

IRON AGE AND ROMAN QUERN MANUFACTURE IN THE MIDDLE DERWENT VALLEY, DERBYSHIRE

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SUMMARY

Excavation at Blackbrook and further extensive fieldwork by the authors in the Ambergate area has revealed evidence for a quern making industry within the middle Derwent valley during the late Iron Age and Roman periods. The sites are scattered along the ridges of Ashover grit flanking the valley sides, now mostly overgrown with woodland and scrub. The evidence of quarrying and quern production in this area has not been previously dated or the quern types categorised.

INTRODUCTION

The survey began at Longwalls Lane, Blackbrook (SK332483) where a cache of querns retrieved by Mr Clarke from stone walls on his land prompted an excavation by the writers. A probable worker's settlement was revealed with remains of rough stone buildings to the east and west of the lane, and further querns re-used in the Roman floors and walls. The pottery was dated from late 1st to mid 3rd century AD (Palfreyman and Ebbins 2007; 2011).

Questions arose as to whether Blackbrook was a collection centre for other production sites scattered to the north. Was it a finishing/dressing centre? Or a conveyancing hub to send them down the Derwent valley to the *Derventio* market, and on to the Trent valley? A search for more evidence was undertaken.

THE SURVEY (2007-13)

As at Blackbrook, many querns in the wider survey were found built into the stone walls of field boundaries where earlier quarries were a useful source for coping stones (Fig. 1). Perhaps this occurred during the Tudor period, when some fields were first divided for use as pasture, or in the 18th century after the passing of the Enclosure Acts. Many querns had been deliberately broken to fit and others were broken during manufacture in the Roman period. Inspection of the weathering on the break and its sharpness usually identifies which was the case. Some lay abandoned in the undergrowth near to quarries, which were searched for any still *in situ*.

All the querns were measured and recorded with any diagnostic and interesting characteristics being noted. The better-preserved and more accessible examples were photographed. Querns that were recorded in the field walls were not removed, ensuring that the stability of the wall was not compromised. Those in the quarries were left *in situ* to preserve the historical integrity of the site.

All the sites were on areas of Ashover grit in the Millstone grit series (Fig. 2; British Geological Survey maps 1:50 scale, Derby: England and Wales Sheet 125 and Chesterfield: Sheet 112).

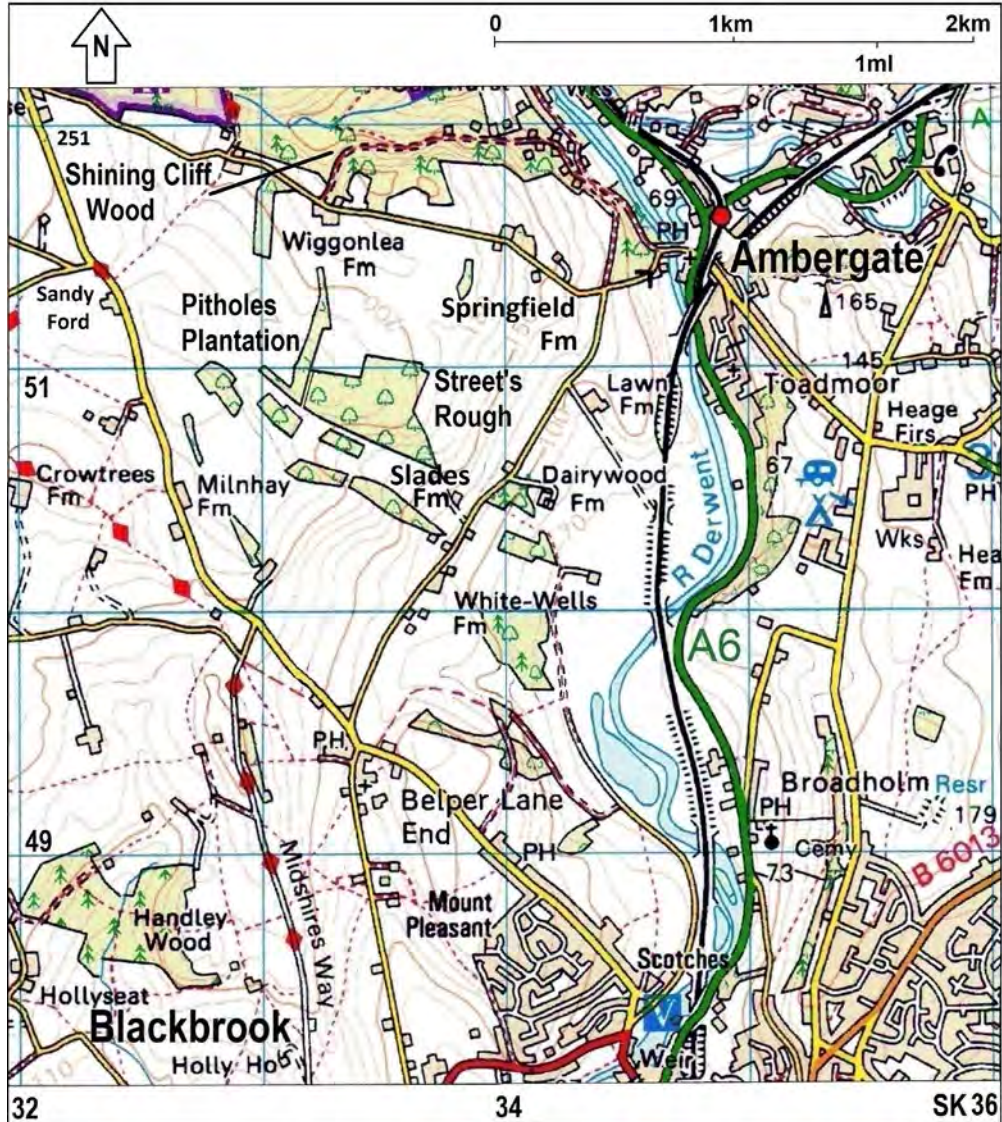


Fig. 1: Map showing the most concentrated area of the survey. Adapted from OS map sheet 119, scale 1:50,000. Cassini Publishing Ltd. 2014.

