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Metalwork and metal-working residues from Beechbrook Wood, Hothfield, Kent (ARC BBW00, ARC BWD98)

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TABLE OF CONTENTS

1 THE PREHISTORIC METALWORK ... 4
1.1 Introduction ... 4
1.2 Description and discussion ... 4
Context 569, SF 203 ... 4
1.3 Metallurgical analysis ... 5
Context 254, SF 209 ... 5
Context 505, SF 208 ... 6
Context 787, SF 204 ... 6
Context 1345, SF 276 ... 6
Context 2030, SF 304 ... 7
1.4 Conclusions ... 7
2 THE LATE IRON AGE/ ROMAN METALWORK ... 7
2.1 Introduction ... 7
2.2 The finds by context ... 8
Industrial enclosure 1022 (50 BC - AD 270) ... 8
Pit 504 ... 8
Cremation pit 1344 (AD 120-270) ... 8
Enclosure ditch 2150 (300 BC - 43 AD) ... 8
2.3 Discussion ... 8
3 MISCELLANEOUS POST-MEDIEVAL FINDS ... 9
4 IRON SLAG ... 10
4.1 Introduction ... 10
4.2 Method ... 11
4.3 The slag assemblage ... 11
5 THE WORKED STONE ... 18
5.1 Introduction ... 18
5.2 Method ... 18
5.3 Context and date ... 19
5.4 Discussion ... 19
5.5 Catalogue of worked stone ... 20
6 BIBLIOGRAPHY ... 21

LIST OF TABLES

Table 1: Quantification of Prehistoric metalwork 4
Table 2: Late Iron Age/early Roman and post-medieval metalwork 9
Table 3: Quantification table for the iron slag and related debris from Beechbrook Wood.......... 14
Table 4: Quantification of worked stone small finds 18

1 THE PREHISTORIC METALWORK

by Peter Northover

1.1 Introduction

Six items of prehistoric analysis were assessed for compositional and metallographic analysis. They are listed in Table 1 with their suggested dating based on contextual and stratigraphic evidence.

Table 1: Quantification of Prehistoric metalwork

SF_ Numbe	Context	Feature Number	PX_ Interpretation	Dating	Object Identification	Material
203	569	651	Posthole	MBA/LBA	Object	Copper Alloy
209	254	250	Posthole	LIA?	'Slag'	Copper Alloy
208	505	1022	Ditch	LIA?	'Slag'	Copper Alloy
204	787	1027	Ditch	LIA	Bracelet/ring	Copper Alloy
276	1345	1344	Cremation pit	LIA/ER	Miscellaneous	Copper Alloy
304	2030	2034	Cremation	LIA/ER	Strip fragments	Copper Alloy

MBA: Middle Bronze Age; LBA: Late bronze Age; LIA: Late iron Age; ER: Early Roman

1.2 Description and discussion

Context 569, SF 203

a) Possible blank for knife blade or (?) pin with spatulate head; flat surfaces; tapered outline, expanded at head, thinning at blunt "point". Almost completely corroded with blue-green corrosion products over cuprite.

Present length 71mm; width 21mm; max. thickness 7mm

b) pin shaft, tapered sub-square shaft, flattened and slightly broadened to rectangular section at top; corrosion similar to a), with which it might join.

3 fragments, total length 102mm, max. width 5mm

These fragments, described together because of a potential join, are completely mineralised with cuprite, malachite and copper chlorides as the principal corrosion products. Because of this no analysis was possible so the possibility of a real join could not be checked in that way. Another obstacle to their interpretation is the dimensional change consequent on their severe corrosion. The rod section is clearly a pin-shaft and so could readily date either to the Middle or the majority of the late Bronze Age. If the triangular fragment is truly a pin-head then it is unfinished and was presumably destined to be worked into some rather larger flat shape. It must be remembered, though, that the habit in the middle Bronze Age, except for sheet metalwork, was to cast bronzes quite close to shape.

There are no pins in southern England that correspond to this description in southern England (*vide* Gerloff 1975, Rowlands 1976, O'Connor 1980) but some may be found further afield on the Continent, most notably in Switzerland and neighbouring areas. There are some striking examples in the cemetery at Singen am Hohentwiel in southern Germany (Krause 1988); these have flat, decorated, shield-shaped heads with the upper edge rolled over. As found, the shafts are usually curved. These, though, are dated to Reinecke Bz A1, in the early Bronze Age, and such pins are generally to be dated to the early Bronze Age. Distribution maps of related types are published by Mordant and Gaiffe (1992) and it is clear that there are no examples in the northern and western parts of France. Expanded heads on contemporary British pins are much smaller, thicker, and usually pierced (Gerloff 1975, Plate 57). By the middle Bronze Age they have largely disappeared although there are a very few Swiss examples in Bz B (Fischer 1997, 20).

