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Wealden Iron
Research Group

WEALDEN IRON RESEARCH GROUP

BULLETIN NO. 12

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Reports of Fieldwork

Further Light on Withyham or Stonelands Furnace

In a recent note (see *Bulletin* no.8 Spring 1975 pp.45-6) I commented on the mystery of the site of Withyham or Stonelands Furnace and the unavailing efforts to locate it. Since this appeared I have chanced to read Straker's introduction to the Buckhurst Terrier (*Sussex Record Society* 39 (1933) p.xviii) where he says 'Lord Thomas Buckhurst had a lease of 50 years, from 1571, of Parrock Forge, adjoining St Tye, but in the manor of Parrock. Lower's record of ironworks in Stonelands Park, unfortunately copied in *Wealden Iron* is now proved erroneous.'

This would seem to dispose of Straker's original location of Withyham Furnace in Stonelands Park (now part of Buckhurst Park) and to confirm our negative fieldwork results there. Where then was Withyham Furnace? I am going to suggest that it is on the site Straker calls Crowborough Warren Furnace, (actually slightly downstream, at TQ 496 322, of where he places it in *Wealden Iron* p.252) where there is a good bay and plenty of slag. Straker seemed to be puzzled about this site, on which he could find no certain documentary evidence, and it may be that the evidence he published under the heading of 'Withyham or Stonelands Furnace' relates to this site. Furthermore it is in Withyham parish.

The Ewhurst/Northiam Furnaces

In 1975, when the Field Group visited Straker's Ewhurst or Northiam furnace, at TQ 810 428, they assumed, like Straker, that this was the only one. In *Wealden Iron* (p.320) Straker mentions that Lower considered there to have been two, but discounts the suggestion. It would now appear that Lower was correct. Roger Adams has visited a site about half a mile to the SW and found definite remains of a second furnace. From a study of Straker's map, (pp.352-3) it would appear that this is the one to which he is referring (p.320) and that he did not know of the existence of the site visited by the Field Group in 1975 (see *Bulletin* 9, pp.16-17).

The new site, called Northiam in our records, is at TQ 8170 2445. The bay was originally about 60 yards long, but has been destroyed except for some 10 yards at the SW end, where it is 6 feet high. A modern spillway remains here, further confirmation that this is the Straker site, which he states had been recently restored and the pond in water.

There is glassy slag in the field below the bay and in the stream banks, together with black earth and ore. The two sites are connected by a public footpath.

Whitley Park Furnace Surrey.

This furnace, at SU 927 374, not known to Straker, was discovered by F. Rolling of Guildford Museum and so far no documentary references to it have been found. The site is well preserved although the pond is now dry. The bay, originally about 70 yards long, is intact except at the E end where it has been washed away by the stream. This is probably the site of the original weir. Behind the bay, about half way along, is a circular hollow about 12 feet across which may be the furnace site. Just W of this a shallow channel can be seen running at right angles to the bay and conveniently situated to be the wheel pit and race. This channel continues towards a tributary of the main stream but with an intervening flattened section that suggests culverting. A bulge in the bay near the suggested furnace site may be the loading ramp. There is also a long ramp, leading up to the W end of the bay, which appears to cross the mill race at the culvert site mentioned above. The bay is a formidable one, standing about 12 feet high on the upstream side and 15 feet on the downstream. A large amount of rather dark-coloured glassy slag is scattered all over the area behind the bay and in the two stream beds. There are mine pits in woodland beside the tributary stream referred to above.

Errata

Unfortunately some errors in grid references have crept into *Bulletin* 9 (1976). Members may wish to correct their copies as below:-

Robertsbridge Abbey Forge p.12, TQ 756 236 [corrected in this version]

Bugsell Forge Salehurst p.12, TQ 723 256 [corrected in this version]

C. F. TEBBUTT

Reports of Excavations

PIPPINGFORD COW PARK BLOOMERY TQ 452 309

In *Bulletin* No.11 (1977) a brief preliminary report was given of the discovery and excavation of a bloomery site, consisting of three furnaces of probable 1st-century date. Excavation by members of the

Field Group was continued at weekends through the winter and spring of 1976/7 and was finally concluded in the summer of 1977. Most of this time was spent on a thorough examination of the furnaces and on complete excavation and planning of the working area. This latter produced more sherds, mostly of small size, and a bewildering pattern of hollows and gullies peppered with post- and stake-holes. An attempt will be made to recognise possible huts and fences.