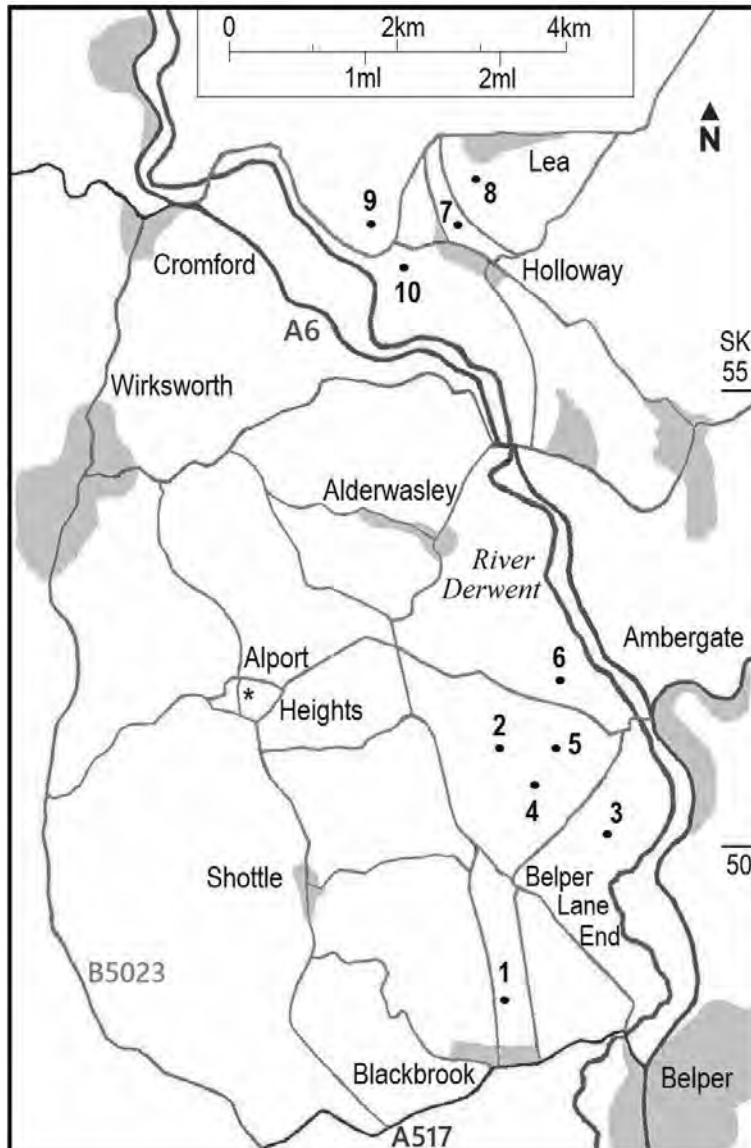


Fig. 2: Quern and quarry sites on the Ashover Grit, showing some of the old inter-connecting lanes.

Blackbrook-Shottle (2007-8, Site 1)

33 querns at Starbuck House and two at Holly House opposite were reported in 2007. A further five querns were found re-used in walls and floors of the stone buildings in four trenches during the Blackbrook excavation. Another was too late to be included in the 2011 report and was found in Test pit 10, after Mr Clarke had dug into the grass verge to repair a drain on the west side of Longwalls Lane. It is worth describing here as it suggests more than one phase to those buildings:

A coarse, slabbed floor/yard was exposed, with a quern rough-out embedded in it, top face up and roughly pecked. It was removed for drawing and to prevent damage. The sides were neatly finished to produce a blank of 355mm diameter and 100mm height. Two cracks along the rim followed bedding planes in the stone, probably the reason it was never finished. About half of the underside was worn smooth but in the central part was a 20mm deep hollow, within which was a square recess of 80 by 75mm, within another dished hollow of 220mm diameter and *c.* 15mm deep. On the edge next to the square hole was an 80mm wide worn area, fanning out slightly at the edge. The writers interpreted this as a discarded quern having been used as a base for a square doorpost, secured in the mortice-hole. The smooth area was made by through traffic and the wear on the edge by the door itself. When removed from this position, the quern was then turned over to serve as a flagstone in a yard or floor which received little wear.

Further fieldwork around the Belper Lane End area identified six quern roughouts, including two beehives, at the top of Longwalls Lane, Narrow Lane and at Gorses Farm, but no pits/quarries were seen. At Holly Seat Farm, Shottle, one disc quern was noted in a wall to the north of a small quarry pit. This was searched but no querns were found. The stone in the quarry was a soft, yellowish sandstone, different to the usual main bed Ashover Grit and clearly unsuitable for quern-making. It was probably part of the subsidiary beds.

The total for this area is 48, but more may remain buried at Longwalls Lane.

Belper-Alderwasley-Ambergate (2008-13, Sites 2-6)

It was decided to concentrate our main survey on this area, although the scope for field-walking was much wider. The following four farms form a close-knit undulating area of pasture fields on the Ashover Grit with intermittent relict patches of woodland. We liaised with metal-detectorist David Beard, who already had access to and was working on this land.

As would be expected on manufacturing sites, the number of querns actually completed ready for use (and in some cases used) are a small percentage of the total (Table I). The majority are either finished roughouts which are ready for the insertion of hopper and spindle holes and a final dressing, or they are partial roughouts, which have not even reached that stage and appear to have been abandoned during the chiselling or pecking processes. Two were even still attached to their host slab of the natural rock (Plate 1).

Wiggonlea Farm, Alderwasley (Site 2, SK332517)

This is a significant site of Roman quern making. The field boundaries are a mix of Medieval/Tudor and Enclosure walls. Querns are widespread in them but are particularly concentrated in and around Pitholes Plantation which is *c.* 550m by 50m and on a slope. Small pits and larger quarries, dug down from the surface, show intense activity here. The authors examined fifteen pits/quarries, from 5-25m diameter and 2-5m deep, all with much build-up in the bottom. Spoil was heaped around the peripheries or placed in the centre. Several querns were found still lying within them. Some pits interconnect where successive quarrying has taken place. An attempt to complete a ground survey had to be aborted due to the dangerous conditions underfoot and difficulties with vegetation, even in winter.

Since then, as the area falls in the buffer zone of the Derwent Valley World Heritage site, LiDAR surveys have partly dealt with this problem. Downloads available via the Derbyshire County Council website, and the Heritage Gateway, show at least 25 earthworks in Pitholes Plantation and possibly another twenty in Street's Rough (Fig. 3). Pitholes wood had been

TYPE	FINISHED QUERN	FINISHED ROUGHOUT	UNFINISHED ROUGHOUT	NO. of QUERNS IN EACH SIZE GROUPING		COMMENTS
				DIAMETER (mm)	HEIGHT (mm)	
Roman Disc quern	10 Top Stone 10 Bottom stone	49 Top stone 28 Bottom stone 60 Undiagnostic	29 Top stone 7 Bottom stone 56 Undiagnostic	330-345: 22 350-370: 77 375-405: 107 410-470: 32	60-85: 38 90-115: 165 120-150: 46 (measured at outer edge)	Concave surface: 28 Convex surface: 15 Concave & convex: 14
Beehive quern	4 Top 2 Bottom	23 Top 3 Bottom	5 Top 2 Bottom	250-300: 18 310-330: 12 340-350: 6	Top-stones Bottom-stones 195-250: 24 280-320: 3 130-150: 2 170-190: 5	
Bun quern		9 Top	1 Top	280-300: 6 320-350: 2	130-150: 3 155-200: 7	
Medieval-Tudor		7 Undiagnostic		400-470: 7	125-160: 7	
Post-Medieval		5 Undiagnostic		330-340: 5	130-140: 3 190-200: 2	
Probable IA saddle quern	1 bottom			Estimated length: 455 (400 remaining, one end cut off) Width at widest: 350, oval in shape		

Table 1

mentioned before but neither the pits nor querns had ever been dated or categorised (e.g. Wiltshire, Woore *et al.* 2005, 113-115). Our search produced 104 querns from this farm (Plates 2-5).



Plate 1: Quern, Q.270, still attached to natural rock.

Whitewells Farm, Belper (Site 3, SK338501)

The old Whitewells Lane gets its name from the springs which emerge on the top of the valley side, essential for settlement; OE *whit*, 'white or clear' and *wella*, *wiella*, or *waella*, 'a natural spring', are fairly common. Whitwell in Derbyshire is recorded as 'Hwitewylle' in AD 1002 (Mills 1991, 357, 384; Cameron 2001, 169).