Thus, if this object is a blank for a pin it is a very unusual one for Britain, be it early or middle Bronze Age in date. If it really should be treated as two objects we have a pin shaft, and a triangular piece of bronze with no clear purpose. However, before we leave this object mentioned should be made of one middle Bronze Age object from France with some similarities in shape, albeit of a rather stouter form. The shaft ends in a chisel edge and the upper end is in the form of a thick spatula. It is published by Mohen (1977) as a chisel of unusual form and was found at Sucy-en-Brie, south-east of Paris.

1.3 Metallurgical analysis

Context 254, SF 209

Small lump of metalworking waste:

The only un-oxidised metal in this object consisted of minute prills of copper in a vitreous mass formed by the reaction of fuel ash, vitrifying ceramic and oxidised bronze. The main mass of the residue consists of cuprite and cassiterite in a glassy matrix, with some other phases present. In this state it is not possible to make any analysis that would assist with dating the fragment. Highly slagged crucibles are a feature of Iron Age metalworking in southern Britain (Northover 1987, 1991, 2001) but they can also occur in the late Bronze Age.

Context 505, SF 208

Small lump metalworking waste:

Compositions: 0.27% Fe; 0.05% Co; 0.41% Ni; 85.53% Cu; 0.01% Zn; 0.17% As; 0.04% Sb; 13.37% Sn; 0.01% Bi; 0.01% Pb; 0.11% S

0.03% Fe; 0.04% Co; 0.52% Ni; 84.69% Cu; 0.42% As; 0.02% Sb; 13.83% Sn; 0.02% Bi; 0.37% Pb; 0.05% S

This lump provided the only analysable bronze from Beechbrook Wood. The last two decades have produced a usable database of bronze analyses for the pre-Roman Iron Age and earliest Roman period in southern Britain. On the basis of these results, which admittedly do not cover Kent, there are no parallels for the impurity pattern in this bronze; in particular, metalwork of the later Iron Age to early Roman period does not have a nickel content as high as 0.5% except in special cases where antimony is also an important impurity. Looking back in prehistory there are very good parallels for this composition throughout southern Britain in the Taunton period of the middle Bronze Age (Northover 1982). The composition of SF 208 is so typical that it must originate in that period. If found in an Iron Age context it must be residual from middle Bronze Age metalworking in the area of the site.

Context 787, SF 204

Corroded fragments of a circular section bronze ring, possible bracelet although no terminals apparent and size is rather small. Completely corroded with pale green corrosion products under earthy encrustation.

Original diameters 55x50mm; width 3.5mm

This object was too corroded to analyse and without a composition it is not possible to make any reasonable comments on dating. A Bronze Age date should not be ruled out.

Context 1345, SF 276

Small lump copper alloy metalworking waste, probably bronze. Too corroded to analyse.

Although this piece was found in an area with cremated bone it is unlikely to be a product of the cremation pyre. Although bronze can be heavily oxidised in a pyre, or become very distorted, it is rare for bronze to be completely melted. This is especially true if the bronze is placed on the body, which burns at a lower temperature than the surrounding pyre, and does so with a reducing flame. In the spectacular early Roman cremation at Folly Lane, St Albans (Niblett 1999), nearly all the silver grave goods were melted but the copper alloy objects were more or less intact, although some were strongly affected by the heat. Given the results from the analysis of SF 208, it is possible that this too is residual from middle Bronze Age metalworking.

Context 2030, SF 304

Originally six fragments of thin copper alloy strip; flat, straight edges, part curved - tweezers? Heavily corroded with green corrosion products.

4x1mm section

The corroded state of this bronze precluded analysis, and its fragmentary nature hindered identification. A small pair of tweezers could be any date from Bronze Age to Roman.

1.4 Conclusions

Our understanding of the copper alloy metalwork from Beechbrook Wood is compromised by its severely corroded state. Its bias appears to be towards the middle Bronze Age. To this writer the analysis of SF 208 is convincing evidence of middle Bronze Age metalworking, and the crucible residue and other bronze waste could also be residual from the middle Bronze Age. There is then the enigmatic unfinished object which could be a product of that metalworking, although it could be even earlier. The actual bronze objects, the rin and the possible tweezer fragment, do not offer any useful dating evidence, but could again be Bronze Age rather than Iron Age.

2 THE LATE IRON AGE/ ROMAN METALWORK

by Valerie Diez

2.1 Introduction

An assemblage of 325 metal small finds was recovered by hand excavation and during environmental processing of bulk samples from the two Beechbrook Wood sites, ARC BBW00 and ARC BWD98.

