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A Roman Iron-Smelting Site at Blakeney, Gloucestershire: excavations at Millend Lane 1997

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With contributions by Nina Crummy, Rowena Gale, Peter Guest, Fiona Roe, Chris Salter and Jane Timby

Introduction

In 1997 a planning application was submitted for residential development on 1.25 ha to the west of Millend Lane in Blakeney, an industrial village in west Gloucestershire near the river Severn and in the parish of Awre. Given the previous discovery of Roman remains in the same part of the village south of the main Gloucester–Chepstow road (A48), and the close proximity of the site of a medieval mill, the Forest of Dean district council required that the archaeological importance of Millend Lane be evaluated prior to the determination of the planning application. A brief for a field evaluation was prepared by Gloucestershire County Council Archaeology Service which stipulated that 2% of the site area be investigated by trenching. The evaluation was undertaken by Cotswold Archaeological Trust (CAT) in February 1997. Nine trenches were cut in areas of proposed new building, with two placed to examine a narrow terrace where a local resident, Mr. B. Johns, recalled observing a cropmark on a photograph published several years earlier in a newspaper. No evidence was found of any features in these two trenches, and archaeological activity was only detected in one trench (9) which was located in the extreme south-east corner of the site. The remains comprised Romano-British pits and a cobbled surface associated with iron slag (Barber 1997).

When planning permission was subsequently granted for the development, a condition required excavation of an area of 0.12 ha centred on trench 9 (O.S. Nat. Grid SO 67200675). This comprised the anticipated extent of Roman remains to be directly affected by the construction of three house plots. The excavation was undertaken by CAT in July 1997 and in the event the area examined was increased to 0.14 ha to encompass fully the area of interest. Following completion of the fieldwork an assessment was made of the main findings (CAT 1998) and a programme of analysis and research commenced in April 1998.

The excavation lay in the southern part of Blakeney and immediately west of Millend Lane, which links the village with Etloe (Fig. 1). It occupied a steep north-east facing slope which drains towards the Bideford brook 50 m to the north-east. The site was under pasture at the time of the excavations (it had previously been allotments); the ground level dropped from *c.* 30 m above O.D. at the western corner of the excavation to *c.* 20 m above O.D. alongside Millend Lane. The underlying geology consisted of a red clay-marl derived from the underlying Lower Old Red Sandstone.

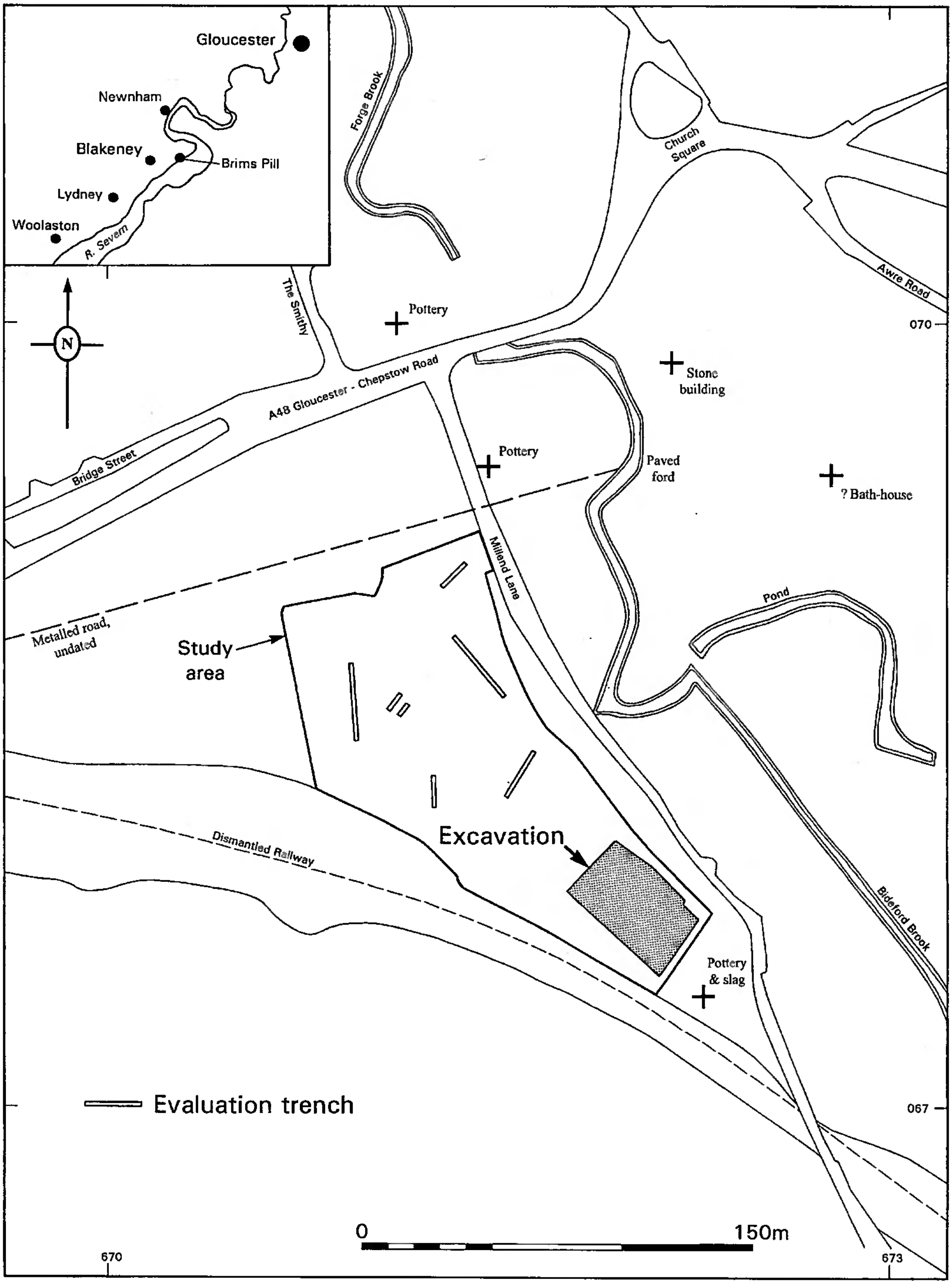

Fig. 1. Location of the excavation area and previous Roman finds from Blakeney.

Excavation Methodology

Modern allotment soil (1001) and an underlying post-Roman horizon of silty-clay colluvium (hillwash) (1002) were removed by a mechanical excavator equipped with a toothless grading bucket under archaeological supervision. Within the south-eastern half of the excavation area these deposits directly overlay archaeological features cut into the red marl substrate (1028). Further north-west, however, the features were cut into a deposit of pre-Roman colluvium (1107) which infilled a natural depression in the marl (Figs. 2–3).

Following hand-cleaning, all archaeological features were sampled by hand excavation. The objectives of the excavation concentrated on recovering the plan and structural sequence on the site. As a rule all pits and postholes were half-sectioned, and all linear features sectioned at least once by hand. Bulk samples were collected for metallurgical and palaeoenvironmental analysis. A full written, drawn and photographic record was made. In the following report cut features such as ditches and pits are denoted by square brackets, e.g. [1013], while fills and layers are contained within round brackets, e.g. (1027).

EXCAVATION RESULTS

The excavation results have been divided into four Periods based upon a combination of stratigraphical relationships and an assessment of the artefact assemblages. The Roman activity has been divided into two Periods (1 and 2), although allocation of features to each of these Periods cannot in every case be demonstrated conclusively.

Period 0 (Prehistoric) (Fig. 3, nos. 1–2)

No prehistoric features were encountered although two residual worked flints (a concave scraper and knife) were found in residual post-Roman contexts. The pieces are not particularly diagnostic although a broad Neolithic or Early Bronze-Age date is likely.

A pinkish-brown silty-clay colluvium (1107), approximately 0.15 m thick, overlay the natural marl across the north-western half of the excavation area. The presence of colluvium indicates erosion, presumably caused by land clearance, on the upper slopes of the hillside. There is no dating for the deposit save that it is earlier than the activity of the 3rd to 4th century described below. It could therefore have accumulated in either the prehistoric or early Roman period.

Period 1 (3rd or 4th century A.D.) (Fig. 3, no. 3)

Two ditches [1013 and 1071] ran respectively along and below a discernible break of slope of the hillside. Ditch [1013] was in excess of 27 m long (it had been recut at its south-eastern end by Period 2 ditch [1016]). It was at least 0.7 m wide and 0.3 m deep with a gentle 'U'-shaped profile, and contained two charcoal-rich silty-clay fills (1014 and 1015). To the north-east of [1013] was a second curving ditch [1071], 1.7 m wide and 0.7 m deep with a 'V'-shaped profile. Its clay fills (1072 and 1075) yielded abundant charcoal and burnt clay, together with several fragments of quernstone.

Immediately north-east of ditch [1071] three sub-circular pits [1104, 1118, and 1120] were partially revealed at the edge of the excavation area. The presence of profuse charcoal flecking and burnt-clay fragments within their clay-loam fills suggests that these were waste pits, associated with iron-working in the vicinity. Also in this area was a slab-lined hearth or oven-base [1100], 1.2 m in diameter, containing a thin charcoal fill (1114) which was subsequently sealed