Adjacent to Pitholes Plantation is Street's Rough, another larger wood bounded on the southern edge by an old green lane which runs downslope from a little way west of Pitholes wood down to Whitewells Lane. An excavation across this 7.5m wide lane was carried out in 2007 by Anton Shone and members of the Wirksworth Roman Project who were seeking a Derby-Wirksworth road. At the higher north end a road repair had been carried out halfway across, reducing it to a single carriageway, showing wheel ruts. It comprised soil mixed with ungraded and unpacked gritstone. They concluded that this was a result of Parliamentary measures to improve the road systems between 1690 and 1759 in this area. No dating evidence or vestiges of a multi-layered Roman road were found but it does indicate an established route here before the 18th century.

Street's Rough contains many smaller pits but lacks the concentration of larger ones. Five

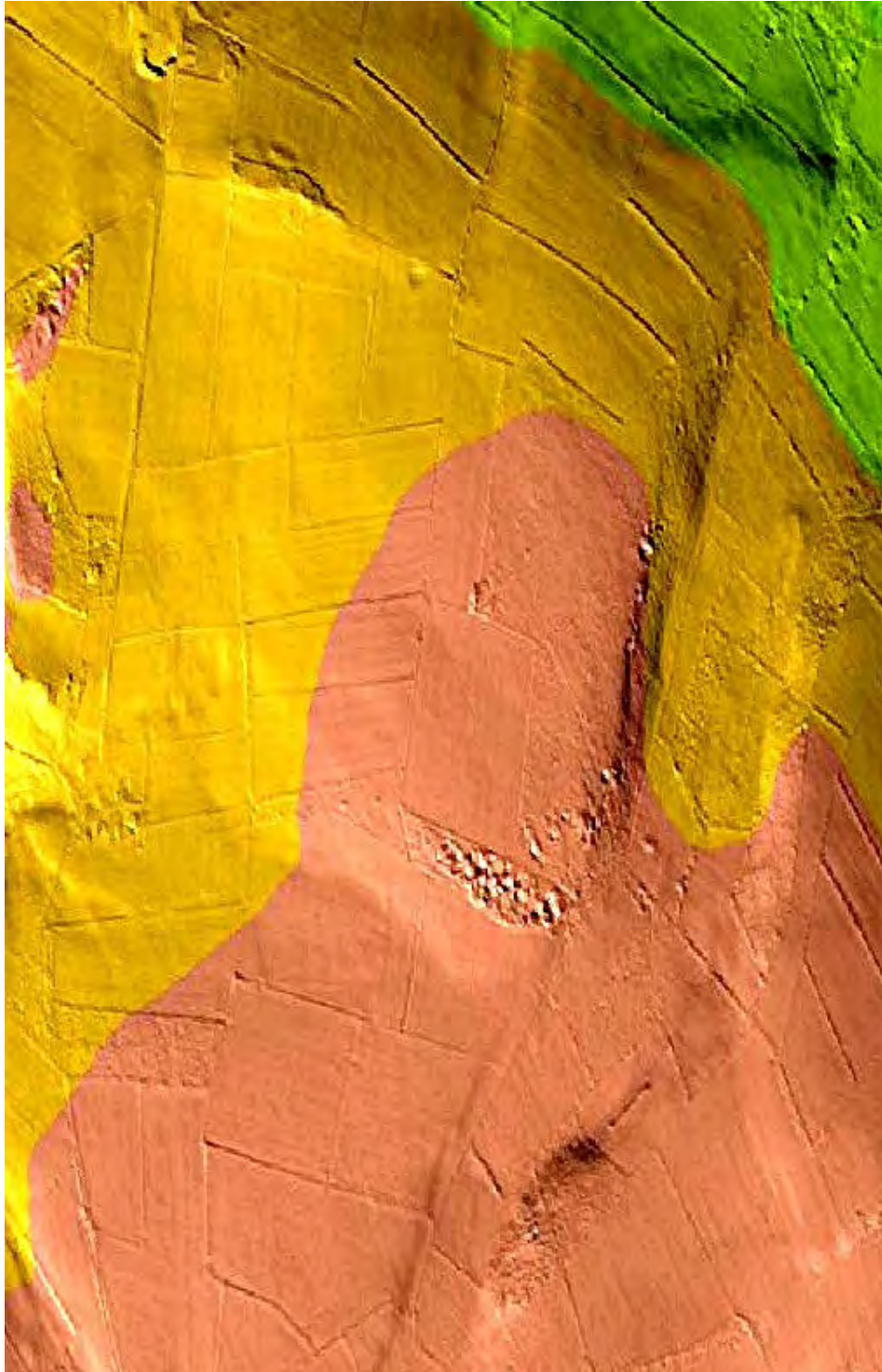


Fig. 3: LiDAR map showing pits in Pitholes Plantation and Street's Rough.



Plate 2: Quern, Q.143 with 'dishing' furrows, unfinished.



Plate 3: Quern, Q.149. Underside of neatly-pecked top-stone, unfinished.



Plate 4: Quern, Q.199. 'Bun' rough-out *in situ* in pit.



Plate 5: Quern, Q,165. Bun or 'hemispherical' shape with hopper part-worked.

querns were recorded from the wood itself but another fifteen were in the south and west walls which probably derived from the pits. In all 47 querns were recorded on this farm, some away from the quarries but close to the slades (see below).

Slade Farm, Belper (Site 4, SK338504)

The farmhouse is situated where the green lane meets Whitewells Lane, hence the name. On the 19th century OS maps, a series of long narrow woods including the 'Upper and Lower Slades' and 'Gun Covert' run parallel to this green lane. These may both have been used to convey the querns and other stones away over the centuries. Nineteen querns were recorded here, on either side of the green lane, from Street's Rough down the slope to the farmyard. The original OE meaning of *slaed* was 'valley', much used in charter boundaries for flat-bottomed dry valleys as well as wetter ones. They are generally off the main river valley and can be kept as 'greensward' where crop-growing is impossible, apt for this area (Gelling and Cole 2014, 141-2).

Springfield Farm, Ambergate (Site 5, SK342513)

This land is to the north-east of Street's Rough and is an important site. The small copse at the top of the hill was checked and one beehive quern found, the rest being mainly incorporated in the field walls. High concentrations were noted particularly bordering two fields, which had a stream running south-westwards along the wall.

Metal detectorist David Beard had found Roman brooches on this farm and allowed SE to study and catalogue them (Appendix I, Figs 4 and 5). This additional Roman evidence raises interesting questions which are discussed below. Altogether 125 querns were recorded here (Plates 6-9).

Shining Cliff woods, Ambergate (Site 6, SK333518)

The woods cover a very large area, much of it inaccessible. The writers were aware that some very useful work was being carried out here by R. Carr and P. Smith, who discovered earthwork platforms associated with stone quarrying, terraced working areas, pits, delves and possible trackways (H.E.R. 16137 and 16138, SK334532). As there is no definite dating on these, perhaps due to a lack of associated finds, it was decided to do a small-scale examination to see if any Roman evidence existed.

Along the footpath from Holly Lane into the wood were ten querns built into or fallen from the west wall. Presumably they were fetched from the wood. All of these we considered to be Roman, some more finished than others but six could be identified as top and bottom stones and other features such as grooving, beginnings of hopper and spindle holes and general shape and size were recognisable.

Continuing along this footpath *c.* 500m on the right, a shallow hollow *c.* 7m long was noticed in the vegetation, which on closer inspection concealed six more querns, five containing pebbles up to 18mm in size, perhaps the reason for their unfinished state. Our total here is sixteen, but there is scope for further work.