Event Code	*Material*	*Quantity*
ARC BWD98	Copper Alloy	3
	Lead/Lead Alloy	2
	Silver	1
ARC BBW00	Iron	319

Activity on the site dates from the Mesolithic period through to the early Roman. The range of metal small finds is however very poor and not intrinsically datable for most part. The first section of the report is a brief chronological narrative, placing the artefacts within the context in which they were found. There then follows a brief discussion of the artefacts.

2.2 The finds by context

Industrial enclosure 1022 (50 BC - AD 270)

Context 53 corresponds to a surface find, a single nail, from the top of the enclosure. Context 210, the final fill in intervention 211, revealed a small fragment of unidentified iron object, possibly a nail. Finally, context 212, a reference number given to finds recovered from the top of enclosure 1022 during machining, contained the fragment of a socketed implement, probably a tool (dimensions 125 x 30 mm). It consists of two wing-shaped flanges folded over to form a hollow tube for handle and there is no evidence of perforation for rivetting. Fragment of flattened sheet may be part of a large blade.

Pit 504

The primary fill of this undated pit (525), possibly associated with late Iron Age/early Roman furnaces to the west, revealed two small unidentified fragments of iron objects, probably nails.

Cremation pit 1344 (AD 120-270)

This cremation pit contained the largest assemblage of iron artefacts from the entire site, mostly hobnails. The primary fill, 1345, contained 200 hobnails, 7 nails and 9 nail shank fragments. The secondary fill, 1346, contained 32 hobnails, 54 nails and 4 nail shanks. Finally, the upper fill, 1347, revealed 6 hobnails and 1 nail.

Enclosure ditch 2150 (300 BC - 43 AD)

A single sheet fragment (SF 408) was recovered from this enclosure ditch, context 2427 (finds reference number).

2.3 Discussion

Most small finds came from late Iron Age or early Roman contexts and are likely to date from this period. None of the artefacts can be typologically dated due to their nature (mostly nails and hobnails) or their fragmentary state.

The nature of the assemblage suggests a low status rural site. The small quantity of material is not unusual on this type of site. Another site dug in advance of the CTRL, Leda Cottages (Diez 2006), and situated only *c* 3 km to the north-east of Beechbrook Wood, revealed only 5 nails on the entire site. The two sites are comparable in date and appear to be of a similar nature and economic base. Metalworking evidence in the form of furnaces was uncovered on both sites. The paucity of metal artefacts suggests that both sites were metalworking producer sites rather than consumer for this period. All metalwork is summarised in Table 2 below.

3 MISCELLANEOUS POST-MEDIEVAL FINDS

Seven unstratified small finds were recovered from ARC BWD98, a small excavation area located to the south of ARC BBW00. They consisted of a copper alloy button (SF 8), 2 copper alloy sheet fragments (SF 2 and 3), a copper alloy rectangular buckle (SF 4), a lead weight, a lead strip (SF 7) and a silver mount (SF 6) in the form of an ivy leaf. All artefacts are of post-medieval date.

Table 2: Late Iron Age/early Roman and post-medieval metalwork

Event Code	Context	Small Find No	Object Identification	Function	Total
ARC BBW00	53		Nail	Miscellaneous	1
	210		Unidentified	Miscellaneous	1
	212		Unidentified	Miscellaneous	1
	525		Unidentified	Miscellaneous	2
	1345		Hobnail	Personal	200
	1345		Nail	Miscellaneous	7
	1345		Shank	Miscellaneous	9
	1346		Hobnail	Personal	32
	1346		Nail	Miscellaneous	54
	1346		Shank	Miscellaneous	4
	1347		Hobnail	Personal	6
	1347		Nail	Miscellaneous	1
	2427		Sheet	Miscellaneous	1
ARC BWD98	0	8	Button	Personal	1
	0	6	Mount	Miscellaneous	1
	0	3	Sheet	Miscellaneous	1
	0	2	Sheet	Miscellaneous	1
	0	4	Buckle	Personal	1
	0		Weight	Tool	1

	0	7	Strip	Miscellaneous	1
Grand Total					*325*

4 IRON SLAG

By Lynne Keys (May 2005)

4.1 Introduction

Almost 76kg of iron slag and related debris were recovered during excavation (ARC BBW00). Most was found in contexts related to sub-groups 1022 and 1020 (two ditches) and to furnaces or hearths [255], [257], [260] and [262] beside the sub-group 1022 ditch. Elsewhere on the site, three pits [229], [231], and [233] may represent further iron working. Small quantities of smelting slag and other pieces too broken to identify (undiagnostic slag) were found scattered elsewhere over the site. These are probably re-deposited and none can be used to pinpoint further metalworking activity.

