



NEWSLETTER 55 SPRING 2012

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WINTER MEETING FEBRUARY 2012

The title of the advertised talk – Bardown Roman Ironworks: an update – drew a larger-than-usual attendance at the Winter Meeting, and those present were rewarded with a fascinating account of research that has been undertaken by the self-styled Independent Historical Research Group. IHRG grew out of a group of metal detectorists, but has now espoused archaeological aims. Their talk was begun by Robin Hodgkinson (no relation of the writer) who described their interest in the Bardown site, south east of Wadhurst, and the significant discovery there of a medallion dating to the reign of the emperor Antoninus Pius (AD138-161). This token of esteem, probably given to a high-ranking official, suggested that Bardown may have had greater importance than merely an ironworking site. Curwen, we were told, had noted that iron slag had been removed from the site for road building in the 18th century, indicating that the remains there had formerly been greater than at present. A project design had been agreed with the East Sussex county archaeologist to relate Bardown with its ‘satellite’ sites and to trace trackways associated with them.

David Staveley, a geophysicist with a particular interest in Roman roads, then showed a sequence of slides of magnetometer surveys of the Bardown site, from which it was possible to see the area that had been excavated by Henry Cleere in the 1960s, the probable location of the iron furnaces that he had been unable to pinpoint at that time, and two clearly defined tracks that converged on the site. A branch off one of these tracks, to the south east of the site, led towards the other side of the River Limden in the direction of Wallcrouch and the other site Henry Cleere had excavated, at Holbeamwood, where a number of furnaces were discovered. This track had a sandstone surface, and similar metallurgy has been found adjacent to Sheepstreet Lane, which runs along the ridge to the east of Bardown and may have



Magnetometer survey of the Bardown site

formed the access from the site to the River Rother.

Robin Hodgkinson resumed the account by showing magnetometer surveys of two features close to the route of Sheepstreet Lane. The first of these was a circular ditched enclosure – possibly Iron Age – that had been identified by the Hastings Area Archaeological Research Group at Cottenden, east of Stonegate, and the second – and of greater significance as far as Bardown is concerned – a quasi-rectangular enclosure, identified by geophysics, on the end of the ridge between the Limden and Rother in a field where more than 30 Roman coins have now been found. If this is some sort of Roman outpost, it may indicate where iron from Bardown, brought along what preceded Sheepstreet Lane, was transferred onto barges for onward transportation to Bodiam. Both Bardown and Bodiam are sites where finds of stamped tiles have shown the involvement of the *Classis Britannica* – the British Fleet. Robin postulated that similar sites may have been

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The possible Roman enclosure north of Etchingam

established to serve other groups of ironworks in the period.

It had originally been intended that the afternoon's talks would begin with Professor Henry Cleere setting out the background to the discoveries at Bardown. Unfortunately, owing to a misunderstanding, Professor Cleere did not arrive until late, so he delivered his talk while tea was being taken. He explained that he had come to excavate at Bardown as a consequence of undertaking a doctoral thesis on the Roman iron industry [now available on the WIRG website]. Although he had not been able to locate smelting furnaces at the site, he had found a roasting hearth, remains of buildings, abundant pottery and slag, and the furnaces at Holbeamwood. Consideration of the role of the *Classis Britannica* in the iron industry in the Weald in the Roman period had also been stimulated by the excavations at Bardown (as had the formation of WIRG). An interim report on the excavations had been published as an Occasional Paper by the Sussex Archaeological Society (SxAS) in 1970, but other circumstances, not least of which was a dearth of expert knowledge, at the time, of the local pottery being found, had prevented publication of a full report. The involvement of the IHRG and a Margary grant from the SxAS had recently made possible a report on the pottery from the site by Malcolm Lyne, prompting a long-overdue reassessment of the excavation in the light of recent work and the chance to produce a full report. This will now be looked forward to with eager anticipation.

JSH

WIRG BULLETIN 32 2012

Contributions for this year's Bulletin should reach David Crossley by **31st March 2012** (for contact details see back page)

Modeling Profitability of a Mid-18th Century Cannon Business

Even though historical iron cannon making technology information is widely available very little is published about overall business performance of 18th Century gun manufacturers. Furthermore mid-18th Century business financial recording methods were still allied more towards estate accounting practices. These focussed on recording and managing payments and receipts, reporting trading margins and cash accumulation in excess of any initial investment.

Indisputably gun manufacturing was an important and extended source of income for the Fuller family along with their other sources of estates and investment incomes. The Fuller Letters 1728-1755 describe effects of many gun making operational successes, contentions, problems and decisions. Even so this written record gives only a few instances where combined effects of these influence overall gun business financial performance.

To unravel this problem of interactions between many variables I have built a research tool in the form of a computer model based on information from the letters. The model enables exploration of how operational dependencies and changes between labour, materials, gun programmes, pricing, quality and management decisions for an annual gun making campaign affects Incomes, Costs, Margins and Profit. Importantly the model gives substance to the written and qualitative historical record.