The proximity of Shining Cliff woods to the Roman activity across these farms and the unfinished querns seen by the writers, could suggest the same period for a few of Carr and Smith's earthworks, although others are probably later. The data in Table 1 includes Sites 2-6.



Plate 6: Quern, Q.11. Bottom stone with spindle hole. View east towards River Derwent.



Plate 7: Querns, H.11 and 12, finished, grooved and fluted.



Plate 8: Quern, Q.73, hopper with rim, grooved and used.



Plate 9: Querns, Q.16 and 35. Beehive top-stone rough-outs, one partly worked.

Possible sites further north (2007-8, Sites 7-10)

At Holt Hill, Holloway (Fig. 2, Site 7), natural crags of Ashover grit form the steep flanks and ridge, where quarrying is evident. A rubble-strewn terrace runs along the crest and on two protruding blocks of stone are horizontal lines of chiselled out wedge-holes preparatory to splitting it into slabs. This is unlikely to be Roman but by the footpath from Holt Lane were a large complete roughout 550mm x 130mm, which could have been a Roman military or later stone, and half of an unfinished pre-Roman, bun-shaped top-stone; 320mm grinding surface diameter and 110mm high. It is likely, therefore, that stone was also extracted here in the Roman period, but it is difficult terrain to search. This path meets Long Lane on top of the ridge, which has a packhorse route running parallel to it. Long Lane was probably a prehistoric 'Ridgeway'.

At nearby Lea Gardens (Site 8), a known quarrying area, five rough-outs were noted, some only partly worked. Two were Roman sizes, one was 460mm diameter, one was buried in soil so not accessible and one at 500mm, was possibly later.

Two other sites were shown to us by Richard Carr at Bow woods, Cromford (Site 9) where we recorded nine querns, five being possibly Roman but three were a standard 450mm x 150mm size, rather large for Roman domestic use. They could be medieval stones or have been requested for specific use by the Roman army. Another was re-used in one of the 17th-18th century 'white coal' kilns which exist in these woods. This one was probably nearer in date to the kilns rather than Roman.

The other site was Lea Woods near the Cromford canal (Site 10), where five were recorded, four being 350-400mm diameter and *c.* 70-110mm in depth, so within Roman dimensions. One at 450mm had a visible fault in the rock and was not far into the roughout stage when discarded.

Both woods are not fully accessible, so this was not a comprehensive search and ground survey is the only method of dating any Roman querns present. Again, more may be buried in the undergrowth. Nevertheless, this does demonstrate the potential for more quern-making centres in the Derwent Valley.

DISCUSSION

The Blackbrook quern group was compared with others on Derbyshire sites (Palfreyman and Ebbins 2007, 39-40) and, although variations were present, there was a general conformity to Curwen's original criteria (1937; 1941). Querns in the Ambergate area appear to be much the same, including the fact that the Roman ones are generally thicker than Curwen's examples, a feature also noted at Blackbrook. Although Curwen's work is still relevant, Peacock began the process of updating quern classification using the larger amount of information now available (2013, 58-65).

Details from the querns

Querns from these middle Derwent Valley sites include the 'beehive' type of the late Iron Age to early Roman period, and the 'bun' type, a more squat or rounded version. In Heslop's study of North Yorkshire and South Durham querns, beehives are grouped into 'hemispherical' and 'upright', the latter including some shorter forms (2008, figs 16 and 18). These short forms, still having a conical shape, are a better match for most of the bun shapes here, although

there is the odd exception which could be called 'hemispherical' (Plate 5). It is difficult to tell if these were a transitional type between the taller Iron Age and disc-shaped Roman types or if they were contemporary with the taller querns, this being a cultural rather than a chronological difference. The main Roman period 'disc' types are mostly Curwen's type 2a, as at Blackbrook (1937). There are no fully-perforated spindle holes, nor fully-collared hopper holes, to indicate a late Roman date. There are, however, six with slight rims or lips around the eye, suggesting the start of a trend maybe in the early 3rd century. The flat and thin, wider forms of the 4th century do not appear in this study. Larger forms of 430mm diameter or more and over 120mm height were likely to be medieval to 16th century, unless they were being made especially for military use.

A check was made to see if Roman lower stones were thicker than the uppers. All the identifiable upper and lower stones were found to fit within a height range of 70-150mm, and in both groups most were 75-120mm thick, therefore no difference was evident. It is likely that the type of local stone used dictated regional variations.

The grooved grinding surfaces and/or vertical fluting down the outer edge, seen at Blackbrook, appear on 21 of the querns described here and evidence of wear denoting use occurs on ten (Palfreyman and Ebbins 2007, 38-39).

There were 33 examples with hopper or spindle holes worked or started. A few of the part-worked roughouts had fluting, grooving or hopper holes started, even though the basic shaping was not finished, as if the fully-finished quern was being made in one stage. Maybe they were experimental pieces.

No standardised method of manufacture was seen here apart from the overall regularity of sizes. The work seemed to have been by many different hands. Occasionally we found a few of the same size and shape which might have been made by the same person or small group and had not been moved far from their work-place. Finished roughouts were convex/concave upper stones and convex/flat lowers, although the latter could be adapted to an upper if needed. Some were flat on both sides, presumably for the consumer to adapt for use as either stone.

What the tool-marks tell us

Some indication of manufacturing techniques can be gleaned from the roughouts. On twelve of the querns which did not make the finished roughout stage, there are radiating furrows made into the stone, very different from the sharp grooving on finished grinding surfaces, and clearly made with a cruder pick, chisel or point (Plate 2). They become deeper between the rim and centre and seem to have been used in shaping the slightly concave grinding surface required on an upper stone, as well as to centre it. Afterwards, this 'marking out' of grooves and ridges would have been pecked away and smoothed off with a finer pointed pick and onto this grinding surface either a finer 'arc' or 'radial' grooving would have been carved, if required.

Tool marks were noted on 41 of the querns, other than the final pecking. Apart from hammers and wedges for extracting the rock, adzes, chisels and picks of various sizes would have been needed (Manning 1976, 25-6, figs 15 and 16; McWhirr 1988, 24, fig. 4). A heavy hammer would have been used first to flake off extraneous rock from the slab, leaving scars which still exist on some unfinished roughouts. The preferred tool in the dressing stage seems to have been a pick-hammer (Blagg 1976, 155, fig. 1B). A chisel or adze could have been used to make the vertical linear marks down some of the outer edges, followed by some

finer pecking to smooth them to produce the fluting that appears on some finished stones. Pearson discusses further stonemasons' tools and their specific uses (2006, 53-56, fig. 20) and a smithing workshop would have been needed somewhere on site to constantly sharpen the iron tools and produce new ones.

Brooch-making on site?