Furnaces (or hearths) [255], [257], [260] and [262] were clustered in the angle where the two ditches (sub-groups 1022 and 1023) meet. Sub-group 1022 ditch contained large quantities of charcoal in its fills and slag had also been thrown into it. The larger diagnostic slag types found in the furnaces and in the above-mentioned ditch were those produced by smelting; microslags in the form of flake and spheroidal hammerscale – found in all the furnaces/hearths – reveal, however, that smithing was also occurring in the same area. The spheroidal hammerscale indicates either that iron blooms produced by the smelt were being worked to remove more slag or that high temperature welding to join two pieces of iron was taking place. The flake hammerscale indicates ordinary hot working of pieces of iron also took plasce place. The furnaces/hearths [255] and [262] contained diagnostic smelting slag while [257] and [260] did not. It would appear that iron-making and iron-working processes were situated, at least for a time, beside the ditch: a convenient place to discard waste. One might expect some kind of shelter if more than basic iron smithing was taking place (to allow the smith to see the colour of the iron - indicating when it should be quenched or tempered - in a darkened environment), however none appears to have left traces or been present.

In sub-group 1020, the pits inside the enclosure formed by this ditch contained more smelting than smithing slag fragments, although not in amounts large enough to indicate prolonged activity. Elsewhere pits [229] and [231] both produced iron slag: a smithing hearth bottom in [229] and some flake hammerscale in [231]. The nearby pit [233] contained some fired clay.

4.2 Method

The 76kg of slag and related debris were recovered by hand during excavation and from samples taken from deposits where burnt material - charcoal and fired clay - were found. While soil samples were wet sieved, the bulk slag was generally left unwashed. The slag assemblage was visually examined and categorised on the basis of morphology alone. Each slag type in each context was weighed; smithing hearth bottoms were weighed individually and measured to obtain their dimensions for statistical purposes. Quantification details are given in the table below. Additionally a magnet was run through the soil in bags to detect micro-slags such as hammerscale. At the time of publication no slag had been analysed in a laboratory.

4.3 The slag assemblage

Activities involving iron can take two forms:

1) the manufacture of iron from ore and fuel in a *smelting* furnace. The resulting products are a spongy mass called a bloom consisting of iron with a considerable amount of slag still trapped inside, and slag (waste).

2a) *primary smithing* (hot working by a smith using a hammer) of the bloom on a stringhearth, usually near the smelting furnace, to remove excess slag. The bloom becomes a rough lump of iron ready for use and the slags from this process include smithing hearth bottoms and micro-slags, in particular tiny smithing spheres;

2b) *secondary smithing* (hot working by a smith using a hammer) to turn a piece of iron into a utilitarian object or to repair an iron object. As well as bulk slags including the smithing hearth bottom, this will also generate micro-slags: hammerscale flakes from ordinary hot working of a piece of iron, or tiny spheres from high temperature welding to join two pieces of iron.

Some types of iron slag are diagnostic of smelting or smithing, while others are not; slag described as undiagnostic could have been produced by either process. Slags may be broken up during deposition, re-deposition or excavation so surviving fragments have to be assigned to the undiagnostic category. Undiagnostic slag made up 27,368g of the assemblage – a substantial amount. Because of this, where there were hints as to whether it might be smelting or smithing, comments have been made on the quantification table. Other types of debris encountered in some slag assemblages are the result of a variety of high temperature activities - including domestic fires - and cannot be taken on their own to indicate iron-working was taking place. These materials include fired clay, vitrified hearth lining, cinder, and fuel ash slag. However if found in association with iron slag - particularly diagnostic iron slag - they can be considered as possible products of the process.

A large fragment of a smelting slag known as a slag block was found in (1080) [1079] (sub-group 1957). Slag blocks were produced in a furnace with a pit below, allowing the slag to collect, rather than being tapped or run out of the furnace. The distinct slag produced by this furnace is called a slag block from the German *Schlackenklotz*. Slag blocks are commonly encountered on Iron Age smelting sites in southern Scandinavia, north Germany and Poland but until recently very few examples had been recognised from England and these were thought to be early Anglo-Saxon in date. Recently, however excavations at several sites – including Leda Cottages and White Horse Stone (both CTRL projects) – have recovered slag blocks from definite Iron Age contexts.