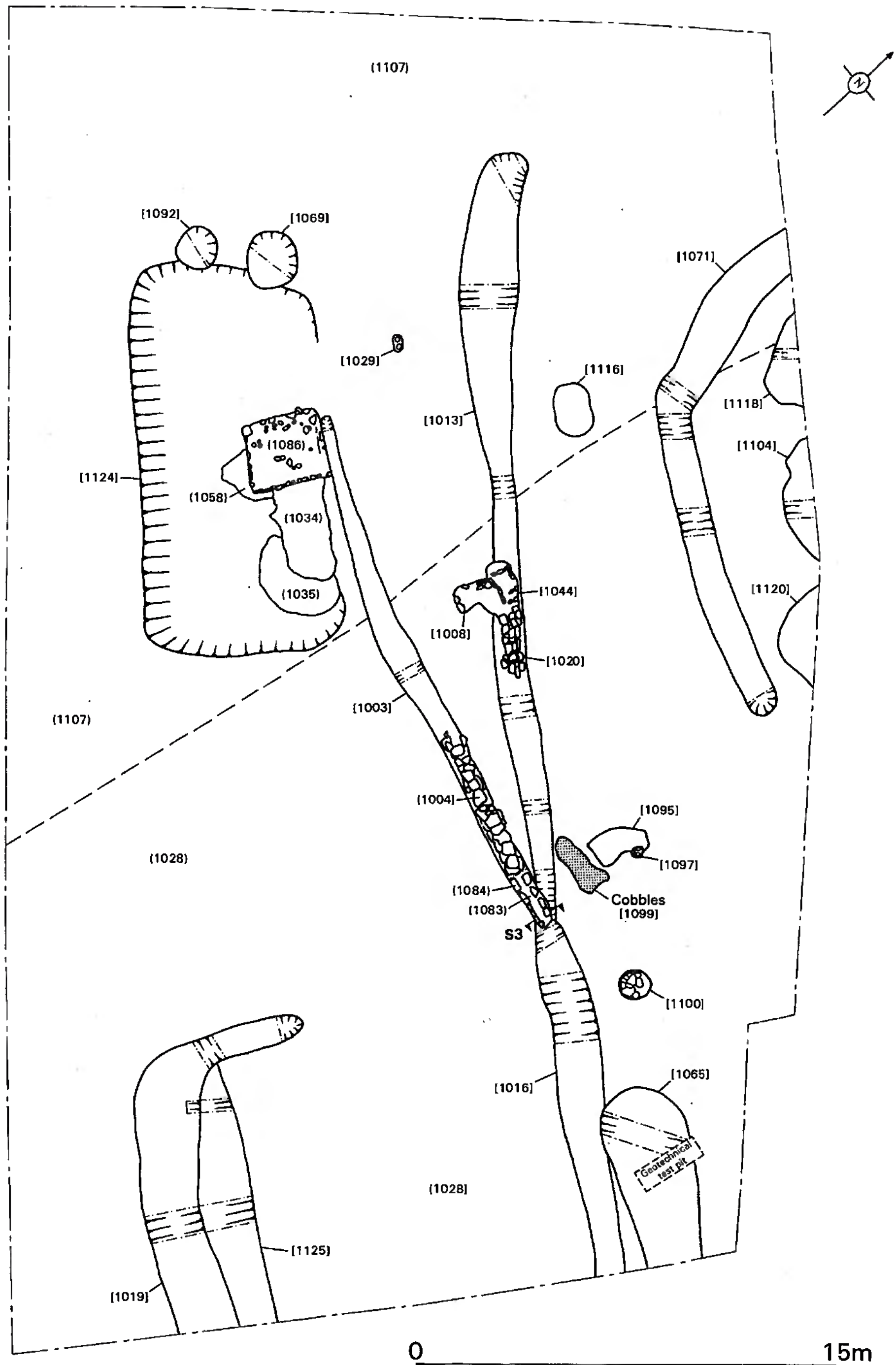

Fig. 2. Plan of all Roman features.

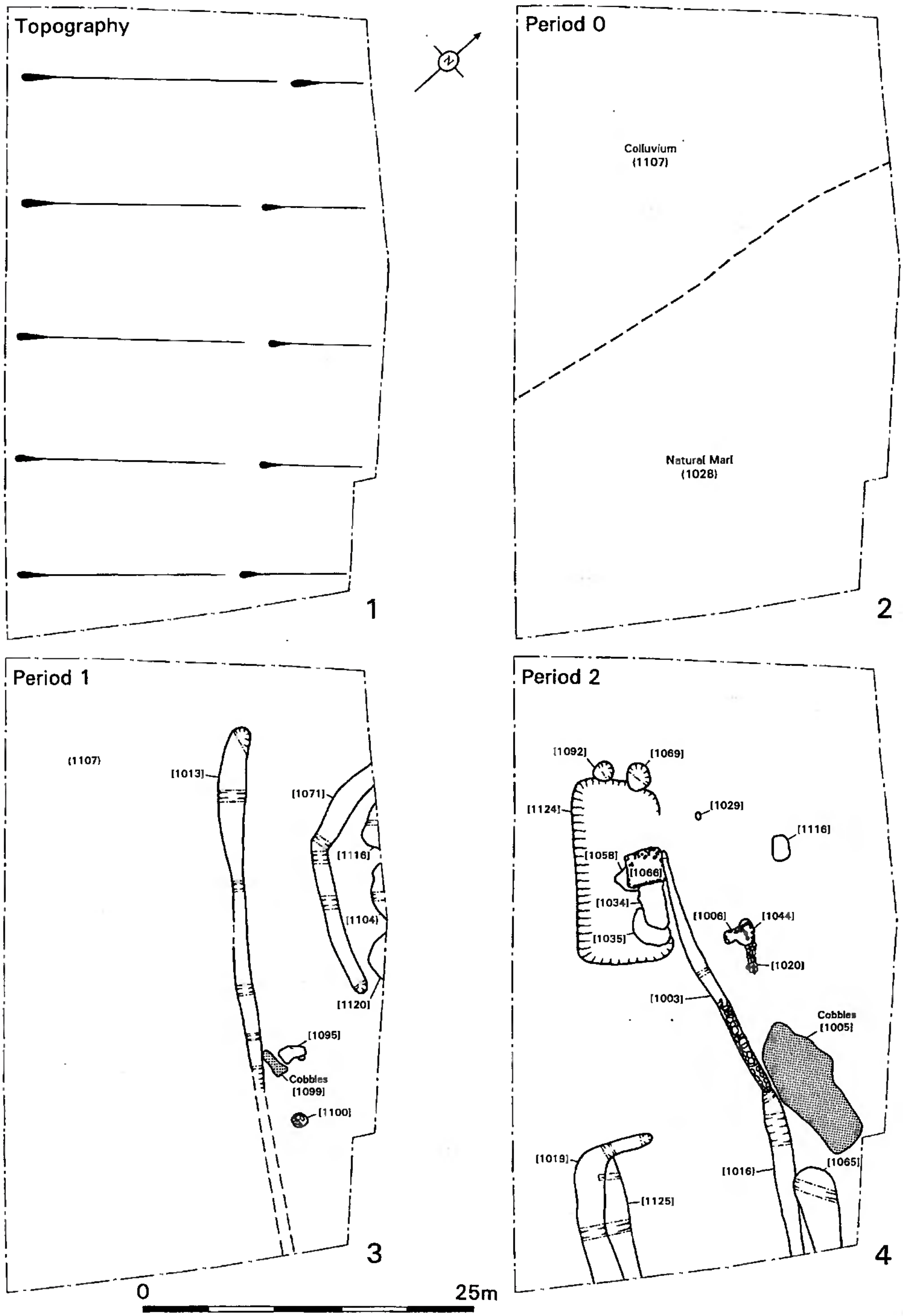

Fig. 3. Phase plans.

by a soil spread (1113). This acted as a level base for a second stone lining (1101), containing a similar charcoal spread (1102). No metallurgical material was noted within charcoal deposits (1114) and (1102). A worn exterior surface (1099) of small rounded sandstone cobbles, and an adjacent charcoal spread (1096), within a shallow irregular cut [1095], lay north-west of hearth [1100]. There was no scorching of the underlying marl beneath scoop [1095] to indicate that *in-situ* burning had occurred, and it may rather represent the truncated remains of another metal-working waste pit. A stone-packed posthole [1097], 0.35 m in diameter, cut spread (1096) but, surviving in isolation, its function remains unclear.

A charcoal-rich silt-loam (1006), approximately 0.25–0.40 m thick, subsequently sealed all Period 1 features immediately north-east of ditch [1013]. The composition of layer (1006) matched that of the charcoal-flecked silty-clays (1014 and 1015) infilling ditch [1013]; it may be that the same deposit both filled and spread beyond the feature.

Little can be said of the layout of the site in this period. The profusion of charcoal, slag and burnt-clay fragments within the ditch fills, together with their proximity to probable metal-working waste pits, suggests that the ditches may have defined a series of working areas. Both ditches drained from north-west to south-east and channeled hillside run-off away from the industrial focus which presumably lay to the north-east of the excavation area.

Dating evidence

The pottery from the filling of the Period 1 features and associated layer (1006) provides a *terminus post quem* of *c.* 270 for the Period 2 activity (below, The Finds). The absence of residual earlier pottery suggests that activity is unlikely to have commenced within the excavation area before the earlier 3rd century at earliest.

Period 2 (late 3rd or 4th century A.D.) (Fig. 3, no. 4)

A sub-rectangular terrace [1124], 14 × 7 m in area, was cut into the natural marl and colluvium on the hillside. The terrace contained a degraded sandstone slab surface (1086), approximately 2.5 × 3.0 m in area, bordered by a pitched stone kerb. Fragmentary remains of dumps of sandstone and iron slag (1035, 1034, and 1058) on the south-eastern and south-western sides of (1086) formed further rough surfaces. No postholes or padstones were encountered to indicate that these rough surfaces had ever been covered. Adjacent to the hard-standing were two pits [1069 and 1092] with charcoal-rich fills containing iron-working waste. Another pit [1116], 10 m further north, was unexcavated but contained a similarly charcoal-rich fill. Approximately 2.5 m downslope of the hard-standing was a small irregularly shaped pit [1029] cut into the underlying colluvium. Two circular iron hoops (1030 and 1031) from a stave-built bucket were exposed at the top of the feature, together with a small hoard of nine coins datable to the period *c.* 337–40 (below, The Finds).

Running downslope from the northern corner of hard-standing (1086) was a linear ditch [1003] containing a charcoal-flecked silty-clay (1063). The ditch was 0.95 m wide and 0.3 m deep with a 'U'-shaped profile, and it was culverted for the lowermost 7.5 m of its length. The culvert was formed from rough blocks (1064) and large capstones (1004), averaging 0.4 × 0.6 m in size, of the local Lower Old Red Sandstone Brownstones. South-east of the culverted section ditch [1003] joined ditch [1016] which almost certainly recut a length of the now infilled Period 1 ditch [1013]. Ditch [1016], *c.* 1.6 m wide and 0.6 m deep, had a gentle 'V'-shaped profile and contained two charcoal-flecked silty-clay fills (1017 and 1018).

North-east of ditch [1003] and overlying Period 1 dump (1006) was a spread of sub-angular sandstone cobbling (1005) approximately 11 × 3 m in area. Its position close to culvert (1064)/(1004) suggests that it may represent the remains of a metalled track which formed a durable approach from the hillside above. The presence of further isolated rubble north-west of (1005) is evidence that the metalling was originally more extensive.