In 1978 a trumpet brooch (AD 75-175) was found off Holly Lane nearby (H.E.R. 16112; SK34535154) and in 1884 a Roman brooch and pottery were uncovered in the floor of Bat House cave in Shining Cliff wood after a large rock-fall, exposing a cave 25ft. high (Page 1905, 236-7, fig. 40; H.E.R. 16105; SK334523). The trumpet-derivative brooch had the same discus-shaped decoration as No. 10 described here (Appendix 1). The occupation at Bat House cave was dated 2nd to 3rd century. Brooch-making in the north Derbyshire caves is not unknown. Branigan and Bailey have reported this at Poole's Cavern, Buxton, with associated evidence of lead formers and metalworking debris, mainly in the 2nd-early 3rd centuries (1989, 46 and 49). Thirst or Thirse House, Deepdale had 7 brooches and coins from the late 1st to 3rd century (Page 1905, 233-5, fig. 35). Hart also noted cave occupation during the 2nd and 3rd centuries in other Derbyshire caves (1981, 105-20). These two brooches and the twelve from Springfield and Whitewells farms may be interpreted as personal losses, but the writers also see them as the products of itinerant craftsmen using the site during the 1st-3rd centuries. A lead hearth area was found by David Beard on Dairywood Farm, on the eastern side of Whitewells Lane, where folded thin lead sheet ready for recycling and galena boulders were present. Lead bowl-hearths are relatively common in this area but not just in the Roman period. Such a hearth could have been used for the leaded bronze used in Roman brooch-making although no associated bronze-working debris has yet been found.

In Shaffrey's study of Old Red sandstone querns in the Forest of Dean, she suggests that the silver/lead mining in the Mendips may have provided other industries like querns with a more extensive distribution network (2006, 8). This may have applied to lead export in Derbyshire with several routes around Wirksworth probably using the same lanes already established in the Iron Age by the quern quarries for distribution. These lanes would have been beneficial to both industries when demand increased in the later 1st-2nd centuries and would also have helped boost any brooch-making industry.

CONCLUSIONS

Production

The querns here were in all stages of completion from aborted attempts to roughed-out blanks to the finished article. Some even showed signs of use, suggesting, as at Blackbrook, an industrial workers' settlement somewhere on the site.

The rock had to be sought in open pits, there being no vertical face quarries and from the number of discarded querns, not all the Ashover grit was suitable. This appears to be the case in most of the sites mentioned above, resulting in a scatter of quarries on outcrops of the main bed deposits, laid down in the middle Carboniferous period. The Ashover grit used is a medium to coarse-grained feldspathic sandstone, sometimes with pebbles up to 20mm in size. It can vary from a pinkish-buff through grey to brown and rarely with purple flecks or spots. The siliceous cement provides the hardness and durability that the querns need.

We can only speculate on what the output was here. If it were possible to remove the deep build-up of decayed material, the mass of vegetation and dislodged head rock in the

quarries, the number of querns recorded would be larger. Some parts of field walls were also inaccessible. The small number of finished, grooved querns with hoppers and spindles, however, suggests that they had an efficient system of trade and transport, and that querns were produced on demand from roughouts.

The large number of roughouts left on site needing finishing off, suggests deliberate stockpiling. It is likely that an arrangement had evolved whereby farming communities undertook the initial stages of quern-making during seasonal lulls. Quarrying of stone and making rough-outs would have been well within their capabilities. From a composite plan of working floors at Wharncliffe quarry near Sheffield, Peacock suggested family or tribal groups or individuals working in different areas 5 to 10m apart (2013, 140, fig. 8.4). This level of activity would presumably have diminished when agricultural labour was needed on the farms.

Skilled craftsmen could then access the roughouts to finish them off as required, or possibly a merchant buying some could get them finished off and convey them to market himself for sale at a profit.

Distribution

The product is deemed to have lasted for a generation and local demand would soon have been satisfied. A wider market with access to civil and military populations with no suitable stone would have demanded this level of production and growth of the Roman road system and the *Pax Romana* provided opportunities for such trade. Increased output by sites such as these competed with imported lava querns, which eventually tailed off during the later 2nd century.

Table I shows large numbers of unfinished querns, which would have been passed to skilled ‘finishers’ here or nearby, thus reducing their size before being transported on. Whether the slades were a Roman feature or not, it is likely that the querns would have been conveyed down the valley side, probably on sledges, as far as Whitewells Lane where they could have been loaded onto ox-drawn wagons or packhorse teams for transport southwards to Little Chester and beyond; or they could have been taken on eastwards down the valley side to the River Derwent. The writers believe that navigation of the river at that time would have been difficult over long distances, but a convenient ford/bridge may well have existed where the present railway crosses the river on stable bedrock (SK347495). From there *Rykneld Street* (SK385499) was c. 2.2 miles (3.5km) further east for north/south access to wider markets and the forts of Pentrich and Chesterfield lay only 2.4 (3.8km) and 13.5 miles (21.6km) to the north.

Millstone grit querns are known to have reached most of the Midlands and East Anglia. The majority of the 79 ‘Carboniferous sandstone’ beehive querns at Hunsbury hillfort, Northamptonshire, were thought to be Millstone grit as were those at Breedon on the Hill, Leicestershire, a mid Iron Age hillfort (Ingle 1994, 27, 214). Buckley recorded three querns and three millstones of Millstone grit at Wanborough, Wiltshire (Anderson *et al.* 2001, 157). He noted also that Dix had found them in mid 1st century features and others later in the period, at Odell, Bedfordshire. Alcester, Warwickshire produced three stones ‘from the Carboniferous region of Derbyshire’ in the Northern extramural area (Booth and Evans 2001, 260). In the Southern area there were seven stones of Millstone grit and another four probably from Derbyshire (Cracknell and Mahaney (eds) 1994, 233, 246-248, figs. 112-118). Three were millstones. Most were in contexts from late 2nd-mid 3rd century and two were

4th century. Possibly supplies from the middle Derwent Valley could have reached so far but it is unlikely that a definite petrological match could be made with querns on consumer sites given the variability of the stone within the source area.

Other dating evidence

No pottery has yet been recovered at Springfield and Wiggonlea farms as they are largely pasture and no excavation has taken place. However, at Dairywood Farm and Whitewells farms on the east side of Whitewells Lane, a mix of field-walking and metal-detecting by David Beard has produced around 30 sherds of Derbyshire ware, showing occupation at least from c. AD 140. At Blackbrook one possible Iron Age sherd was present and although several could have been late 1st century AD, most were dated by Ruth Leary as early 2nd to mid 3rd century (Palfreyman and Ebbins 2011). At Springfield Farm a possible iron smithing hearth was located by DB with an iron chisel, punch, nails and other broken pieces of iron found across the farm.

The discovery of Roman brooches is a helpful dating tool for the industrial activity of the site (Appendix 1). Their dates range from the conquest period to the latest possibly 3rd century AD, most being in the 1st to early 2nd century. Six Roman coins have also been found, mostly in poor condition. There is a Flavian *as*, probably Vespasian (AD 69-79), a silver *denarius* of Nerva (AD 96-98), and an unidentified 1st century coin. SE believes this to be an *as* of Agrippa, some of which were minted under Caligula, but this has an early 'crocodile' reverse and may have been issued under Augustus (AD 27-14) or his stepson Tiberius, the size (28mm) being commensurate with that time. Such early coins are usually found on military sites. From the 2nd century is a Marcus Aurelius *sestertius* of AD 169 and two more unidentified, one possibly a mid 3rd century radiate. Quern making is thought to have begun earlier than the conquest but otherwise the evidence concurs with the dating of the brooches and coins. The industry appears to have gained added impetus with the Roman arrival and continued probably into the 3rd but not into the 4th century.

Further work

There are few published sites where the source of the stone with the quern evidence *in situ* has been found together with artefact evidence. There may have been a core of permanent settlers here enhanced by seasonal workers, but this possibility and the type of occupation will need fuller discussion if/when any structural evidence is found.