Tap slag (of which 8104g were found in greater or smaller quantities in and between the sub-groups 1022 and 1020 area of the site) is a dense, low porosity, iron silicate slag with a ropy flowed structure. It was formed as the liquid slag is allowed to flow out continuously or intermittently through a hole in the side of the furnace into a hollow in the ground. This removal of the slag facilitated retrieval of the bloom after the smelting operation. It is believed furnaces with tap holes replaced bowl furnaces as their efficiency was recognised early in the Roman period. Analysis by Sarah Paynter (Ancient Monuments Laboratory, English Heritage), however, of Iron Age slag from several sites (including Leda Cottages, a CTRL site) indicates the slag pit below the smelting furnace may have been deliberately slanted to allow slag to run out, slag that might sometimes resemble tap slag. Run slag is what its name suggests and was produced by smelting. If tap slag is very fragmentary it can be hard to identify as such and the term 'run slag' has been used in these instances. 518g was recovered from the sub-group 1020 and 1022 ditches. Dense slag is of low porosity like tap slag but lacks the flowed surface; it too represents smelting activity although only a small amount was recovered (68g).

Other smelting slags present in the assemblage were slag furnace bottoms, resembling large smithing hearth bottoms, produced in a covered bowl furnace, or fragments of these which have been referred to as furnace slag (16,905g in total). Where the furnace bottom is complete its dimensions have been recorded in the table. This slag was found principally – in diminishing amounts - in sub-groups 1020, 1022, 1023, 1026 and 1028. The largest fragment came from (1512) in pit [1513] near ditch sub-group 1020; another was found in (275) ditch fill [276]. Although examples of this slag form a link between the areas of 1020 and 1022/1023 it does not indicate smelting was taking place all over that area but merely confirms the concentration if Iron Age smelting in this part of the site.

Some fragments of fired clay of a smoky grey colour were recovered and probably represent parts of the superstructure of smelting furnaces. From one fragment found in (511) [512] (sub-group 1022) it was possible to ascertain that the walls were at least 35mm thick.

The smithing hearth bottom (seven examples found weighing a total of 4,594g) is the most characteristic bulk slag of that process. It formed as a result of high temperature reactions between the iron, iron-scale and silica from either a clay furnace lining or the silica flux used by the smith. The predominantly fayalitic (iron silicate) material produced by this reaction dripped down into the hearth base during smithing forming a slag which, if not cleared out, developed into the smithing hearth bottom. When removed from the hearth they were usually deposited in the pit or ditch nearest the activity. The proximity of cut features or dumps with amounts of smithing hearth bottoms to a building is often a good indication the structure may have been a smithy. Most examples were associated with sub-group 1022 followed by 1020 ; one was from (230) [229] and another in (302), a context described as natural sand.

Hammerscale is a term used to describe two diagnostic microslags produced by smithing. The ordinary hot working of a piece of iron either to make an object or repair it produces flake hammerscale. The other, small spheres, is produced when an iron bloom is worked at high temperature to remove excess slag after smelting (the production of iron in a furnace from ore and a fuel), or by high temperature welding as a smith joins two pieces of iron to make an object. Since both types are not visible to the naked eye when in the soil but they usually remain in the immediate area of smithing activity (around the anvil and between it and the hearth) when larger (bulk) slags are cleared out. They remained in the hearths near the ditches in sub-groups 1022 and 1023. Flake hammerscale was found in fill (232) of pit [231]. As it was usually in soil or adhering to slags it could not be weighed with any accuracy: the quantity is indicated in the comments column of the quantification table.

Vitrified hearth lining (3225g) was produced nearest the tuyère region (the region of highest temperature) of a hearth or furnace. By itself it is not diagnostic of smelting or smithing activity and can be produced by a number of other high temperature activities but its association with other diagnostic material provides support for the process. Cinder is a very porous, highly vitrified material formed at the interface between the alkali fuel ashes and siliceous material of a hearth lining.

Ferruginous concretions are made up of a re-deposition of iron hydroxides (rather like iron panning), enhanced by surrounding archaeological deposits, particularly if there is iron-rich waste present as a result of ironworking. Only 92g were recovered.

Table 3: Quantification table for the iron slag and related debris from Beechbrook Wood