A turf hut, made by the diggers, proved quite satisfactory as a storm shelter and tool store for over twelve months and was found to need very little support by timber uprights. Similar shelters, if made by the iron workers, would leave little recognisable in the way of a pattern of post holes.

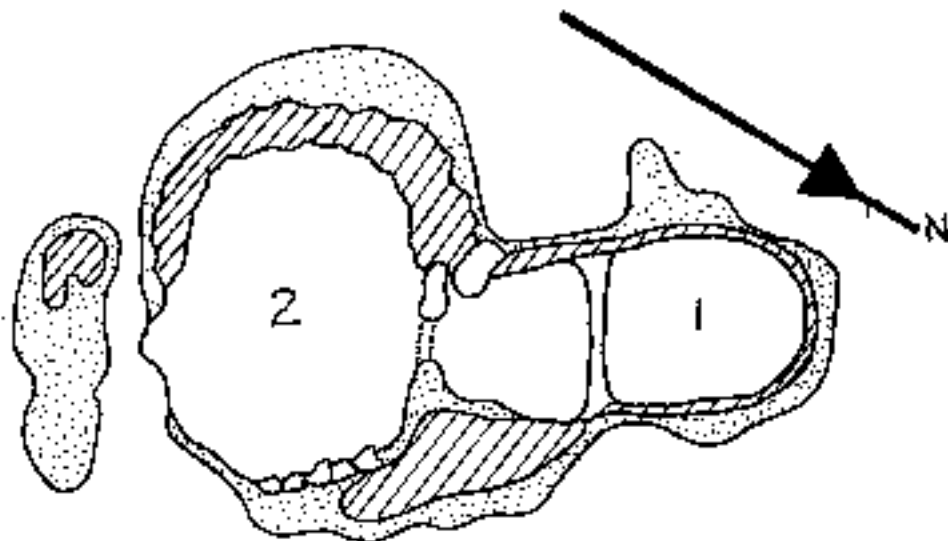
Clay samples from the furnaces have been taken by A. J. Clark, of the Department of the Environment, for magnetic dating, and the pottery sherds, some 60 in number, are kindly being examined by Dr M. Fulford of Reading University. These results must be awaited before final publication can take place.

C. F. TEBBUTT

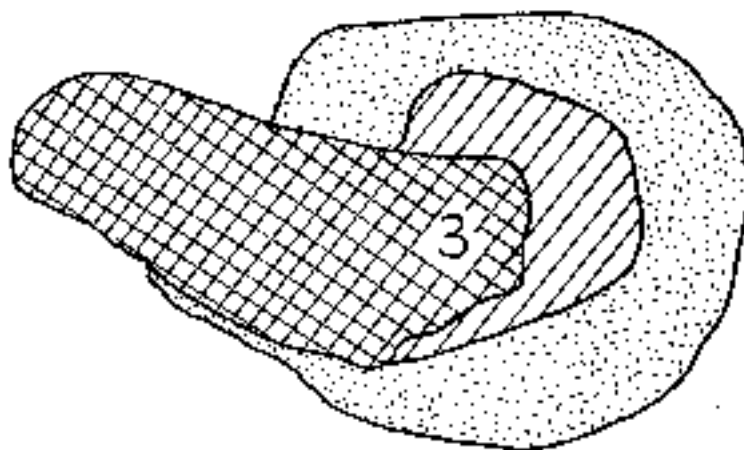
Bloomery Furnaces at Maynards Gate, Jarvis Brook

August 28th & 29th 1977

Maynards Gate blast furnace was excavated in 1975-6 by the Sussex Archaeological Field Unit when work was started on an industrial estate on the surrounding land. Development stopped for a time and the land was acquired by new owners. When work began again members of the Wealden Iron Research Group and Crowborough Field Society observed the area as mechanical diggers removed the turf and top soil. Areas of blackened soil were soon apparent and closer examination revealed reddened patches in one area about 38m. west of the new site road and 30m, north of the Crowborough - Rotherfield road at TQ 538 297. The owners Taylor Servomex Ltd., and the contractors Tarmac Construction Ltd., were approached and agreed to investigation of the site when they were not working. A brief rescue dig was arranged for the only days available to us, the Sunday and Monday of August Bank Holiday 1977. The site lies on the field known as the Four Acre on the Rotherfield Tithe map, and it is about 120m. from the bay of Maynards Gate Furnace pond.