A large oven (Fig. 4) was cut into the silted fill of Period 1 ditch [1013] *c.* 4 m downslope of the hard-standing. The oven consisted of two rectangular chambers, with a slab-lined channel leading off the more northerly of the two. The southern chamber [1008], *c.* 1.6 m long, 0.8 m wide and 0.2 m deep, must have been the fire box. Remains of a sandstone lining, incorporating slabs up to 0.3 × 0.2 m in size, survived on all but its eastern side where scorching of the natural marl was noted. The floor of the chamber sloped gently northwards to link with a slab-lined, but unscorched, rectangular chamber [1044]. This chamber, *c.* 1 m long, 0.6 m wide and 0.4 m deep (the structure having subsequently distorted under pressure), had been constructed from vertically-pitched sandstone slabs set into a red brown clay lining (1043). It contained a 0.2–m thick, charcoal-rich, primary fill of grey brown to black silty-clay (1041) which contained fragments of burnt clay, 148 gm of iron slag, and wood charcoal from narrow roundwood and twiggy material (below, The Fuels). The material probably represents accumulated rakings from the firebox [1008].

Adjoining chamber [1044] to the south-east was a channel [1020] *c.* 2.5 m long, 0.6 m wide and 0.2 m deep. Its steeply-sloping sides were lined with close fitting limestone slabs, many set in place with stone packing behind them, and it had a slightly concave base. The function of the channel is uncertain. It is unlikely to have been a water trough as its base sloped down from the south-east towards chamber [1044] and there was no surviving evidence of a waterproof lining. A possibility is that the channel was covered and served as a flue taking smoke and gases away from the main chamber to a vent or chimney at the south-eastern end. Following the abandonment of the oven the junction between the fire box and the northern chamber was blocked with a fragment of quernstone. The whole oven structure was then infilled with a silty clay (1040) containing profuse burnt-clay fragments and charcoal. It is difficult to ascertain the function of the oven. It had very little iron slag associated with it, and it does not resemble at all the iron-smelting furnaces excavated lower down the Severn estuary at the Chesters, Woolaston (Fulford and Allen 1992).

Three further ditches were found in the excavation which are difficult to phase. One [1125], aligned NW–SE, was at least 1.9 m wide and 0.3 m deep and it had gently sloping sides and a shallow concave base. It contained a charcoal-rich silty-clay fill (1027) and was subsequently recut as ditch [1019], up to 1.95 m wide and 0.65 m deep with a gentle 'V'-shaped profile. Ditch [1019], containing a series of charcoal-flecked silty-clay fills, ran parallel with ditch [1016] before turning sharply north-eastwards and narrowing to a 0.2–m deep terminal. The terminal of a third ditch, [1065], was noted immediately north-east of ditch [1016]. It was *c.* 2.6 m wide and 0.25 m deep with a broad gentle 'V'-shaped profile, its clay-silt fill (1066) also containing abundant charcoal-flecking.

Dating evidence

The coin hoard of *c.* A.D. 337–40 from pit [1029] and two sherds of shell-tempered pottery from the fill of ditch [1019] point to activity continuing on the site into the second half of the 4th century at least (below, The Finds). Given the small quantity of pottery recovered it is not possible to determine whether Periods 1 and 2 spanned a century or more or fall entirely within the 4th century and thereby represent only a short period of use.

Period 3 (Post-Roman)

A silty-clay colluvial soil (1002), between 0.3 and 0.5 m thick, sealed all Roman features across the site. No later activity was encountered, although a single sherd of intrusive 13th- or 14th-century

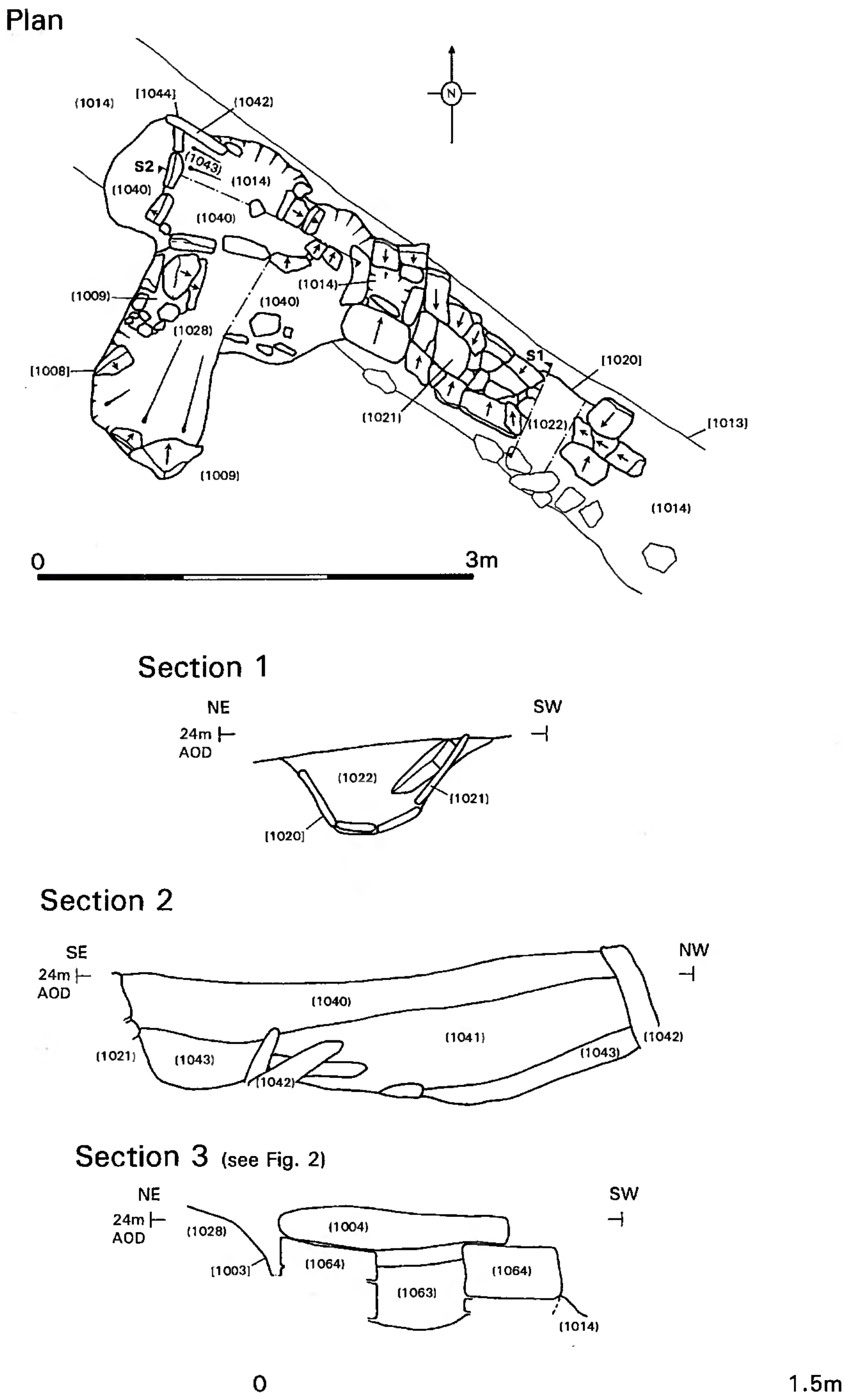

Fig. 4. Plan and section of the oven.

pottery was found over cobbling (1005) and a late 13th- or 14th-century silver penny within post-Roman colluvium (1002). Evidence of modern activity was limited to clinker contamination, from a (disused) railway line to the south-west, within the overlying 0.1–0.2 m of allotment soil (1001).

THE FINDS

THE COINS by Peter Guest

At least ten coins were recovered from the excavation. Nine bronze Roman coins were retrieved from pit [1029] (fragments of potentially two further coins were also present) while a much worn medieval sterling penny originated from the colluvial deposits overlying the Roman deposits (1002). The Roman coins could be dated to the 4th century and in most cases closer dating was possible (Table 1). Found together, they form a small hoard deposited within two iron hoops from a wooden bucket (six coming from within band (1030) and three from within band (1031).

All the Roman coins are contemporary types dating to the A.D. 330s and of the common GLORIA EXERCITVS, VRBS ROMA and CONSTANTINOPOLIS reverses. The restricted date-range of the hoard suggests that it was buried not long after the minting of the most recent coin, some time between A.D. 337 and 350. The fact that the hoard contains neither copies of these reverse types nor coins struck for Fausta or Helena makes it unlikely that the coins were buried later than A.D. 340.

Britain produces a significant peak of hoards in the A.D. 330s, all composed of bronze denominations such as those found here. An explanation of the widespread burial and loss of hoards at this date has yet to be put forward. The Blakeney coin hoard is the first recovered in association with bucket fittings, although many unusual containers were used during the Roman period, including bells, bronze buckets, and quernstones.

THE POTTERY by Jane Timby

An assemblage of 1,022 sherds of pottery weighing 19.4 kg and mainly dating to the later Roman period was recovered. The material was sorted into recognisable fabrics and quantified by sherd count and weight (see below, Table 2) for each excavated context. The information was summarized on an Excel spreadsheet which forms part of the site archive.

The pottery is relatively well preserved with an average sherd weight of 19 gm. The surfaces and edges, however, had suffered some deterioration from hostile ground conditions. There are several joining sherds suggesting there had been little ongoing disturbance of deposits. The assemblage is relatively limited in composition but is very typical of the later Roman period, particularly in the Severn Vale and Forest of Dean. The occupation span appears to be from the early 3rd to the later 4th century, although the chronologically earlier wares (e.g. samian) appear to be redeposited in later contexts. The main fabrics present include products of the large regional industries, notably Severn Valley wares (SVWOX), Dorset black-burnished wares (DORBB1), Oxfordshire colour-coated wares (OXFRS) and mortaria, both whiteware and colour-coated types (OXFWHM, OXFRSM), Midlands grog-tempered storage jar (PNKGT), samian (SAM) and micaceous grey or black wares (MICGW). Unfortunately, most of the forms span several decades and it is thus not possible to discriminate later 3rd-century pottery from 4th-century material. One context, (1024), produced two sherds of late Roman shelly ware (ROBSH) indicating activity into the last quarter of the 4th century.

Table 1. Roman coins.