con.	<>	in	ident	s-gp	interpretation	wt.	len.	br.	dep.	comment
100					pot/glass vitrified ceramic	66				
201				1022	furnace slag	582				
201				1022	stone/ironstone	144				
201				1022	tap slag	864				
201				1022	undiagnostic	1162				
212				0	undiagnostic	1106				
214				1022	tap slag	212				
214				1022	undiagnostic	230				
214				1022	vitrified hearth lining	60				
221				0	vitrified hearth lining	462				
227				1023	vitrified hearth lining	156				slag runs into fabric
230		229	pit	0	smithing hearth bottom	2130	145	130	90	possibly furnace bottom
232	201	231	pit	0	fired clay	80				
232	201	231	pit	0	hammerscale - flake	1				
232	201	231	pit	0	ore?	38				two frags. - magnetic
234	209	233	pit	0	fired clay	0				with hammerscale inclusions
254	209	255	furn.	0	fired clay	146				includes flake and occ. spheres
254	209	255	furn.	0	hammerscale	0				very little flake hammerscale
254	209	255	furn.	0	sand, fired clay	336				
254	209	255	furn.	0	undiagnostic	58				
256	207	257	furn.	0	ferruginous concretion	92				
256	207	257	furn.	0	fired clay	620				
256	207	257	furn.	0	non-iron slag	44				yellow-green in colour
256	207	257	furn.	0	undiagnostic	1270				
256	207	257	furn.	0	micro-slags and hammerscale	410				mostly flake and lots runs
256	207	257	furn.	0	vitrified hearth lining	20				
258		252	ditch	1961	undiagnostic	1140				smelting?
259	202	260	furn.	0	cinder	4				
259	202	260	furn.	0	hammerscale	1				occ. flake & one large sphere
259	202	260	furn.	0	iron rich slag	50				
259	202	260	furn.	0	mixed fired clay etc.	792				
259	202	260	furn.	0	undiagnostic	1080				

con.	<>	in	ident	s-gp	interpretation	wt.	len.	br.	dep.	comment
259	202	260	furn.	0	undiagnostic	149				runs
259	202	260	furn.	0	vitrified hearth lining	768				
261	203	262	furn.	0	dense	68				
261	203	262	furn.	0	fired clay	18				
261	203	262	furn.	0	hammerscale	0				occ. flake
261	203	262	furn.	0	sand and fired clay	550				
261	203	262	furn.	0	smithing hearth bottom	336	120	70	40	
261	203	262	furn.	0	tap slag	4614				
261	203	262	furn.	0	undiagnostic	3474				
261	203	262	furn.	0	undiagnostic	174				runs
261	203	262	furn.	0	vitrified hearth lining	116				
271		272	post hole		furnace slag	1057				
271		272	post hole		undiagnostic	385				
275		276	ditch	1023	furnace slag	3750	180	150	90	furnace bottom
275		276	ditch	1023	furnace slag	654				
275		276	ditch	1023	undiagnostic	552				
277	261	276	ditch	1023	undiagnostic	112				possibly smelting
277		276	ditch	1023	vitrified hearth lining	210				
279	204	260	furn.	0	micro-slags	364				flake, some tiny spheres, sand etc.
279	204	260	furn.	0	undiagnostic	386				possibly smelting
280	205	262	furn.	0	micro-slags and hammerscale	390				flake-not much, sand, fired clay, charcoal
280	205	262	furn.	0	undiagnostic	723				runny
285		282	ditch	0	vitrified hearth lining	18				
302				0	smithing hearth bottom	302	85	65	35	
302				0	undiagnostic	712				
505	208	506	ditch	1022	fired clay	340				
505	208	506	ditch	1022	micro-slags	62				spheres and occ. flake
505	208	506	ditch	1022	run slag	124				
505	208	506	ditch	1022	smithing hearth bottom	208	80	55	50	
505	208	506	ditch	1022	undiagnostic	900				
505		506	ditch	1022	furnace lining	287				
505		506	ditch	1022	undiagnostic	539				
511		512	ditch	1022	furnace lining	158				35mm thick
511		512	ditch	1022	undiagnostic	84				
514		509	ditch	1023	fired clay	51				
516	210	255	furn..	0	micro-slags & hammerscale	389				flake and one sphere
516	210	255	furn.	0	undiagnostic	408				runny frags.
517	211	255	furn.	0	undiagnostic	368				flake hammerscale on slag and some tiny spheres