Furnaces 1 and 2



Furnace 3

Scale 1 cm. = 1 metre.



Natural Reddened Grey Black
 burnt clay



Post hole

Maynards Gate bloomery furnaces

August 28th and 29th. 1977.

Field walking over the area of soil uncovered by the diggers revealed some blast furnace slag and much bloomery slag and charcoal concentrated 26m to the north of the site, 20m to the east and 60m to the west. Some small pottery sherds were found, all medieval or post-medieval, as well as a few flint tools and cores. There was a concentration of pottery on the blackened area to the north of the site.

The diggers had created an artificial terrace as they cut away the soil. The higher level was investigated first. The layer of soil immediately above the furnace walls contained some small sherds of what appeared to be early medieval date, the only pottery found in the furnace area.

The burned grey walls of two furnaces (1 & 2) were revealed, surrounded by reddened natural clay about 50cm. below the modern ground level. Furnace 1 was filled with a mixture of tap slag, charcoal and collapsed wall at the top, a 20-35cm. thickness of charcoal and larger pieces of slag, and a thin layer mainly charcoal at the bottom. Furnace 2 had a larger diameter than furnace 1 but the tapping area was much the same size and in the same place as the tapping area for furnace 1. The fill of this furnace was quite different, the major part of the interior being filled with re-fired clay, probably collapsed wall lining from the furnace itself, or a deliberate fill of old lining from other furnaces. Underneath this was a thin layer of charcoal and slag. The outer walls of the tapping area had been altered to allow it to be used as the tapping area for furnace 1 which appeared to be the later of the two furnaces.

In contrast to furnaces 1 and 2, more of the upper layers of soil and the walls of furnace 3 had been destroyed by the digger. There was a shallow pit containing charcoal, slag and sandstone at the east end and a much more solid concentration of slag at the west. The grey colouring typical of furnaces and the reddening of the clay around it suggests that this had also been a furnace. The mixed nature of the fill indicates that it was abandoned and deliberately filled in. This was probably the earliest of the three furnaces. Just over 1m to the north was a large post holed filled with slag and charcoal.

Further work by the contractors revealed large blackened areas to the S.W. of the site, associated with slag and charcoal. Obviously we were able to investigate only a small part of a complex site. Samples

of the furnace walls were taken for magnetic dating and the pottery found near the furnaces will be examined and dated. Samples of charcoal have been kept for Carbon 14 dating and analysis of species of wood used.

All of the pottery found on the site or on the field surface was medieval or post-medieval suggesting that this may well be a medieval bloomery site, and if so, only the second to be excavated in the Weald. It is of additional interest that the site lies close to the 16th century blast furnace, giving evidence of the continuity of the industry in this area.

Thanks are due to Fred Tebbutt for his advice over recording the excavation, and to members of W.I.R.G. who assisted with the work.

PAM COMBES

Ashburnham Furnace, Penhurst

In view of imminent consolidation work on the spillway and dam at the upper site, Ashburnham Furnace, TQ 685 171, it was decided by the Wealden Iron Research Group, with the permission and encouragement of the owner, Mr J. Wallace, to investigate the nature of a depression close to the dam, and to attempt some precise location of the furnace itself.

The depression proved to be a wheel-pit, re-used in the 19th century as a cottage cellar, and built with ashlar sides and breast, on a wooden floor whose side planks underlay the masonry. The dam end was not a true breast, not being shaped to a radius, but was apparently designed to direct water downwards towards the paddles of a low-breast or even undershot wheel. The brick-arched tail-race culvert was still partly open, and was traced to an outlet in the stream bank 35m. from the wheel-pit, with a falling gradient of 1:83. Apart from damage at one corner of the wheel-pit, caused by a breaking through to give access for use as a cellar, and some erosion of brickwork at the tail-race exit, the structures are in good condition and, with the spillway and dam wall, would amply justify expenditure on consolidation, given the paucity of surviving remains of the iron industry in the Weald.

By contrast, the furnace appears to have been severely robbed. Two cuttings, set out with reference to the wheel-pit, were designed to test for any standing masonry near the centre of the furnace end, respectively,

at the corner of the furnace between a bellows arch and the wheel-pit. These cuttings produced characteristic debris: for the casting area there were sand and gun-mould fragments, for the centre of the furnace, slag characteristic of the lower part of a hearth, and on the usually solid side towards the tail-race, broken brick. However no upstanding structures were encountered, and it appeared that robbing had been thorough. Only full area excavation could disclose a plan, which may well be marked only by robber trenches. Documentary evidence for the date of abandonment of this part of the Ashburnham complex is to be sought.