A picture is building of the exploitation of lead, pottery clays and stone in the Derwent Valley corridor within the Roman period, but the *Societas Lutudarensis* in respect of lead, controlled soon after conquest by imperial administrators, perhaps had its roots in the Iron Age with the quern industry, supported by local agricultural communities.

Quern reports have traditionally referred to the source of Millstone grit as 'the Pennines' which cover a large area from Derbyshire to Yorkshire. This study demonstrates that the quarrying area included the southern Pennine fringe, in fact beginning only 7 miles (11.2km) north of the two forts in Derby and continuing for 7.5 miles (12km) along the western side of the River Derwent.

APPENDIX I

The Brooches by S. Ebbins with drawings by A. Palfreyman.

1. Hod Hill type; of the wider head type. The head projects at 90° before dropping in a slight arc. There is a central vertical flat rib, flanked by furrows, then further raised knurling decoration down each edge, damaged on one side. Two knobs extend from the lower corners of the head. The top of the head has been rolled back to house the bar which supports the robust hinged pin. The covering is missing on the damaged side. Below the head is a horizontal rectangular panel with raised edges. This may have had some decoration, now corroded. The bow tapers to a small catch-plate. It may have had a small knobbed foot which is now missing. L 35mm

Hod Hill type brooches are known to have originated on the Continent in the late 1st century BC and came into Britain with the army at conquest. They went out of use in the 60s AD. Their distribution is normally south of the Humber-Severn line, so this example is on its northern limits. Local survivors are Dragonby (May 1996, fig.11.7 no. 77, 80-82) and *Margidunum*, East Bridgford (Todd 1969, fig. 37 no. 1). Also similar in form are brooches from Colchester (Crummy *et al.* 1983, fig. 5 no. 25) and Richborough (Bayley and Butcher 2004, fig. 53 nos 95-99).

2. Aesica type. It has distinctive 'celtic' decoration on the head. On the front are lentoid bosses in the two top corners and a vertical one in the centre. Below are two round bosses at each edge and below that two curved mouldings at the base of the head. Remains of tinning cover c. 30% of the surface. At the top is a broken backward-facing hook 7mm wide with raised borders and tinning. The head is 20mm wide narrowing to 17mm at the bottom. The flat fan-tail bow is a plain sheet which had originally a rivet in each corner, only three remain. Undoubtedly this has lost its repoussé decorated front panel, probably of similar design to the head, which would have fitted onto the back-plate. On the tinned back is a plain catch-plate and two more rivets near the narrow top which fits through a cast metal band on the head. There would probably originally have been a wing case holding a spring, the chord held by the hook.

The two-part arrangement belongs to the Rosette brooch, the forerunner of the Aesica, this appearing around the conquest period. This is shown in the Stonea brooch, with the backward hook possibly AD 40-55 according to Mackreth (1982, 314, fig. 7). One from Alcester he dated before AD 60/65, after which this early type went out of use (Cracknell and Mahaney (eds) 1994, 166, fig. 78 no. 46). The rear-hook indicates a similar date for this Ambergate brooch. Mackreth cited the Waddon Hill, Stoke Abbott example as still the earliest at c. AD 50-60 (Webster 1979, 60, fig. 25 no. 2) and it has a similar type of decoration but with the bow intact. A parallel to Waddon Hill is from Camerton (Wedlake 1958, 225, fig. 51 no. 20). One from Wanborough is visually a close match but is dated c. AD 75-100 because of the later Polden Hill spring mechanism (Anderson *et al.* 2001, 46, fig. 18 no. 45). Hull Type 37. L 45mm.

3. Colchester derivative. It is small and plain with a slightly humped head and a narrow D-shaped moulding between head and wing, which on the right is poorly-made. There is no catch-plate and just a rounded end to the tapering bow. The 21mm wings are semi-cylindrical and housed a missing spring. It has a damaged backward-facing hook on top of the head to hold the chord, both now obscured by corrosion. In the back of the spring cavity is a squarish

recess, probably where it was secured when the pin was depressed. It appears to have a piercing in the end of one wing and may have held an axis bar through the spring. These early attempts at a secure mechanism continued during the 50s and 60s AD. Mackreth's discussion for Little Chester, Derby places this in the pre-AD 75 period (Dool *et al.* 1985, 283, fig. 123 no. 2). Examples are Winterton (Stead 1976, fig. 101 no. 30) and Baginton, Warwickshire from c.AD 60 (Hobley 1973, 65 no. 2). Hattatt dated the rearward hook type to AD 40-55 (1982, 63-79). L 23mm.

4. Colchester derivative. It is difficult to interpret the arrangement on the head as it appears to have a 'flashing' attached. There is no sign of a hook but there is a spring with part of the broken pin corroded together in the open-backed wing cavity and the ends of an iron? axis bar just visible. The upper part of the damaged wings, however, seems to be standing above the head with a visible crease running horizontally along the metal. This could have been a failed attempt to fit the top part of the wings with the misshapen metal remaining. Alternatively, there was a pierced headplate to hold the chord, but the brooch looks too early for this interpretation. The plain rounded bow tapers to a broken tip and no catch-plate remains. Probably it belongs in Hattatt's fig. 30 group (1985, 73), perhaps AD 55-65. Hawkes & Hull recorded a wide range of British Colchester derivatives, this being Hull's type 94a (1947, 314-6). These were seen by Butcher and Bailey at Richborough as prototypes to the developing Colchester derivatives with the Polden Hill type mechanism, which were in circulation by AD 75 (2004, 157, fig. 127). Length 27mm from top of head.

5. Colchester derivative. It is corroded but has a raised band around the end of the 7mm wing on the complete side, the other wing having broken off. These are semi-cylindrical and the full one has a closed end with a corroded piercing to hold the bar supporting the lost spring, in the Polden manner, but no hook stub can be seen. It does not have the head-wing mouldings of the Polden type and the head is flatter than the dolphin shape. There is an unusual cupped shaping on the lower central part of the wing cavity which would apparently confine the spring to that position when tensioned. A raised rib, presumably serving as a catch-plate, runs down the underside of the bow, the tip of which is broken. Similar examples are from Alcester, dated pre-75 AD by Mackreth (Cracknell and Mahany (eds) 1994, fig. 75 nos 2, 7, 8 and fig. 76 nos 12, 13). Hull Type 94a. L 33mm.

6. Colchester derivative. A very corroded example which retains the dolphin shape with a slightly humped head and a short ridge on top, the wings being longer than those above, c. 28mm, the bow less curved and longer with a plain foot and a narrow catch-plate. The wings both have damaged ends and are left open. The spring and pin are missing. There is a peak at the top of the ridge which may be the stub of a backward hook. On the better-preserved wing there seems to have been an attempt to close it at the back, perhaps to convert it to a hinged pin. Possibly another doomed to failure. It should belong in Hattatt's fig. 30 group, which he dates AD 40-55, and not much later than nos 3-5 above (1985, 73 fig. 30). L 48mm.