SF No.	context	obverse	reverse	mint mark	mint	reference	date	remarks
1	1031	CONSTANINVS NOB C	GLORIA EXERCITVS 2 stds	// [.....]	Lyons	HK 193 or 198 RIC 249 or 254	330–5 332	
2	1030	CONSTANTINOPOLIS	Victory on prow	// [.....]	Trier/Lyons		330–7	
3	1030	CONSTANTINOPOLIS	Victory on prow	// TR•P	Trier	HK 66 RIC 543	330–5 332–3	fragments
4	1030	copper alloy coin					4th C?	very fragmentary
5	1030	CONSTANTI-NVS IVN NC	GLORIA EXERCITVS 1 std	// [.....]	Trier	HK 88 or 93 RIC 586 or 591	335–7 335–7	plus fragments of a second coin?
8	1002	uncertain	Sterling penny	[.....]			late 13/14th	very worn
18	1030	VRBS ROMA	Wolf and twins	wreath // [.....]	Trier/Arles	HK 76 or 376 RIC 553 or 373	330–5 333–4	
19	1030	CONSTANTI-NVS IVN NC	GLORIA EXERCITVS 1 std	//•TRP•	Trier	HK 93 RIC 591	335–7 335–7	
20	1031	VRBS ROMA	Wolf and twins	// wreath TRP	Trier	HK 200 RIC 257	330–5 332	
21	1031	copper alloy coin (possibly 2)					4th C?	very fragmentary

Period 1

Approximately 22% of the assemblage by count came from Period 1 contexts with the largest group, some 148 sherds, from ditch [1013]. This assemblage contains most of the range of wares noted above. Amongst the OXFRS are two bowls (Young 1977, types C45 and C47) in production between *c.* A.D. 270 and 400. Several sherds from a large grog-tempered storage jar (PNKGT) showed evidence of repair using ?iron rivets. Other wares dating from the later 3rd century include plain-rimmed dishes and conical-flanged bowls in both DORBB1 and MICGW and an oval, handled fish dish in DORBB1. Ditch [1071] produced a much smaller assemblage including a bodysherd from an OXFRS beaker decorated with applied barbotine scales, Young 1977, type C28 also dating from *c.* A.D. 270.

The remaining sherds from Period 1 were two pieces from pit [1104] and several fragments from layer (1006) sealing the Period 1 features. The latter context includes an OXFRS dish (Young 1977, type C44 dated *c.* A.D. 270–350), a carinated jar in MICGW (Fig. 5, no. 8) and further examples of conical-flanged bowls in DORBB1 and MICGW. The group could not be separated chronologically from that contained in the filling of the features.

Period 2

The pottery from the Period 2 features showed little difference in composition to that associated with Period 1. Further pieces of the Midlands storage jar came from the cobbles (1005, 1058) and layer (1059). The sandstone cobbling (1005) produced quite a large group of material, 215 sherds in quite a good state of preservation. Amongst these were OXFRSM mortaria and OXFWHM mortaria (Young 1977, types C97–100, M22) dating from the late 3rd to the 4th centuries. Also present were five sherds of samian, perhaps curated vessels. A single sherd from a medieval glazed jug decorated with an applied stamped pad and vertical strips (13th–14th century) suggests some later contamination. The small pit [1029] containing the hoard of coins dated *c.* A.D. 337–40 produced a single small, fine greyware sherd of unrecognisable provenance and date.

Ditch [1003] contained few sherds but of note was a sherd of wheel-turned Malvernian grey ware. Slightly more material came from [1016], 23 sherds, with the largest group coming from ditch [1019], 118 sherds. This included SVWOX, DORBB1, MICGW and OXFRS with a single sherd of samian and two pieces of late Roman shelly ware. The OXFRS includes further examples of bowls (Young 1977, type C45) along with a flanged bowl (type C51). The shelly ware suggests abandonment of this feature after *c.* 360/70.

Period 3

The colluvial soil (1002) sealing the Roman activity produced 173 sherds. They were similar to material from the Roman features although interestingly there were no further pieces of shell-tempered ware.

Discussion

Although quite a modest assemblage, the pottery from the Millend Lane excavations is a further useful addition to the distribution of Roman wares along the Severn estuary and in the Forest of Dean. The range of wares (Table 2) very much mirrors that from other sites along the estuary such as the Chesters, Woolaston (Fulford and Allen 1992), and Oldbury (Timby n.d.). One of the commoner fabrics found on Roman sites along the estuary is DORBB1. At Blakeney this accounts for 22.5% by sherd weight compared to 58% at Woolaston (Fulford and Allen 1992, tables 1–2), 26% at Oldbury Flats (Allen and Fulford 1992, table 3) and 15% at Oldbury Power Station (Timby n.d.). Oxfordshire wares account for approximately 11% by weight at Blakeney compared to 8% from the trial trenches at Woolaston (lower from the iron-making quarter of that site) (Fulford and Allen 1992, tables 1–2) and 4% at Oldbury Power Station (Timby n.d.). Pottery from earlier excavations at the Woolaston villa complex (Scott-Garrett and Harris 1938) might suggest a slightly higher figure (material in Gloucester Museum). Oxfordshire wares also appear to be quite well represented at Lydney (Wheeler and Wheeler 1932, figs. 26–7) to the south-west of Blakeney and suggest well-established commercial links. The presence at Blakeney of significant quantities of Oxfordshire tablewares, along with the samian, strongly suggests that there was a moderately well-appointed household in the immediate locality and that the site was not just an industrial complex.

Severn Valley wares (SVWOX) are quite well represented at Blakeney (26% by weight) along with a micaceous grey or black ware (MICGW) (18.5% by weight). The other main ware found in the Blakeney assemblage is the Midlands grog-tempered ware in the form of storage jar accounting for 18.5% by weight, 2.5% by sherd count. This fabric is relatively rare at Gloucester and *c.* 6,700 sherds from Oldbury Power Station yielded only two examples (Timby n.d.). The Blakeney finds considerably extend the provisional distribution map compiled by Booth and Green (1989) for this ware.

Catalogue of illustrated pottery (Fig. 5)

Pottery from Period 1 contexts

1. Bifid rim jar. SVWOX. Ditch [1013] (1014).
2. Handled fish dish. DORBB1. The interior surface has a burnished line diabolo. Parallel scored lines into the surface appear to be made in antiquity. Ditch [1013] (903).
3. Jar with oblique lattice. DORBB1. Ditch [1013] (903).
4. Dish with an internal rouletted ring. Young 1977, type C47. OXFRS. Ditch [1013] (903).
5. Everted rim jar. Grey-black slightly sandy micaceous greyware (MICGW). Ditch [1013] (903).

Table 2. Quantification of the Roman pottery assemblage by sherd weight and sherd number.

	Fabric	**Description**	**Wt.**	**%**	**No.**	**%**
Import	SAM	samian	143	*	9	*
Regional	DORBB1	Dorset black-burnished ware	4386	22.5	274	27
	OXFRS	Oxon. colour-coat	1601	8	170	16.5
	OXFRSM	Oxon. colour-coated mortaria	292	1.5	15	1.5
	OXFWH	Oxon. whiteware	188	1	5	*
	OXFWHM	Oxon. whiteware mortaria	116	*	3	*
	PNKGT	Midlands grog-tempered ware	3603	18.5	26	2.5
	ROBSH	late Roman shell-tempered	7	*	2	*
	SWWS	South-west white-slipped	5	*	1	*
Local	MALVRT	Malvernian wheelmade	10	*	1	*
	SVWOX	Severn Valley ware	5097	26	261	25.5
	MICGW	micaceous greyware	3591	18.5	229	22.5
Unknown	OXID	oxidised sandy ware	111	*	15	1.5
	GREY	grey sandy wares	229	1	7	*
	WSLIP	white-slipped oxidised ware	25	*	4	*
Total			19404	100	1022	100

*Indicates a volume less than 1%.

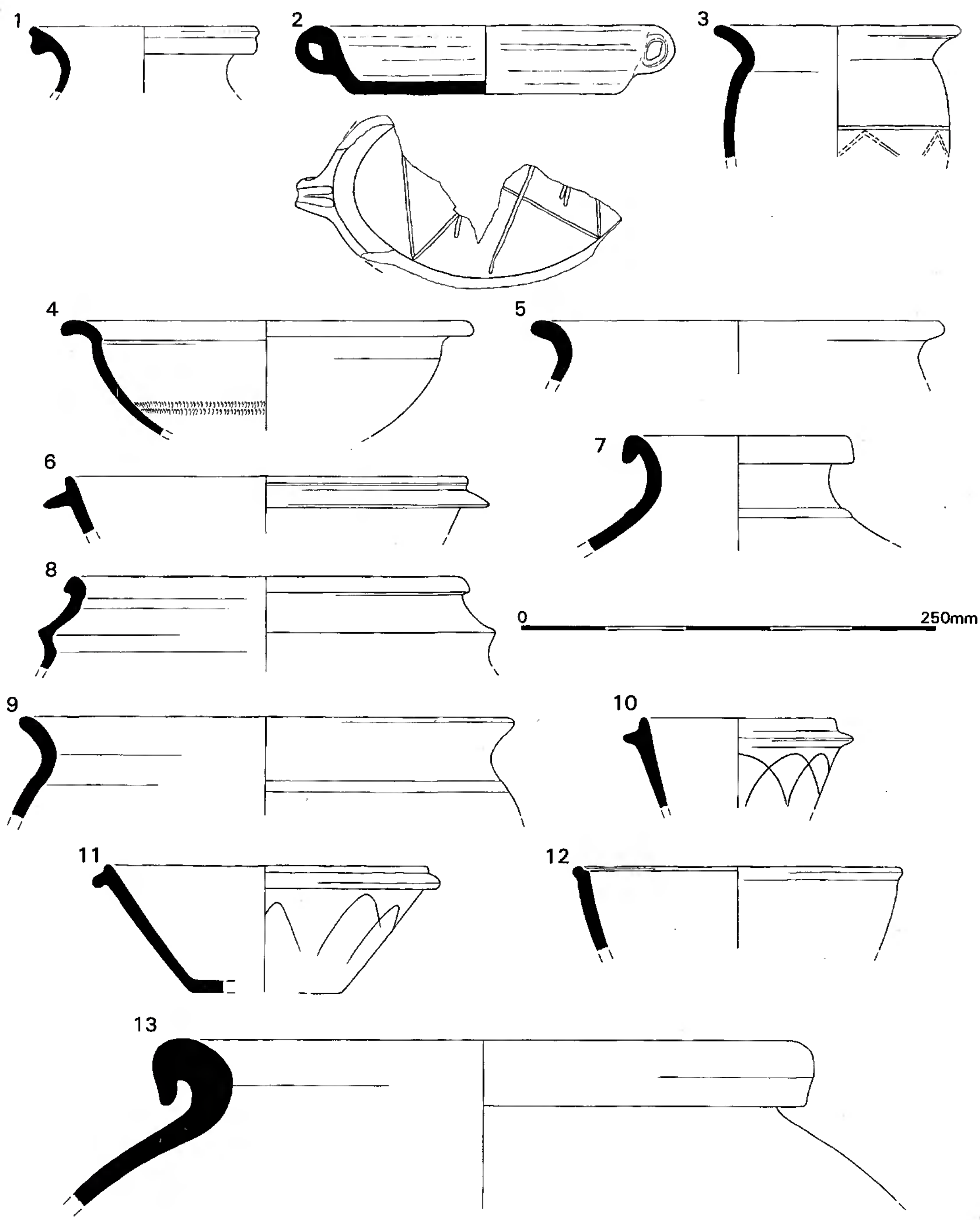

Fig. 5. The pottery.

