake
564	2	flint: struck flakes

Pottery & Dating Evidence

Abbreviations Listing

BB1	black-burnished ware category 1
C	Century
CFB	conical flanged bowl
Chin	China
cp	cooking pot
cw	coarseware
Dor	Dorset
Eng	English
gfw	gravel-free ware
gy	grey
ind	industrial
jr	jar
L	late
Med	Medieval
mic	micaceous
ND	North Devon
ox	oxidised
PM	Post-Medieval
PRD	plain rim dish
Rom	Roman
SD	South Devon
SE	South East
stg	storage
stnw	stoneware
SW	South-Western
typ	type
unc	unclassified
w	ware

Roman

context	*contents/dating evidence*	*sherds*	*vessels*
502	Rom (3C/4C)		
	total sherds: 13		
	total vessels: 7		
	SE Dor BB1 (L3C/4C, typ 20 cp with obtuse lattice)	2	1
	SD w (?3C/4C, cp)	10	5
	PM intrusive		
	ND gfw	1	1
503	Rom (L3C+)		
	total sherds: 9		
	total vessels: 5		
	SE Dor BB1	2	2
	SD w (cp rim typ 4.2a)	4	2
	SW gy w (L3C+, stg jr)	3	1
513	Rom		
	total sherds: 1		
	total vessels: 1		
	SE Dor BB1	1	1
514	Rom (L3C/4C)		
	total sherds: 25		
	total vessels: 5		
	SE Dor BB1 (c. 270+ CFB typ 46.1)	1	1
	SD w (1 cp, L3C/4C)	24	4
518	Rom		
	total sherds: 2		
	total vessels: 1		
	BB1 (2 small scraps)	2	1
524	Rom (3C/4C)		
	total sherds: 18		
	total vessels: 7		
	Samian (small scraps)	2	2
	SE Dor BB1 (3C/4C, 1 cp rim)	13	3
	Rom mic gy w	2	1
	unc Rom cw (cp rim)	1	1

532	Rom		
	total sherds: 2		
	total vessels: 1		
	unc Rom cw (?cp rim)	2	1
535	Rom (c. 270+)		
	total sherds: 9		
	total vessels: 5		
	SE Dor BB1 (c.270+, 2 CFB, 1 typ 45.1d)	4	2
	SD w	3	2
	unc Rom cw	2	1
545	Rom (L3C/4C)		
	total sherds: 1		
	total vessels: 1		
	SE Dor BB1 (L3C/4C, typ 20 cp with obtuse lattice)	1	1
556	Rom		
	total sherds: 1		
	total vessels: 1		
	SE Dor BB1	1	1
564	Rom (L2C+)		
	total sherds: 7		
	total vessels: 6		
	Samian (small scrap)	1	1
	SE Dor BB1	2	1
	SD w (L2C+, 1 PRD)	3	3
	unc Rom cw (ox cp rim)	1	1

Statistics-Roman
total number of sherds: 88
minimum number of vessels: 40

Post-Medieval

context	*contents/ dating evidence*	*sherds*	*vessels*
500	19C		
	total sherds: 8		
	total vessels: 8		
	Eng ind Chin (L18C+)	2	2
	Eng stnw (19C)	1	1
	ND cw (PM)	4	4
	ND cw (Med)	1	1
576	PM		
	total sherds: 1		
	total vessels: 1		
	ND gfw (PM)	1	1
unstrat	total sherds: 2		
	total vessels: 2		
	ND cw (PM)	2	2

Statistics-Post-Medieval
total number of sherds: 11
minimum number of vessels: 11

Slag

context	*qty*	*weight*	*comments*
500	4	144	tap slag
502	41	14994	tap slag
505	10	174	tap slag
506	7	230	tap slag
507	1	10	tap slag
513	3	192	tap slag
528	7	992	tap slag
535	1	20	tap slag
576	1	62	tap slag
unstrat	2	146	tap slag

Slate

context	*qty*	*comments*
502	5	fragments of roof slate: roman

Small Finds

SF	*context*	*qty*	*material*	*comments*
400	503	1	Fe	flat bar fragment
401	524	1	Fe	?nail
402	564	1	Fe	nail

Stone

context	*qty*	*comments*
506	1	burnt natural