DAVID CROSSLEY

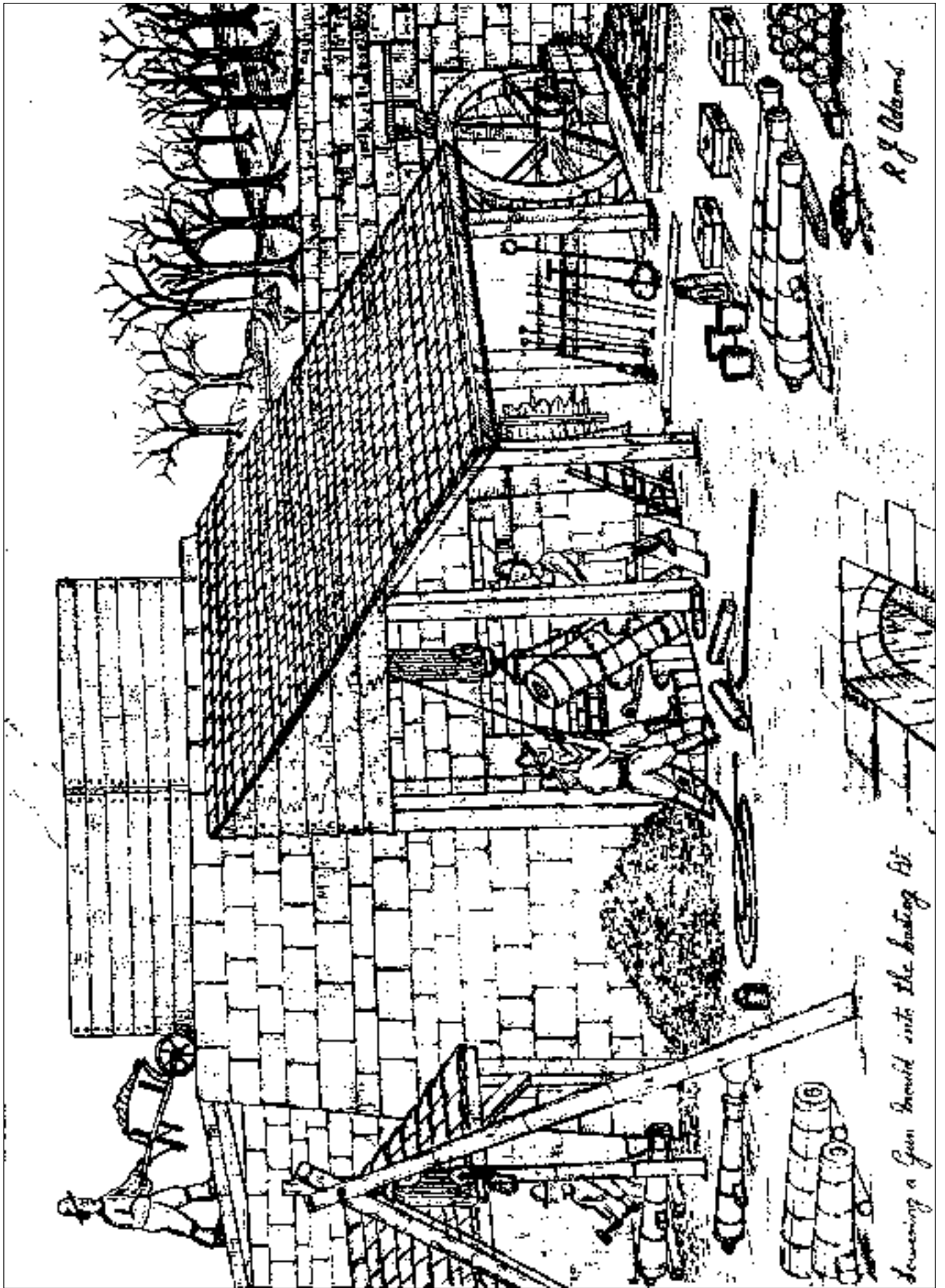
A Reconstruction of a Gun-casting Blast Furnace

The drawing opposite is mainly conjectural, as no accurate pictorial records of the period seem to be in existence, only a few feet of blast-furnace superstructures have so far been found by excavation. Below the level of the working floor much more is known.