6. Flanged bowl. Fabric similar fabric to no. 5 (MICGW). Ditch [1013] (903).
7. Large hook-rimmed jar with a cordoned neck. SVWOX. Dump (1006).
8. Wide-mouthed jar with a sharply carinated shoulder. Grey MICGW. Dump (1006).

Pottery from Period 2 contexts

9. Jar with an everted rim. Gritty very micaceous fabric with a scatter of brown iron, MICGW. Ditch [1003] (1063).
10. Conical flanged bowl. Black micaceous surfaces. The core is grey with red margins. Burnished arc decoration on the exterior. Cobbles (1005).
11. Conical flanged bowl. DORBB1. Irregular burnished arcs. [1087] (1088).
12. Unusual bowl with an internal ledge. DORBB1. [1087] (1088).
13. Large storage jar. PNKGT. Gully [1077] (1078).

THE METALWORK by Nina Crummy

This small assemblage consists of fragments of two iron hoops, an unidentified copper-alloy object, a lead staple, a fragment of an iron fitting, three iron hobnails and 23 iron nails or nail shaft fragments. Most are Roman, but a few of the nails are of post-medieval date.

The most important items are the two iron hoops, which are of a type used to fix stave-built buckets. They were, however, found not one on top of the other but both at the same height in the top of a pit. No handle or side-plates were recovered. The hoops were associated with a small scatter of late Roman coins and a tiny concentration of fragments of sheet copper alloy and iron, probably from a stud. The apparently deliberate positioning of these objects suggests that there may have been a ritual aspect to the deposit.

Iron hoop (Fig. 6, no. 1), in fragments, with traces of mineralised wood on the inner face of some pieces. Internal diameter of hoop varies from 195 to 216 mm, and the hoop is splayed, it being wider at the top than the bottom. On many of the fragments the section shows rounded edges and faces slightly bowed outwards by the development of a hollow within the metal, but the original thin rectangular section is preserved on others, 16 to 18 mm wide × 3 mm thick. Small fragments of copper-alloy sheet (1032) adhering to thin iron sheet were found inside this hoop, but some distance from the edge. Two appear to have a curved edge, suggesting that they were part of a stud. SF6 (1030).

Iron hoop (Fig. 6, no. 2), in fragments and part missing. Internal diameter varies from 159 to 183 mm, and is splayed. Thin rectangular section, 12 × 3 mm. SF7 (1031).

Iron hoops similar to the Blakeney finds were used to bind Roman stave-built wooden buckets and tubs. The slight splaying allows for the gradually increasing diameter of the vessel. The continuous bands of iron were hammered down over the staves. On buckets they also served to hold in place two iron side plates with pierced tops into which the handle was fixed. In this instance no handle or side-plates were found.

A number of unprovenanced hoops are in the British Museum, as well as examples from Borough Hill near Daventry, Northamptonshire, and Hod Hill, Dorset, although the last may be of Iron-Age rather than Roman date (Manning 1985, 103). The diameter of the Blakeney hoops falls at the bottom end of the range covered by the British Museum collection (from 195 to 355 mm), and they are much narrower than most, although the larger Blakeney hoop is close to one from Borough Hill in width (ibid. 21). The variation in diameter at Blakeney is probably the result of compression during deposition.

A complete bucket from Gadebridge Park, Hertfordshire, is fitted with two hoops, one half-way down the staves and one at the bottom. The lower hoop is *c.* 36 mm wide, the upper

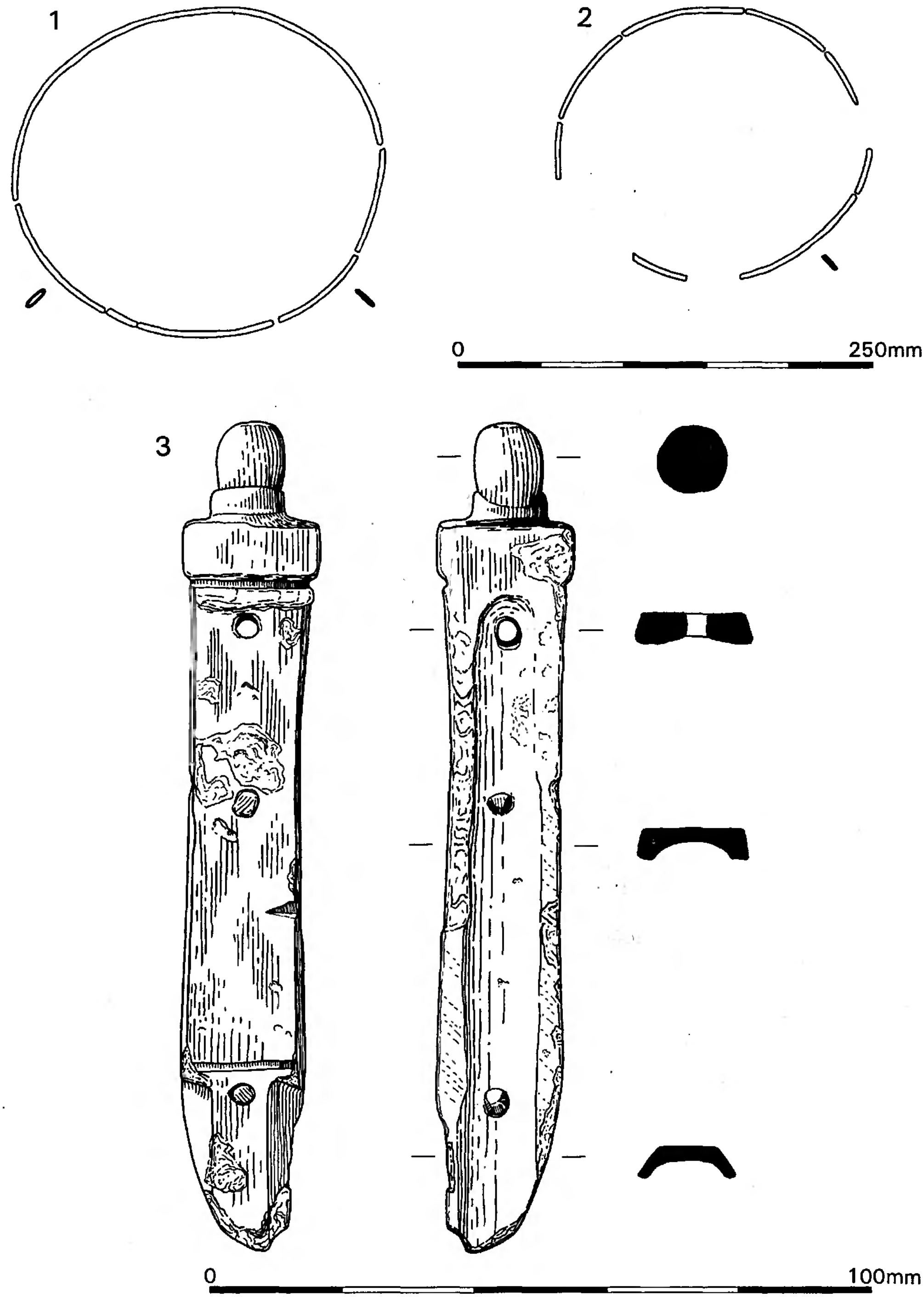

Fig. 6. Small finds.

c. 30 mm (Manning 1974, fig. 7). Both are much larger that the Blakeney hoops, and they differ also in that the one with the smaller diameter is the taller.

A closer parallel is provided by a well-preserved bucket from Newstead (Scottish Borders), which has one hoop at the top and one at the base. The bottom hoop is *c.* 14 mm wide, the upper 21 mm. The height of the bucket is given as just below 12 in (*c.* 300 mm), its diameter at the mouth as $10\frac{1}{2}$ in (*c.* 267 mm). Another Newstead bucket was *c.* 204 mm at the mouth (Curle 1911, 310), a measurement close to the diameter of the larger Blakeney hoop.

Assuming the Blakeney hoops are from a bucket similar in size to the smaller example from Newstead, their location side-by-side rather than one above the other and the absence of a handle and side-plates suggest that either they had never been fitted to a bucket or that it had fallen apart. The latter seems the more likely, as the grain of the small fragments of mineralised wood on the larger hoop appeared to be aligned with the metal. Attempts to identify the species of wood yielded no result, as the fragments were too small and friable.

Cast object (Fig. 6, no. 3) of heavily-leaded gunmetal (alloy identification by Justine Bayley, Ancient Monuments Laboratory, English Heritage). The casting is crude and the object poorly finished. It is in the form of a long hollow-backed bar with, at one end, a flat-backed rectangular moulding surmounted by a collar-moulding and a knob. At the other end, below a cross-groove, the bar has broad chamfers on each side and has been rough-trimmed to a curved tip. Three copper-alloy rivets, one now missing, set along its length indicate that the object was fitted to a backing piece that ran from below the collar moulding to, and possibly beyond, the tip. At the moulded end the backing piece could only have been 1 mm thick, being the measurement by which the collar moulding projects, while in the hollow towards the tip it was probably at least 2 mm thick, that measurement being the surviving length of the rivet, which may not be complete. These measurements suggest that, if organic, the backing piece was leather rather than wood, or that it may have been a second piece of metal, either iron or copper alloy. SF16, unstratified.