7. Colchester derivative. Slightly humped head with short wings 19mm across and is in poor condition, having lost much of the surface metal. A worn pattern of at least four vertical lines of tiny punched squares can just be seen running down the middle of the bow from the top of the head. No hook is evident. There is a thin moulding between head and wings. The spring is not visible as it has fully closed wings at the back with rounded ends. The tip of an axis bar

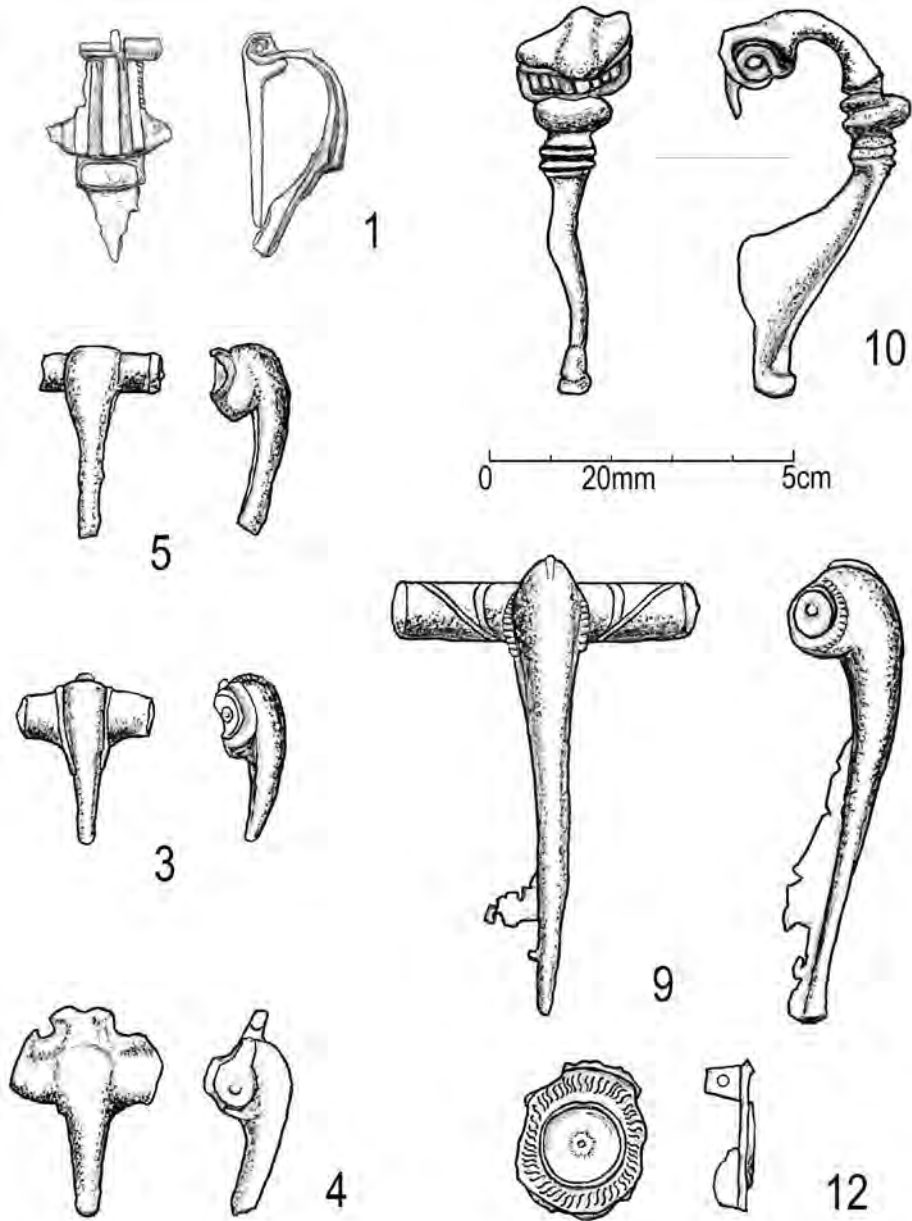


Fig. 4: Brooches 1, 3, 4, 5, 9, 10 and 12.

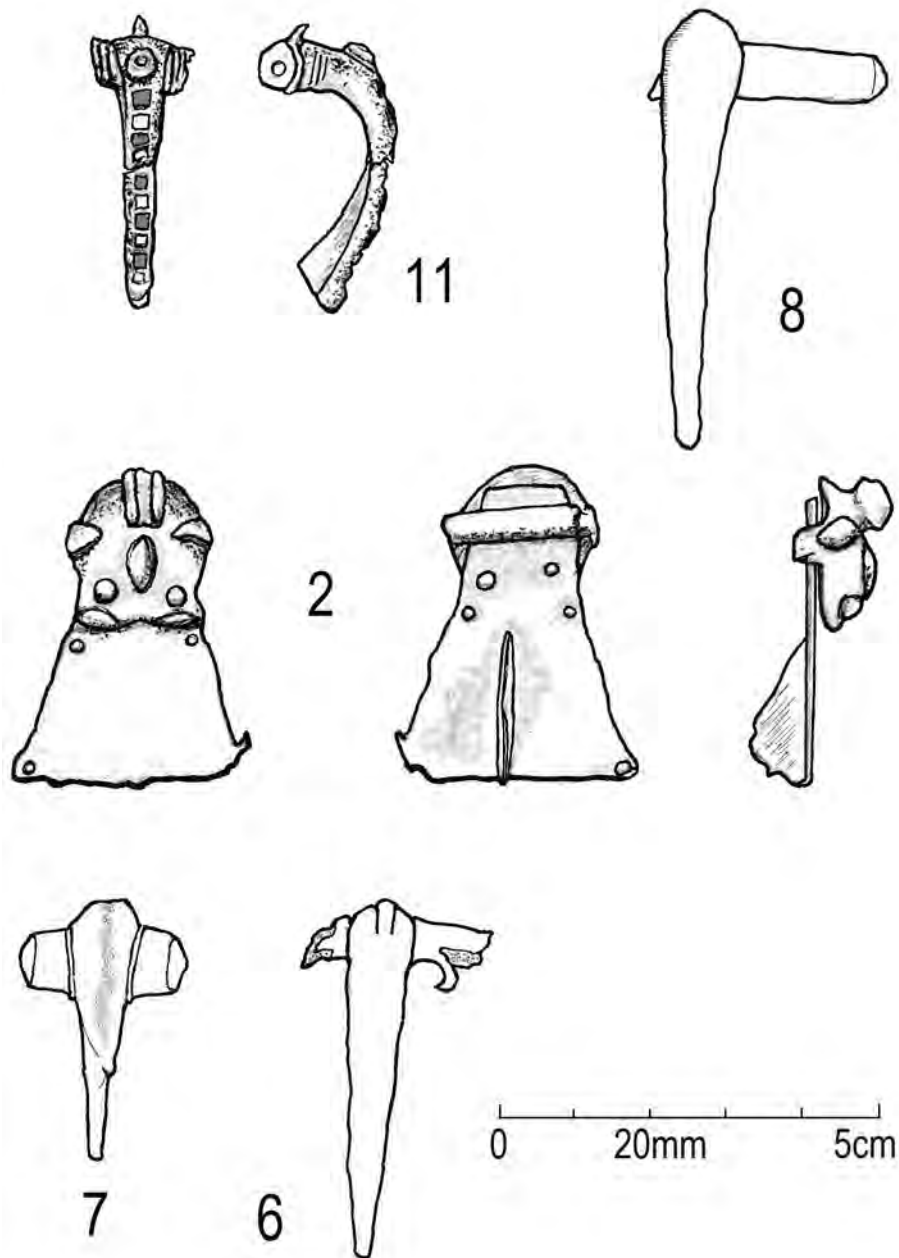


Fig. 5: Brooches 2, 6, 7, 8 and 11.

is exposed at one end. There is a bulge below the middle of the spring case, perhaps where the spring was intended to bind against the case. The lower part of the tapering bow has broken off and no catch-plate is visible. Perhaps it is a little later in date than nos 3-6. Two appear at Woodcock Hall with hooks, dated late 1st or early 2nd century (Brown 1986, 27, fig. 19, 127, 128). Similar head decoration appears on a later Polden Hill brooch from Richborough (Butcher and Bailey 2004, 92, fig. 72 no. 213). They cite other parallels with this decoration from *c.* AD 70 to early 2nd century date. Mackreth gives the same date for one with beaded head decoration at Croft Ambrey, Herefordshire (Stanford, 1974, 144, 146, fig. 67 no. 2). As a proto-Polden, this is perhaps later 1st century. L 33mm.