Some of the details that may be noted, starting from the left hand side, are the charging bridge, supported high up on the stone-faced ramp from the charcoal and ore store on the valley side, as in this case the bay is a low one. Note also the wooden wind-shield on top of the furnace and the very high quality of the stonework throughout the site. Below the charging bridge a gun is being cleaned up. The casting head has been cut off and is lying in front of the heap of cinder and mould debris. Next to it is another gun with the head still on it, and nearby are two gun moulds.

The cinder hole is in the casting arch, and owing to the restricted space slag had constantly to be cleared away. In front of the furnace may be noted the lintel, with the date and the ironmaster's initials cast in it. The heavy lifting tackle and the deep oak-lined casting pit take up most of the floor space in front of the casting arch. The pit could be covered over by a sand-casting floor for shallow moulds.

It must have been very hazardous working in the casting pit with the charge of molten iron accumulating in the hearth above and accidents must have been frequent. Between the furnace and the stone-faced bay can just be seen part of the bellows in their frame, and the long shaft of the small water wheels. This is partly recessed into the bay, to reduce the length of squared-up and hollowed-out tree trunk forming the



R. J. Adams

Lowering a Gun Powder into the Loading Pit

water shoot. The flow on to the wheel is controlled by a wooden gate at the pond end of the shoot. To keep the water-wheel shaft as short a possible the tail-race culvert often passed under the casting floor, tight against the casting pit, as shown here.

In front of the water-wheel is a furnace lintel that has been removed from the casting floor, the remains of the mould cavity still in the sand. Below this is a hammer head, also some sawn off gun heads that are going to a forge for conversion into wrought iron. In the boxes are cannon-ball moulds to be filled with any spare metal from the gun cast when the furnace is tapped. This is probably depicted in the painting facing page 160 in *Wealden Iron*. Below the three guns waiting dispatch to the boring mill can be seen a hammer-helve pivot casting and some cannon balls.

R. J. ADAMS

Antonio Averlino Filarete: description of a 15th-century ironworks

(Editor's note: Filarete was an Italian architect, born in Florence in 1400. About 1464 he wrote a book on architecture, in which he described the imaginary construction of an ideal city, Sforzinda, named after his patrons, the Sforza family. Within the text comes a description of an ironworks, supplier to his city project, and there is no reason to think that the place and methods he portrays were other than Italian. If this is the case, it appears that the blast furnace, and probably the finery, for this appears to be referred to, came relatively early to Italy, well before the first English example, Newbridge, in 1496.

It is strange that this text has been so little used in England, but coming some 50 years before Bourbon's description, printed by Straker, it deserves to be better known.

The original dwells at some length on the journey from Milan to the ironworks, which appears to have been situated in the Ligurian Apennines which the author is at pains to emphasise as a place in all ways remote and distinct from Lombardy.)

I had found out that a deposit of iron had been found 40 or 50 miles from the town (Milan) ... So on the first day we took a boat

... travelling until about two hours after dusk to Pavia, where we found a good lodging. Next day we journeyed on, in a boat on the great river (Po) ... That evening we came to Plaisance where several gentlemen met us to see to our comfort ...

Next morning we went 12 miles on horseback to a house belonging to a friend, where we stopped a while, and then, through a fertile plain and hills to a house of the great Florentine Frescobaldi where we arrived that evening. It lay on a hill high overlooking the river ... Next day we continued. We climbed the valley. It grew very cold, indeed began to freeze; the north wind was cold enough to seem more like December than March. On the way we had to cross the river on our horses and my little dog was so tired that when he could he stretched out on a rock and I had to give him a ride on my horse. The valley became narrower and more wild ... We warmed ourselves with bread and wine at an inn and went on, eventually leaving the difficult riverside to reach a ridge from where we could see another valley, with many small houses ... several people from the neighbourhood came to meet us; they seemed like wanderers or gypsies, with pale and unhealthy faces, ill-fitting short clothes of bleached cloth ... The ground seemed very infertile. This district was part of our guide's estate, and there he had decided to rebuild a ruined castle.

Several miles on, we followed another river and at last reached our objective, the newly-built forging hammer. Night was already falling, and luckily we were able to gather round a cottage fire and to eat a meal of onions and sea-fish, only, unfortunately, salted anchovies, washed down with a wine fit only for cleaning horse-shoes.