con.	<>	in	ident	s-gp	interpretation	wt.	len.	br.	dep.	comment
517	211	255	furn.	0	undiagnostic	1230				
517	211	255	furn.	0	vitrified hearth lining	90				
518	219	255	furn.	0	crushed run slag & clay	183				
518	219	255	furn.	0	fired clay	1948				
518	219	255	furn.	0	micro slags & hammerscale	325				broken runs; two flakes; one sphere;
518	219	255	furn.	0	sample	1657				fired clay, run slag, undiagnostic
518	219	255	furn.	0	tap slag	148				
518	219	255	furn.	0	undiagnostic	418				
713		714	ditch	1020	furnace slag	59				
713		714	ditch	1020	undiagnostic	334				
725		726	ditch	1020	furnace slag	563				
725		726	ditch	1020	tap slag	449				
725		726	ditch	1020	undiagnostic	331				
727	217	726	ditch	1022	micro slags	8				
727	217	726	ditch	1022	undiagnostic	27				
729	216	730	pit	1971	micro-slags	18				micro slags and one flake hammerscale
729	216	730	pit	1971	undiagnostic	16				
735	215	737	pit	0	undiagnostic	1				run
735	215	737	pit	0	furnace slag	413				
748		747	ditch	1020	run slag	101				
748		747	ditch	1020	undiagnostic	1035				
768		767	ditch	1022	cinder	16				
768		767	ditch	1022	fired clay	70				
768		767	ditch	1022	furnace slag	660				with runs on surface
768		767	ditch	1022	furnace slag	263				
768		767	ditch	1022	run slag	791				
768		767	ditch	1022	smithing hearth bottom	382	100	80	35	
768		767	ditch	1022	undiagnostic	1606				large lumps - smelting?
768		767	ditch	1022	undiagnostic	146				silica-like slag
768		767	ditch	1022	undiagnostic	1752				
768		767	ditch	1022	vitrified hearth lining	205				
776	220	255	furn.	1022	undiagnostic	90				runs
783		784	ditch	1022	furnace slag	1402				large lump
783		784	ditch	1022	iron lump	20				
783		784	ditch	1022	tap slag	1199				
783		784	ditch	1022	undiagnostic	1989				smelting?
783		784	ditch	1022	vitrified hearth lining	225				
792		790	ditch	1028	furnace slag	1311	145	135	55	furnace bottom
801		793	ditch	1022	runs	70				
801		793	ditch	1022	smithing hearth bottom	112	50	50	30	

con.	<>	in	ident	s-gp	interpretation	wt.	len.	br.	dep.	comment
801		793	ditch	1022	undiagnostic	294				
801		793	ditch	1022	vitrified hearth lining	694				includes fired clay
894		896	ditch	1020	undiagnostic	140				
929		928	ditch	1026	furnace slag	1324				
943	242	942	ditch	1021	undiagnostic	1				
968		966	ditch	1020	undiagnostic	122				
968		966	ditch	1020	vitrified hearth lining	200				
969		966	ditch	1020	undiagnostic	140				smelting?
1008		1010	ditch	1020	smithing hearth bottom	1124	150	100	55	
1019		1018	ditch	1020	undiagnostic	702				smithing slag?
1063		1061	ditch	0	cinder	16				
1063		1061	ditch	0	undiagnostic	134				
1065		1064	ditch	0	undiagnostic	53				
1080		1079	ditch	1957	slag block	4000	160	160	120	
1193	267	1192	pit	0	undiagnostic	9				
1345	276	1344	crem. pit	0	tap slag	106				
1345	276	1344	crem. pit	0	undiagnostic	8				
1406		1405	ditch	1908	undiagnostic	94				runny fragments
1458		1621	ditch	1020	tap slag	50				
1458		1621	ditch	1020	undiagnostic	362				poss. smelting slag
1459		1460	pit	0	furnace slag	420				
1469		1470	ditch	1020	undiagnostic	252				
1481		1482	ditch	1935	undiagnostic	16				
1500		499	pit	0	run slag	894				
1507		1508	post hole	0	tap slag	146				
1507		1508	post hole	0	undiagnostic	594				possibly furnace slag fragments
1512		1513	pit	0	furnace slag	414				
1512		1513	pit	0	furnace slag	4033				one fragment
1512		1513	pit	0	tap slag	92				
1512		1513	pit	0	undiagnostic	320				
1516		1517	pit	0	tap slag	224				
1516		1517	pit	0	undiagnostic	18				
1516		1517	pit	0	vitrified hearth lining	1				
1524		1525	post hole	0	undiagnostic	2				
1529		1528	pit	0	undiagnostic	46				
2233		2235	ditch	2150	undiagnostic	8				
2241		2246	ditch	2150	undiagnostic	16				
					total wt. = 75,888g					

5 THE WORKED STONE

by Ruth Shaffrey

5.1 Introduction

Eight pieces of worked stone were recovered during the excavations at Beechbrook Wood. This includes one rotary quern fragment, one complete ironstone saddle quern and two fragments. There were also two probable rubbers, the upper stones associated with saddle querns and two probable pestles.

The following table gives a summary of worked stone artefacts identification and provenance.

Table 4: Quantification of worked stone small finds

Event code	SF Number	Context	Feature Number	Px Interpretation	Phase	Object Identification	Material
ARCBBW00	0	1034	0	Finds reference number	Unphased	Rotary quern	Stone
ARCBBW00	0	1377	1374	Pit	Early Bronze Age	Hammerstone /rubber	Stone
ARCBBW00	232	1671	0	Finds reference number	Unphased	Whetstone	Stone
ARCBBW00	244	1909	1910	Pit	Early Neolithic	Saddle quern	Stone
ARCBBW00	231	1669	1666	Tree-throw	Unphased	Building stone	Stone
ARCBBW00	0	1200	1220	Pit	Late Bronze Age	Quern	Stone
ARCBBW00	225	230	229	Posthole	Late Bronze Age	Processor	Stone
ARCBBW00	401	446	444	Pit	Late Bronze Age	Processor	Stone

5.2 Method

All the stone was examined with the aid of a x10 magnification hand lens. The following fields were then recorded: dimensions, weight, lithology and description. All the finds have been entered into the CTRL Small Finds database.