This object appears to be a handle, but it is of unusual form. Using terminology appropriate for a knife, this single-sided arrangement is very inefficient and rather than providing support would place considerable pressure on tang, rivets and blade. Though the object is unstratified, it is likely to be of Roman date, given the use of a heavily-leaded gunmetal for its manufacture (Justine Bayley pers comm.).

Lead staple in two fragments. Length 27 mm. SF13 (1088).

Fragment of an iron fitting consisting of two strips held together by a short fragment of a nail shaft. One strip is bent away from the other at a right angle. Maximum dimensions: length 40 mm, width 39 mm, height 41 mm. Probably from a wooden structure. SF11 (1062).

Full details of the iron hobnails and nails can be found in the archive.

WORKED STONE by Fiona Roe

Four rotary quern fragments and three other worked pieces of stone were recovered, all of stone available locally. The querns were made from Upper Old Red Sandstone, one of quartz conglomerate and the other three of sandstone. The stone could have been obtained from high ground to the north-west of the site, only some 2.5 km distant (Dreghorn 1968, 20, fig. 4).

Three of the querns have grooved grinding surfaces (Fig. 7, nos. 1, 3 and 4). The grooving is somewhat idiosyncratic, having been carried out without too much regard to the conventional arrangement, which on Roman querns usually consisted of grooves in neat segments. The grooving on one quern (Fig. 7, no. 3) is particularly crude. The three querns do, however, conform to the Roman disc type, being more or less flat and of no great thickness. The fourth quern fragment (Fig. 7, no. 2), a lower stone, is unevenly shaped, suggesting that it may have been made from a loose boulder. It is altogether thicker, so that the shape is more reminiscent of Iron-Age varieties of rotary quern.

The site lies on the Lower Old Red Sandstone Brownstones, and this dark red sandstone was used for the other three worked pieces. These consist of an unstratified rubber fragment, a possible crude mortar fragment, and another potentially worked piece. These seem to represent the casual use of stone available on or around the site for items other than querns.

Similar opportunist use of local stone is evident at other sites in the area. Querns made from the Upper Old Red Sandstone quartz conglomerate and sandstone were in fact transported from sources in the Forest of Dean and South Wales all over Gloucestershire and further afield during the Roman period. Numerous quarry sites are known (Mullin 1988, 1990), though not all were necessarily in use during the Roman period. At Blakeney stone did not have to be brought from elsewhere in the Forest of Dean, since outcrops were available near at hand; a number of small quarry-like depressions have been reported near Blackpool Bridge 3 km north-west of Blakeney (Mullin 1990, no. 16). The iron-working site at the Chesters villa, Woolaston, demonstrates similar circumstances; quartz conglomerate for rotary querns found there could have been obtained from the ridge of high ground behind the site to the north-west (Fulford and Allen 1992, 202). There is also a rotary quern of Upper Old Red Sandstone from a 3rd-century context at Thornwell Farm, Chepstow (G. Hughes 1996, 78), together with further small items made from the Brownstones; both types of stone were obtainable within a few miles of that site. Such examples suggest that Blakeney is typical of smaller Roman sites along the eastern margin of the Forest of Dean, where the availability of good local materials obviated any need to import stone for querns or smaller artefacts.

Catalogue of illustrated worked stone (Fig. 7)

1. Fragment of rotary quern, upper stone, Roman disc type, diameter *c.* 43 cm, maximum thickness 6.0 cm. Grooved grinding surface; upper surface pecked to shape. Upper Old Red Sandstone, sandstone. SF1 (910).
2. Fragment of rotary quern, lower stone, Iron-Age type, diameter *c.* 41 cm, maximum thickness 12 cm. Unevenly shaped, grinding surface worn smooth, hour-glass hole for spindle. Upper Old Red Sandstone, quartz conglomerate. SF9 (1040).
3. Fragment of rotary quern, possible lower stone, Roman disc type, diameter *c.* 41 cm, maximum thickness 5.8 cm. Grinding surface crudely grooved and also worn; edge and lower surface roughly pecked. Upper Old Red Sandstone, sandstone. SF10 (1059).
4. Fragment of large rotary quern, probably upper stone, Roman disc type, diameter *c.* 51 cm, maximum thickness *c.* 6.2 cm; central hole, crudely grooved grinding surface, edge and upper surface roughly pecked into shape. Upper Old Red Sandstone, sandstone. SF14 (1105).

Catalogue of unillustrated worked stone

Fragment with possible worked, flat surface, maximum thickness 3.7 cm. Rubber? Lower Old Red Sandstone, Brownstones. (1002).

Part of slab, unevenly hollowed, thickness in the centre of hollow 5.0 cm. Possibly used as crude mortar. Lower Old Red Sandstone, Brownstones. SF15 (1105).

Fragment of slab with worn surface, maximum thickness 2.3 cm. Possible rubber. Lower Old Red Sandstone, Brownstones. Trench 9, unstratified.

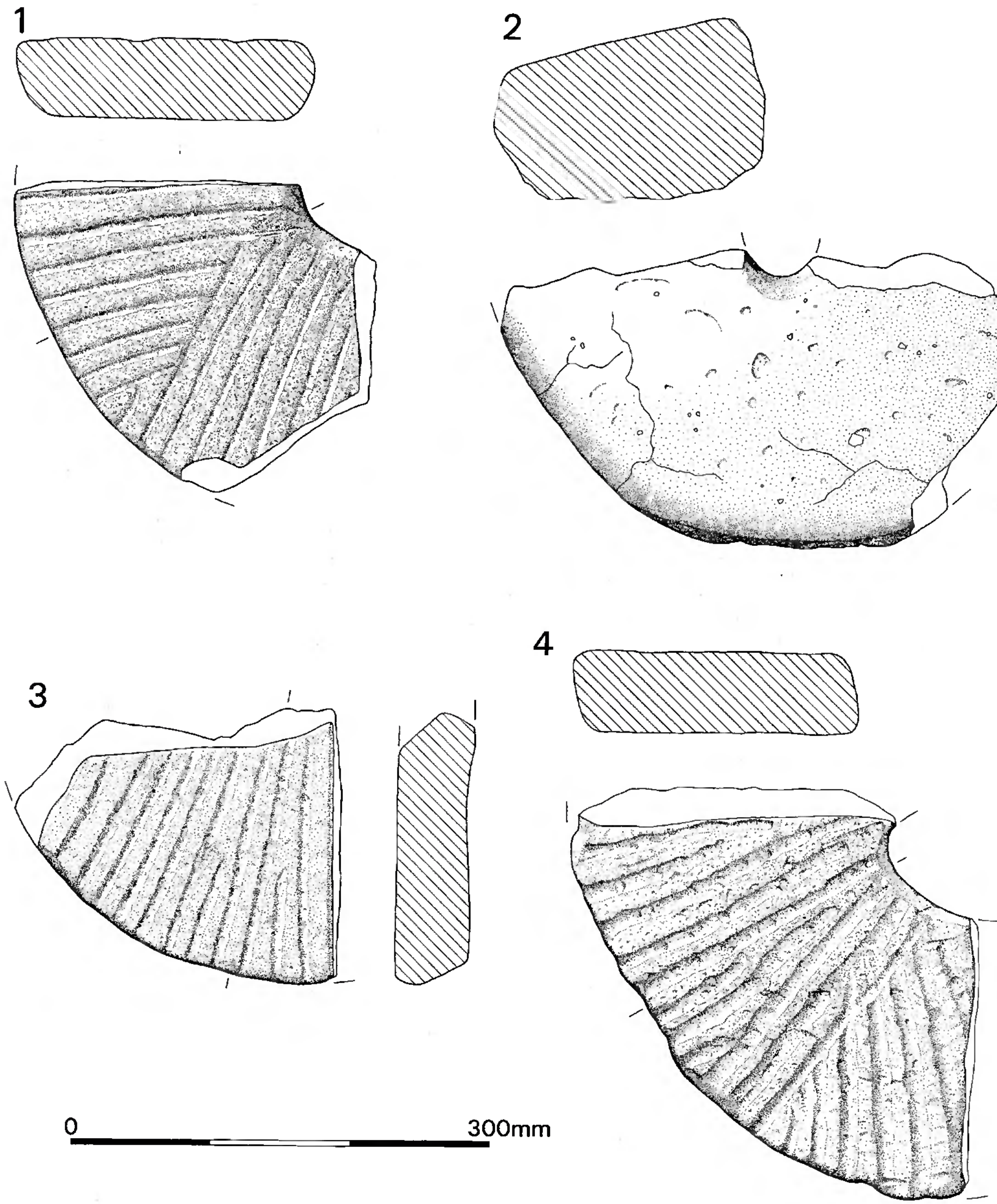

Fig. 7. Quernstones.

OTHER FINDS

One small sherd of vessel glass was recovered from pit [1065]. One small brick or tile fragment was recovered from subsoil (1002), and four tile fragments from pit [1065].

THE FUELS by Rowena Gale

Introduction

Several features from Periods 1–2 (3rd–4th century) included metal-working debris. Associated charcoal deposits were identified to assess the type of fuel used and, if possible, to verify its origin from metal-working processes. The use of fuel is compared to that of the iron-working industry at the Chesters villa, Woolaston.

Materials and Methods

The charcoal was prepared for examination using standard methods. The fragments from each sample were fractured to expose fresh transverse surfaces and sorted into groups based on the anatomical features observed using a ×-20 hand lens. Representative fragments from each group were selected for further examination under high magnification. Freshly fractured surfaces were prepared in the transverse, tangential and radial planes. The fragments were supported in sand and examined using a Nikon Labophot incident-light microscope at magnifications of up to ×400. Anatomical structures were matched to reference material (microscopic slides prepared from authenticated wood specimens).

Where appropriate the maturity (i.e. sapwood/heartwood) of the wood was assessed and the number of growth rings recorded. It should be noted that the measurements of stem diameters are from charred material; when living, these stems may have been up to 40% wider.

Results

The results are summarised in Table 3. The table shows the number of fragments identified for each taxa and where roundwood (r) was recorded. The anatomical structure of the charcoal was consistent with the broadleaf taxa (or groups of taxa) given below. It is not usually possible to identify to species level. The anatomical similarity of some related species and/or genera makes it difficult to distinguish between them with any certainty, e.g. members of the Prunoideae, Leguminosae and Salicaceae. Classification is according to *Flora Europaea* (Tutin *et al.* 1964–80).

Table 3. Charcoal taxa represented.