8. Colchester derivative, hinged. It has long narrow wings; one broken off, the other 24mm long from the middle of the head and it is entirely plain, with a humped head and a narrow, well-curved bow. At the back the wing case is divided in the middle, and a small gap left where the two halves have been folded over after the insertion of the hinge on its axis bar. There is a slight chip off the plain foot, but no sign of a catch-plate is evident. Crummy suggested a late Neronian-Flavian (*c.* AD 60-95) date for two at Colchester (1983, 12, fig. 6 nos 58 and 60). Hattatt dated them to AD 55-80 (1985, 72, fig. 33). Ten hinged examples from Woodcock Hall, mostly decorated, have a date range from *c.* AD 50-100 (Brown 1986, 27, fig. 20 nos 131-140). At Jewry Wall, Leicester, they are dated 1st century predominantly, with some lasting into the 2nd (Kenyon 1948, 249, fig. 80 nos 6-8 and 4 [comparable to no. 7 but with no decoration and not drawn]). A smaller one from Causeway Lane has a wider date range of *c.* AD 75-150 (Connor and Buckley 1999, 249, fig. 117 no. 6). Hull Type 94b. L 62mm.

9. Colchester derivative, hinged. A larger brooch than the rest it has a humped head over 54mm cylindrical wings. These bear a flowing decoration of 2 pairs of sinuous lines incised into the metal, one curving over the wing next to the head, the other reaching out towards the end of the wing. Between the head and wings are arcs of raised beading. The ends of the wings are pierced by an axis bar which is also visible in a gap left in the middle when the bar and the missing hinged pin were inserted. The metal was not fully closed on one wing. There is a short rib on top of the head and the catch-plate starts high up the bow but is damaged. Parts of angular and possibly circular piercings can be seen. The foot is plain. Apart from the parallels given for no. 8 above, an early hinged example at Cirencester with fretted catch-plate was dated to the 20 years after the conquest by Mackreth (Wacher and McWhirr 1982, 90, fig. 24 no. 4). Butcher and Bailey have one from Richborough with a dog-leg pierced catch-plate and wide wings, dated AD 70-85 (2004, 89, fig. 70 no. 206). I can trace no close match for the decoration but similar ones with solid catch-plates from Hod Hill are dated from AD 50-150 (Brailsford 1962, fig. 6 nos 11, 12, 14). L 75mm.

10. Trumpet derivative. It is badly distorted but had a sinuous profile, with a wide flattened head which has a lug on the back still holding the iron? spring with broken pin. The chord runs along the top of the spring against the back of the head. There is no trace of a head-loop or axial bar. It is plain apart from the moulding at the top of the bow which, instead of the acanthus, consists of a smaller discus-shape moulding at the top, a larger one in the middle and a smaller triple version below. They are separated by two deep grooves. Below is a continuous flowing moulding down to the catch-plate and foot which repeats the decoration with a single groove and disc. This bow decoration is echoed on Little Chester examples at Derby (Dool

et al. 1985, 289-293, figs 127 and 128). Mackreth suggested the floruit for these to be early 2nd century. He also noted the continuously-curved profile in another Derby parallel which may date before AD 125/50 (Langley and Drage 2000, 248, fig. 24 no. 4). Two with similar decoration are from Dragonby, where May deemed those with springs and separate loops to be typologically early (1996, 255, fig. 11.10, nos 108, 109). In the Ambergate example it is possible that the chord was meant to press against the head for tension. This unusual method was also found on one from Elderbush cave, Wetton, Derbyshire, where the author saw the brooch as 'experimentation with the basic form in the 2nd century' (Branigan and Dearne 1992, fig. A2 no. 4). The overall dating for trumpets is AD 75-175. L 61mm.

11. Headstud. The head is flat on top with a raised moulding around the stud having an outer ring and a smaller central ring, both of red enamel. Traces of (white?) now yellowish enamel survive between the two. The short three-stepped wings have a broken forward-facing hook on top and a cast loop at the rear to secure the spring and pin, now missing. The bow is damaged, but ten square and rectangular panels remain in the same colours, used alternately. Some raised knurling survives down one side. The plain catch-plate rises half way down and ends above a bulbous plain foot, tilted slightly forward. A similarly decorated brooch from Richborough, was found in a pit dated AD 75-90 (Butcher and Bailey 2004, table 25, fig. 184, A8). Todd wrote that this type of cell is found in the early sprung forms; his example from *Margidunum*, with the fixed head loop and hinge being late 1st to early 2nd century (1969, 88, fig. 37 no. 9). Another is from the tightly-dated Red House Baths near Corbridge, where Hartley dated the samian pottery to *c.* AD 80-85 (Bird (ed.) 1998, 272, fig. 3 no. 15). Painter and Sax show six with this decoration (1970, 157, fig. 2 nos 1-5; 169 fig. 4 no. 8). Their no. 1, from the Honley hoard, dated *c.* AD 72-3 from the latest coin, lacks a real stud. The date range, therefore, for the Ambergate brooch with its spring mechanism and simple foot is perhaps AD 75-90. Hull's Type 148b. L 39mm.

12. Circular Disc brooch. Corroded and much of the rim is missing but it retains some interesting detail. On the front is a border of elongated S shapes around the outer edge, engraved into the metal. A concentric raised band surrounds a flat empty area with a small lipped recess at its centre, 3mm across. Under magnification it appears to have four tiny spots of gilding remaining in the outer field. There are remains of tinning over *c.* 30% of the surface on the back, with a lug at one end which held the missing spring, and an 8mm long catch-plate at the other. These details relate it to a known type. At Wanborough two similar brooches are illustrated (Anderson *et al.* 2001, 64, fig. 26 nos 137, 138). 138 has the same outer ring decoration but retains a conical, dark olive green, glass-paste setting in the centre. The metal was 'gilded on the front and tinned behind'. This and the same colour glass cone occurs at Richborough (Butcher and Bayley 2004, 134, no. 388, colour plate 7). The gilding/tinning and the 'S' border occur again on a Derby example which held a marbled gem set on a bed of green glass (Dool *et al.* 1985, 297, fig. 129). For these gilded types, Mackreth cites one in a *c.* AD 300 context at Fishbourne (Cunliffe 1971, 106, fig. 40, 43) and one at Zugmantel 'before AD 260'. He put them in the first half of the 3rd century, following on from the earlier enamelled types. Another in an even worse state from Derbyshire is shown on the P.A.S. website (DENO-BFE96C) also with a small patch of remnant gilding, dated *c.* 200-350. It seems that local craftsmen were copying this type. No traces of enamel can be seen to place it in the 2nd century. Diameter 27mm.

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