5.3 Context and date

The majority of the worked stone was found in contexts of Bronze Age date. The exceptions to this were a saddle quern found at the base of an early Neolithic pit (1910), a fragment of rotary quern (Cxt 1034), which cannot be earlier than early Roman in date, although it was from an unphased deposit, and an unphased whetstone (SF 232) which is also likely to be Roman in date. The complete saddle quern (SF 244) is of particular interest since it was found at the very base of a pit, and although it was well used, it was complete and remained in useable condition. The condition of the object and its position inside the pit suggest it formed part of a placed deposit. The deliberate deposition of querns, particularly in pits, is increasingly being observed in subsequent periods of archaeology (Shaffrey 2003a, 164). This provides an excellent early example of which there are very few, although it can be compared to Pamphill in Dorset where a similar saddle quern was found placed in the base of a pit (Addison 1989, 19). Finds like these demonstrate that the ritual importance of querns for their contribution to food was apparent from their very first use.

Also amongst the worked stone were two processors (SF 225 and 401) and a saddle quern fragment (Cxt 1200), all found in late Bronze Age pits (229; 444; 1220), while another probable pestle or small hammerstone was found in an Early Bronze Age pit (1374). A well used polisher was unphased as it was a surface find (Cxt 1671).

5.4 Discussion

The worked stone comprises a number of typical domestic tools of the sort expected from occupational sites including saddle querns, rubbers and processors. All the worked stone shows signs of having been simple in manufacture and extensively used. The complete saddle quern (SF 244) is a good example of an early quern, being crudely made from a boulder. It is extremely thick and heavy but has been very well used; the grinding surface has been worn very smooth and shows signs of polish towards the edges. Of the two processors found, SF 225 was certainly multifunctional having been used as both a pestle and a hammerstone while SF 401 was more simply used as rubber.

A variety of lithologies were present including lava, Greensand and ferruginous, limonite cemented sandstone. The ferruginous sandstone and Greensand are probably both local originating in the Weald Clay and the Cretaceous beds respectively. The lava was imported from the Niedermendig region of Germany. Most of the stone was fairly weathered, in particular the lava, which demonstrates the heavy friability typical to lava found in Kent. Lava was a common quern material on Romano-British sites in Kent (Shaffrey in prep) while the use of heavily ferruginous sandstones for saddle querns, was not common although it was used for saddle querns at Gravesend in a Bronze Age context (Roe 1994, 399) and at Hayes Common, Hayes (Philp 1973, 51). It has also been found in Bronze Age contexts at Heathrow (Shaffrey 2003b) and at Angmering in West Sussex (Shaffrey 2002).

The worked stone assemblage from Beechbrook Wood is small but includes some interesting objects, in particular the multifunctional processor and the deliberately placed saddle quern. With the exception of the Roman lava quern, the stone was collected from local sources.

5.5 Catalogue of worked stone

The number (Y-) visible at the end of each catalogue entry refers to the unique record ID which can be found in the database.

SF - Upper rotary quern fragment. Very weathered but probably of Roder type 4 (rimmed).Cxt 1034. Y-53.

SF - Probable quern fragment. One smooth worked flat surface but no edges or centre remain. Hard quartzitic well cemented stone. Cxt 1200. Y-50.

SF - Hammerstone/rubber. Small elongate rounded pebble with use wear damage at both ends. Red quartzite pebble. Cxt 1377. Y-54.

SF 225 - Multifunctional processor. Well used hand sized shaped stone used as a pestle and hammerstone. Poorly sorted fine to coarse grained pink sandstone. Dim. 101 x 74 mm. Thick 47 mm. Cxt 230. Y-51.

SF 231 - Building stone. Large roughly rectangular chunk of greensand probably utilised for building but not particularly well shaped and not finished. Cxt 1669. Y-57

SF 232 - Large freeform whetstone. Dim 112 x 80 mm. Thick. 52 mm. Cxt 1671. Y-55.

SF 244 - Crudely shaped and very thick saddle quern probably formed from a small boulder Dim. 240 x 140 mm. Thick. 110 mm Cxt 1909. Y-56.

SF 401 - Processor. Small rounded item with two smoothed slightly rounded faces caused by rubbing. Item probably used as a small processor/ hand rubber. Pale cream quartzitic and slightly glauconitic Greensand. Cxt 446. Y-52.

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