Context	Sample	Acer	Alnus	Betula	Corylus	Prunus	Quercus	Salix/ Populus	Ulex/ Cytisus
1041	1	1	1	1	19r	2	27r	1	–
1115	8	–	–	15	20r	1	10r	–	12r
1006	10	–	–	–	13r	12r	6r	10r	–
1050	16	3	–	–	7r	–	2r	–	–
1062	19	–	–	10	14	4	12r	1	–
1070	23	2	6	30	27r	1	–	–	–

Broadleaf taxa identified from the charcoal (see Table 3)
Aceraceae. *Acer sp.*, maple.
Betulaceae. *Alnus* sp., alder; *Betula* sp., birch.
Corylaceae. *Corylus* sp., hazel.
Fagaceae. *Quercus* sp., oak.
Leguminosae. *Ulex* sp., gorse and/or *Cytisus* sp., broom. These genera are anatomically similar.
Rosaceae. Prunoideae: a group that includes *Prunus avium*, wild cherry; *P. padus*, bird cherry; and *P. spinosa*, blackthorn. It is probable that only one of these species was used but it was not possible to identify the charcoal to species.
Salicaceae. *Salix* sp., willow; *Populus* sp., poplar. These genera are anatomically similar.

Results by context

Sample 1 (1041)
This sample came from a deposit in the bottom of a chamber in the oven. It was composed mainly of oak and hazel roundwood. The hazel ranged in diameter from *c.* 12.5 to 17.5 mm, and included 3–5 growth rings. Oak stems measured up to 20 mm in diameter and included up to 7 growth rings. The stems of both were straight, fast-grown and characteristic of coppice growth. The remaining charcoal was more fragmented and included alder, *Prunus*, birch, maple and poplar/willow.

Sample 8 (1115)
Deposits from a charcoal-rich spread consisted entirely of narrow roundwood and twiggy material. The taxa identified included hazel (diameter up to 5 mm, 2 growth rings), birch (diameter 2 mm, 7 growth rings), gorse/broom (diameter 14 mm, 6 growth rings), oak (diameter 6 mm, 6 growth rings) and *Prunus*. The narrow stem diameters and frequency of branched twiggy pieces suggested an origin from brushwood.

Sample 19 (1062)
The basal fill of ditch [1013] contained metallurgical residues and charcoal. The ditch also contained industrial refuse. The charcoal was mostly too fragmented to assess the likely age and dimensions of the wood. Taxa identified included hazel, oak roundwood, birch, *Prunus* and poplar/willow. A small piece of coal was also recorded.

Sample 10 (1006)
A charcoal-rich silt loam occurred north of ditch [1013]. It was tentatively suggested that charcoal had washed down-slope from the ditch to form the accumulation. The charcoal consisted of narrow roundwood from hazel (diameter 15–20 mm, 5–9+ growth rings, early rings wide), oak (diameter 5+ mm, 6 growth rings), *Prunus* (maximum diameter 15 mm), and poplar/willow (too fragmented to assess diameters). The range of taxa identified was similar to that from Sample 19 from the ditch but differed in its preservation, in being less fragmented and degraded; this does not necessarily negate an origin from the ditch.

Sample 16 (1050)
Charcoal from a ditch fill with associated metal-working debris. The charcoal consisted of hazel roundwood (diameter up to 30 mm, up to 15 growth rings), oak (fragmented but evidently narrow roundwood), and maple.

Sample 23 (1062)
The charcoal from waste-pit [1069] was mainly too fragmented to assess the age and growth rate of the wood. The sample included hazel roundwood (diameter up to 15 mm, 4 growth rings), birch, alder and *Prunus*.

Discussion

Charcoal was identified from ditches, pits, and spreads. Associated metal-working debris indicated that the charcoal was the residual material of iron-smelting fuel. The unusually high frequency of narrow roundwood and the absence of heartwood (especially from oak) are particularly interesting and conform to a pattern of fuel use recorded at the Chesters villa, Woolaston (see below). When compared with evidence from metal-working residues at contemporaneous sites in other regions, which demonstrates the more or less consistent use of oak heartwood, e.g. in the East Midlands (J. Cowgill pers. comm.) and Devon at Pomeroy Wood (Gale 1999), it appears that in the Forest of Dean the iron-working industry complied with regional preferences or traditions. The general importance of oak heartwood for smelting and smithing continued into the medieval period and later (Blair and Ramsay 1991).

Samples 1 and 10 consisted predominantly of hazel and oak, which appeared to be coppiced roundwood cropped on a relatively short rotation, probably 5–7 years. Charcoal in sample 8 consisted of narrower stems or twigs more characteristic of brushwood. Apart from oak stems, sample 19, from the base of ditch [1013], was too fragmented to recognise as roundwood. Sample 10, however, was contained in the charcoal-rich silt (1006), which had possibly accumulated as wash from ditch [1013], and was less degraded and clearly derived from narrow roundwood.

Although oak and hazel roundwood formed the main components of the smelting fuel, this was supplemented with the sporadic use of other taxa, e.g. birch, maple, alder, *Prunus*, willow/poplar, and gorse/broom (see Table 3).

The fuel from Blakeney is comparable to that from the iron-working industry at the Chesters villa, Woolaston (Fulford and Allen 1992), which mostly dates from the mid–late 3rd and late 4th centuries. At Woolaston fuel residues also included a high proportion of oak and hazel and, in addition, maple, alder, birch, hawthorn, spindle (*Euonymus*), ash (*Fraxinus*), holly (*Ilex*), willow (*Salix*), elm (*Ulmus*), guelder rose (*Viburnum*), and, possibly, poplar (*Populus*) and sweet chestnut (*Castanea*). The fuel consisted of narrow branches and roundwood mainly between 7 and 18 years old; there was no evidence of heartwood.

Environmental Evidence

The Blakeney site lies on red marl/clay on a north-east facing slope, which drains into the nearby Bideford brook. Data from the charcoal analysis suggest that oak and hazel woodlands were probably common. These were coppiced and they supplied faggots and fuel particularly to the metal-working industry. Areas of acidic or impoverished soils are implicated by heathland species of birch and gorse/broom. Alder, willow and poplar are typically wetland species and were, perhaps, associated with the nearby brook. With the exception of *Prunus* and poplar, which tend to sucker, the taxa named above can be grown as coppice (Rackham 1990), but evidence for coppicing taxa other than oak and hazel at Blakeney was inconclusive.

Fuel

At Blakeney the close association of the charcoal deposits with industrial waste and slag suggests that the charcoal represents fuel residues from smelting operations. Such processes usually required charcoal fuel and traditional methods of charcoal making employed fairly wide roundwood, cordwood or split billets, although narrower roundwood was sometimes stacked around the perimeter of the clamp (Edlin 1949; Armstrong 1978). Small charcoal was made by burning faggots and brushwood and then dowsing with water (Hughes 1954). The latter method would, however, probably have been impractical for all but a very small-scale industry. The predominant use of narrow diameter roundwood at Blakeney does, however, suggest a divergence from the usual practice of charcoal-making.

In sample 16 hazel roundwood measured 30 mm in diameter (when charred), with 15 growth rings, but in other samples roundwood was considerably narrower. If it were not that frequent impressions of narrow gauge roundwood (15–25 mm) in furnace slag verified its use for metal smelting, the predominance of brushwood and narrow roundwood might suggest domestic origins (e.g. faggots for use as wood fuel). Use of this type of fuel could indicate that woodlands were too depleted to supply larger wood, but at Blakeney it seems to accord with local metal-working practices.

The site appears to have been dedicated to smelting (there was no evidence of smithing), probably on a relatively small to medium scale (below, The Metal-Working Debris). Unlike the medieval period, when the Forest of Dean was denuded by the activities of charcoal burners providing the fuel for numerous bloomeries being operated in or near the Forest (Neville Havins 1976), metal-working industries in the area were comparatively small in the Roman period. By implication charcoal prepared from narrow roundwood was the preferred fuel for smelting and appears to have been a regional practice. This suggestion is endorsed by similar findings from the Romano-British metal-working centre at Woolaston (Fulford and Allen 1992).

Conclusion

Fuel for metal smelting was provided by narrow gauge roundwood (probably used as charcoal) measuring up to 30 mm in diameter (when charred) but mostly narrower. This was supplied predominantly from oak and hazel coppice but also included birch, alder, willow/poplar, maple, gorse/broom, and *Prunus*. Most of the coppice wood appears to have been cropped on a fairly short rotational cycle and there was no evidence of the use of heartwood. Corresponding impressions of narrow roundwood were recorded in furnace slag (below, The Metal-Working Debris). The use of small bore wood at Blakeney and at Woolaston (Fulford and Allen 1992), compared to the practice of employing wider roundwood containing heartwood in other areas of Britain, suggests a regional preference common to the Forest of Dean.

Other Fuel

Eleven small fragments of coal were recovered from three contexts, layers (1005) and (1027) and ditch [1048]. A further fragment was recovered from sample 19 from ditch [1013] (see above).

THE METAL-WORKING DEBRIS by C. Salter

Introduction

It has long been known that the Forest of Dean was a centre of Roman mining and smelting activity. However, the dating of iron-smelting sites can be difficult because they are often simply dumps of slag and furnace-lining containing little pottery or other datable material. Also, given that the Dean iron resources were extensively exploited during the medieval period, it has been difficult to determine the scale and nature of the Roman industry. There is extensive excavated evidence of iron working from the urban sites of *Ariconium* and Monmouth in the form of slag dumps, furnaces and hearths (B. Walters 1999 for full references). To the south-west the National Museum of Wales excavations at Caerwent have revealed quantities of iron-smelting slag. The *Atlas of Roman Britain* (Jones and Mattingly 1994) shows a total of 71 smelting sites or possible smelting sites within the Forest of Dean. The survival of the archaeology on most of these sites was not sufficient to reconstruct the furnace technology or the layout of the workings of the site. However, the research of Fulford and Allen at the Chesters, Woolaston, has provided an insight into the furnace technology used on a rural villa site of the 3rd or 4th century, even though there were minimal furnace remains, and their fieldwork has shown that iron smelting extended onto the Severn estuary levels (Allen and Fulford 1987).

Although preservation is often poor on iron-working and smelting sites, it is possible to recover far more information from the slags than is usually published. The slag from Blakeney is such a case. Even though the quantity of debris recovered from the excavation was small, and clearly removed from its original furnace context, it does provide an indication of the possible Roman iron industry in the immediate area.