There, we laid out on a straw mattress under a blanket we had brought, packed like herrings, ourselves our only source of heat, for we could see the stars through the roof of our hovel ...

Next day ... I went to see about the iron we needed, and set off to the furnace and foundry, which it is hard to describe ...

The building in which the iron is made is close to the river. It is square, divided into two parts, of unequal size, by a wall 8 arms-lengths high. The smaller is occupied by the melting furnace of which only the upper part with the opening is visible, for the ground is at a high level. It is built of heat-resistant stone. In the adjoining part are the two bellows, placed on edge, and not flat as

elsewhere. Worked by water power they both blow into a tuyère which goes through the wall and into the furnace where it blows the charcoal and ore. The bellows are six arms-length long and four wide. The intake for the air measures an arm's-length square. They are of strong ox-hide and nailed with good-quality iron. When blowing they make a noise just like thunder. Nearby is a vessel with running water in which the cast iron is cooled: doing this gives off a strong sulphurous smell.

The workers are strong, dirty, in shirts or scantily clad; they stand near the furnace, clogs on their feet, tending the fire and casting the metal ... The cast iron is liquid like bell-metal, and like it, can be cast into shaped-out moulds. It is made elsewhere: at the castle in Milan there is a cast-iron mortar resembling a reclining lion.

The cast iron is taken to another building where it is melted a second time; then they begin to work it at the hammer until it has the required shape.

However this works was not built for this latter purpose. Also I will describe the hammer forge which I saw 12 miles from Rome, at Grotte Ferrata. It is a finely-sited abbey on a mountain in wild country, defended like a castle, occupied by monks of a Greek order. A mountain stream operates, by a water-wheel, two cylinders (?cam-shafts), of which one sets the bellows moving, the other the hammer. The metal, cast a second time in the works, is then cast into shapes and worked by the hammer.

The ore is mined from certain parts of the mountain; it is heavily burnt in a roasting furnace. Then it is allowed to cool, and broken by a hammer down to pieces the size of beans. These are sieved and then heaped in the furnace in alternate layers of ore and charcoal. Every 12 hours the workers cast the iron, usually getting, so they say, more than 2 loads each day. I believe there is much sulphur in the iron, for the sulphur smells strongly as it leaves the furnace; more than this, the colour of the furnace flame reminds me of burning sulphur and the people it lights up have a deathly look.

D.W.C. (Translated and abridged)

Review

Owen Bedwin, 'The Excavation of Ardingly Fulling Mill and Forge 1975-76. *Post-Medieval Archaeology* 10 (1976) pp.34-64.

In 1973 the Mid-Sussex Water Co. gave notice of a plan, later approved, to flood the Shell Brook valley at the site of Ardingly Fulling Mill and Forge, and a rescue excavation was carried out by Dr Owen Bedwin of the Sussex Archaeological Field Unit in advance of the destruction of the site.

Documentary evidence in parish records first refers to the baptism of a child of Robert Potter 'fynar of the hammer' in 1571, and thereafter references go on until 1660. The 1574 list includes Ardingly Forge, as does that of 1664, but it seems to have ceased working by 1717. It seems likely that its source of pig iron was the nearby Strudgate Furnace.

The excavation was not a straightforward one as the fulling mill had been established on the same site, probably in the early 18th century, and was itself likely to have ceased working in the next century. It was clear however that for the forge there were two parallel water channels supplying power, one to the two hearths and one to the hammer, for which the timber (tree-trunk) anvil-base was found. The fulling mill required one channel only, and this had been partly reconstructed during its occupation of the site. Useful comparisons are made with the only other excavated Wealden forge site, that at Chingley. (D. W. Crossley, *The Bewl Valley Ironworks Kent*, Royal Archaeological Institute Monograph (1975)).

At Chingley one channel supplied power via different wheels for both hammer and chafery hearth, and the other for the finery. At Ardingly both hearths were operated from one channel and the hammer from the other. As at Chingley there was evidence of secondary working, and it appeared that artifacts such as scissors and knives were made at the forge.

The finds were surprisingly numerous, the waterlogged state of much of the site making it favourable for the preservation of leather, and many shoes and parts of shoes were recovered. Clay pipes were also abundant. These are now proving an important dating item in post-medieval excavations.

The report contains good plans and photographs, and the Field Unit, and Owen Bedwin in particular, are to be congratulated on the results of their first venture into the archaeology of post-medieval industry.

C. F. T.

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Compiled by Margaret Tebutt

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