The Evidence from Blakeney

Over 424 kg of slag was recovered, most of it (355 kg; 84%) from dump (1035) associated with the Period 2 hard-standing. A full list of slag weight by context can be found in the archive. It was hoped when the concentration of slag was found that it might have represented a dump around a short-lived iron-smelting site. Unfortunately, no furnace was found.

Although the detailed work on the slag is not yet finished, it is clear that the material is almost exclusively associated with iron smelting of the late 3rd or 4th century. By far the greater part of the material is tap slag or furnace slag, with some clay furnace-lining material and sandstone, and it seems to represent only the very first stage of the iron-smelting process in which the ore was smelted to a mixed mass of slag and metal called a bloom. To produce usable metal, the bloom would have undergone a subsequent high temperature forging stage (bloom-smithing) in which the majority of the slag was expelled from the bloom and the individual pieces of iron were consolidated. Most of the material found in the excavation was either the slag tapped out of the furnace to solidify as characteristic ropy tap slag, or the more massive lumps of slag that remained in the furnace below the bloom. No evidence for the subsequent processes in which the bloom is worked up into usable metal was recovered. No smithing hearth bottoms were found, and there was no significant quantity of hammer-scale, even though the residue from slag washing was kept and checked for its presence.

Initial examination of the slag on site suggested that the proportion of slag that cooled within the furnace (furnace slag) to that which was tapped out (tap slag) was greater than at many Roman smelting sites. Unfortunately, the furnace slag to tap slag ratio has not often been recorded in published reports of iron-smelting sites of this period. In fact, the slags are rarely differentiated. Only Fulford and Allen (1992) noted the presence of these two different types of smelting slag but, although it is clear that they measured the ratio, they unfortunately did not publish it. Thus the observation that there seems to be a greater proportion of furnace or massive slag than of tap slag is simply an impression based on general observations over a number of sites rather than on statistics.

Most pieces of furnace slag have preserved a number of fuel impressions. These were typically of roundwood charcoal of relatively small diameter (15–25 mm). There were relatively few impressions of flat surfaces from split wood. This would suggest that the smelters were either using top wood or coppiced wood to make their charcoal. This is in line with Fulford and Allen's (1992) observations of the charcoal at the Chesters, where it was found that the wood had been cut in the autumn and winter period, allowed to dry, then burnt to charcoal. By contrast, in the East Midlands (Cowgill pers. comm., and the author's observations of smelting sites in the Claxby area) wood or charcoal of a larger diameter was split to obtain a suitable size for smelting.

The slag itself also retained some information about the way in which the furnace was run. A few pieces of slag that had frozen in the tap-slagging channel were recovered. They showed that the channel was 40–50 mm wide. The presence of narrower channels on the base of the run suggest that one or more obstructions of the tapping channel had been cleared by ramming a rod of 15–20 mm diameter through the base of the tapping arch.

The only other sort of metallurgical material recovered in quantity was furnace lining. It was either sandy clay or sandstone and in some cases it had fused and begun to flow. Given the richness of the ores mined in the Forest of Dean, it is likely that fusion of the hearth lining was necessary to reduce the melting point of the slag sufficiently for freely-flowing tap slags to form.

The Organisation of the Iron-Smelting Activity

The slag found on the site is clearly a secondary dump of material brought from an iron-smelting site in the vicinity and it indicates that the iron-making industry in the immediate area was on a small to medium scale. Given significant parallels with the iron-working site at the Chesters villa in Woolaston — (i) the site is not on the ore field nor on a major water-way; (ii) small wood was used as fuel; (iii) there is no evidence of bloom-smithing or further working of iron with the smelting slags; and (iv) the iron-making occurred during the late 3rd to 4th century — it seems likely that iron production would have been organised in a similar manner to that at the Chesters. That is, there was an iron-smelting building which contained at least one pair of furnaces. Other than for a temporary iron-smithing site, iron-working sites need to be under cover in Britain. To work efficiently the furnaces need to be kept dry, which is not normally possible in this country unless they are in some form of building. Contrary to popular belief, bloomery iron-smelting does not constitute any more of a fire-hazard than any domestic oven. A pair of furnaces has been run for a number of years at Plas Tan y Bwlch, Snowdonia, with a wooden roof only a few feet above the tops of the furnaces without any problems. If the Blakeney furnaces were being run on the seasonal pattern proposed by Fulford and Allen at the Chesters then a supply of wood fuel would have had to be collected, dried, converted to charcoal, and stored in a dry location. The iron-smelting building therefore most probably served also as the wood and charcoal store.

Elsewhere in the vicinity of Millend Lane, possibly towards the river Severn, it is likely that there would have been a forging site in which the blooms were converted to usable metal either in the form of billets or bars for export along the river or, maybe, the metal was fashioned as artefacts for local use. How the iron industry was tied into the local economy remains to be determined. Later Roman iron-making has been found at both industrial settlements and villas. How the pattern of iron production in the Forest of Dean changes over time is also still not clear. Cleere (1985) suggested that Dean iron production remained more or less constant from the early 2nd century to the first half of the 4th century and declined only in the latter half of the 4th century. By comparison the Wealden industry collapsed towards the middle of the 3rd century, as did the fairly minor production from Jurassic ores of the Midlands. The fieldwork of Allen and Fulford (1987) has shown that iron production using Dean ores appears to have expanded away from the ore fields in the 3rd and 4th centuries. However, analysis of the iron artefacts found at Beckford, Worcestershire (Salter 1987), showed an increasing use of iron made from non-Dean phosphoritic ores. This suggests a decline in Forest of Dean iron production and/or an increased use of phosphoritic Jurassic and hard-pan ores in the later Roman period. It can be argued that both the increased use of Dean ore on the Severn Levels and other peripheral sites such as Blakeney and the use of phosphoritic metal at Beckford in a region traditionally supplied with ore from the Forest of Dean are signs of the same phenomena: the return to local production of iron using the nearest available ore after a couple of centuries of more centralised iron production. However, much more fieldwork is required if the history of the relative importance of the production of the Dean ore field, and production on peripheral sites using Dean ore, is to be determined.

GENERAL DISCUSSION by Neil Holbrook

Previous Evidence for Roman Occupation at Blakeney

The nature of Roman occupation at Blakeney is poorly understood. The village is presumed to lie on the putative Roman road from Newnham (and a ferry crossing of the Severn?) to Caerwent (Margary 1967, route 60A), although the principal route from Gloucester through the Forest of Dean to South Wales ran 12 km to the north of Blakeney by way of *Ariconium* and Monmouth (ibid. route 611, 612). No certain evidence for a Roman road has been found in Blakeney, although an undated (medieval?) metalled road has been observed during small-scale developments and a paved ford seen at the crossing of the Bideford brook (Johns 1993) (Fig. 1). A Roman stone building at Legg House, on the opposite bank of the brook, was excavated by Dean Archaeological Group in 1990–2 (M. Walters 1991; 1993). The evidence indicated several periods of occupation and also revealed associated metalled surfaces. Given the limited area investigated, little could be deduced of the building plan although hypocaust *pila* tiles were found in demolition debris. Coins of Vespasian, Domitian and Nerva were retrieved, along with South Gaulish samian, and the excavator, Mr. M. Walters, gave a span from the mid 70s A.D. to *c.* 150 for the sequence. Walters considered that the presence of *pila* tiles suggested the site of a bath-house, and he sought to associate the site with an antiquarian reference to discoveries in a field a short distance east of Legg House. The first volume, published in 1791, of Bigland's *Historical, Monumental, and Genealogical Collections Relative to the County of Gloucester* records the following local tradition:

> Near *Blakeney*, in a ground called *Church Croft*, it is said that the church was intended to have been founded, but that part which had been built in the day was removed during the night to the present situation. This ground was a few years since examined by the proprietor, Mr A'Deane. In his research "he found several large clumps, consisting of various stones, tiles, and mortar strongly cemented. And about two feet from the Surface, a Foundation nearly as many deep, which consisted of four semi-circular walls, 12 or 15 feet in diameter, the ends of which intersected and crossed each other, with two square rooms irregularly connected with the other Building; in one of which were found a number of square Bricks, for pavement, from seven to twelve or fourteen Inches, some whole, and some broken. A quantity of rubbish of the same kind was intermixed with the Ruins"

Finds of Roman pottery from other sites in Blakeney are recorded on the Sites and Monuments Record, including specifically 1st-century material from a pipe trench near the High Street in 1986 (Rawes 1987, 243). Elsewhere, 3rd to 4th-century pottery, slag and other finds have been found immediately to the south-east of the Millend Lane excavation (Johns 1992, 45).

The discovery of a 1st-century masonry building, possibly with an associated bath-house, is noteworthy and M. Walters has suggested that this may have been the residence of an official supervising mining activities in the Forest (the interpretation is discussed more generally in B. Walters 1992, 77–8). The evidence from the Millend Lane excavation cannot be associated with this occupation, however, for it is clearly later than the demolition of that structure. Whether there was a break in Roman occupation in Blakeney, or whether occupation continued in another yet unexplored part of the village, remains to be resolved.

Nature of the Iron-Working Activity in Blakeney

The location of late Roman iron-working at Blakeney is likely to reflect the area's good communications, both by land and water. The site lies away from iron-bearing rocks, the nearest outcrop of ore occurring some 5 km to the north-west near Upper Soudley. The road network may have facilitated transport of ore to the site and export of its iron products. Water transport is also likely to have been of significance. There may have been a harbour at the terminus of the putative Roman road at Newnham, and light craft may have been able to navigate the Bideford brook for 1.5 km upstream from Brims Pill, an inlet on the Severn estuary. The excavated area seems to lie on the very periphery of the late Roman industrial site, which is likely to have spread towards the western bank of the Bideford brook. Salter's analyses have demonstrated that the slag recovered from the excavations is the debris of (seemingly small-scale) iron smelting, with the blooms being forged into usable metal elsewhere (perhaps nearer the river).

The precise nature of the late Roman site at Blakeney remains to be resolved. It is possible that a villa awaits discovery, in which case comparison could be made with the villas further down the Severn estuary at Park Farm, Lydney, the Chesters, Woolaston, and Boughspring, Tidenham (Fulford and Allen 1992). Equally the site may fall into the category of lower order settlements which show little or no evidence for substantial masonry buildings, such as have been discovered in survey on both banks of the estuary (Allen and Fulford 1987). The evidence for activity into the second half of the 4th century at Blakeney can be compared with that from the Chesters where the latest coin recovered from the villa dates to the 370s or 380s A.D. (Scott-Garrett and Harris 1938).

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