The model is easy to use. For example campaign duration, campaign liquid cast iron availability and cost, a gun programme of mixed calibres and lengths are entered and then a few variables checked and set. In return the model gives immediately a 'Campaign Report' with Income by type, Direct Costs, Margins and Campaign Surplus (or Loss) as a proxy for Profit. Then, for example, different values for variables, raw material costs, gun proofing refusal rates or gun selling prices can be trialled giving revised financial outputs. In this way different business scenarios and types of decisions can be explored quickly. Importantly comparative effects on operational business performance can be assessed and expressed as what it really meant for Fullers' business.

As one example of its use in trialling a series of actual gun programmes the model shows how incomes doubled from 1740 to 1750 from Fuller policy insistence on higher proportions of larger calibre guns to manufacture and post 1750, from higher selling prices to Office of Ordnance. However the model shows clearly the magnitude of the strategic effect of this policy on their business from progressively decreasing margins caused by changes in furnace metal utilisation efficiency and especially gun proofing failure rates. Higher incomes were achieved but at the expense of a fundamental

strategic business problem of lower margins.

Further work in hand includes using the model to:

- ◆ Examine comparative financial effects of proofing failures on a range of gun programmes
- ◆ Trial programmes and Break Even Analyses for Campaign Incomes, Costs and Margins on business profitability including effects of proofing failures
- ◆ Show impacts of upgraded selling prices to Office of Ordnance.

Model structure is suitable for investigating a cannon business other than the Fullers'. Members who have particular interests in this type of historical business analysis may wish to suggest other trial scenarios for investigation or to support other documentary findings.

Dr Alan Davies

Members who would like to participate in the project described above can contact Dr Davies at alan.fdavies@tiscali.co.uk.

NEW MEMBERS

We welcome the following:

Sue Barr, Maresfield
 Roy Brown, Wadhurst
 Moira Chalmers, Five Ashes
 Dr Stephen Hall, Eridge Green
 Geoff Juster, St Leonards-on-Sea
 Caroline Sharp and Eddie Mower, Uckfield

PROSOPOGRAPHY Appeal for Help

A prosopography is a collection of information about a group of people who have a common link or endeavour. WIRG is developing a prosopography of people involved in the Wealden iron industry, which is intended to be integrated into the existing Sites Database. For each individual included in the prosopography a collection of data will be recorded: dates and places of birth and death; places of residence; relationships, whether by kinship or occupation; associated iron sites. In due course, other sources of information may be added, such as images. The initial sources for the data will be predominantly books and articles about aspects of the iron industry and, in particular, published sets of accounts.

To develop this powerful research tool, we are keen to recruit members who would be interested in inputting data. This need not be an onerous task; you can offer to do as little or as much as you wish. All

you will need is a computer attached to the internet, and some spare time. A personal introduction and training in the methods used will be given to each volunteer.

If you are interested in helping with this project and would like further information, please contact Jonathan Prus (jonathan@avens.co.uk) or the Editor.

TILFORD RURAL LIFE CENTRE The First Burn

The Wealden iron furnace at Tilford, seen by WIRG members at the 2011 AGM, is a replica of Reg Houghton's diagram in the WIRG Bulletin Second Series No 26, 2006. It was built to half scale and every effort was made to adhere to the measurements offered in Reg's design.

The furnace was nearing completion in May 2011 and it was suggested that a fire should be lit in order to dry out the walls and cure the joints. The date was set for the week before the Surrey Hills Partnership Tour on Wednesday 22nd June 2011. It is interesting to note that John Fuller mentions this very procedure in the first paragraph of his account in the operation of charcoal blast furnaces in Sussex in the early eighteenth century. He states "when the furnace is newly built and the loamy joints are very moist, and the bricks which make the inner walls are yet raw and wet, they burn some trunks or trees or pieces of timber, which burning for some days dissipates the rawness and moisture and prepares the walls for a more lasting use".

It was decided to fill the hearth with a mixture of kindling wood and charcoal. This was done by dropping alternately three buckets of kindling weighing approximately 3kg and three buckets of charcoal weighing approximately 3kg down the chimney. We then dropped three barrowloads of wood averaging 50mm - 75mm in



**The completed furnace at Tilford
 (compare with the photo in the November
 2011 Newsletter)**

PHYL PETTITT LEGACY

The WIRG Committee has agreed a donation of £1250 to the Rural Life Centre at Tilford towards materials for the completion of the replica ironworks.

diameter down into the bosh and finished the whole procedure by topping up the rest of the furnace with chestnut logs averaging 150mm diameter. To light the furnace we placed paper and kindling wood in the fore hearth and at 11 am in the morning we set it alight to see what would happen. The kindling soon caught hold, but the chimney did not draw until the fire in the fore hearth had reached the hearth centre which took approximately one hour. Up to this time the smoke generated was emitted out of the top of the fore hearth and up the side of the furnace. Once the furnace started to draw, the smoke was sucked into the furnace.

After approximately half an hour the fire in the furnace started to take hold. The bellows were not operational during this burn but we placed a piece of 3 in. diameter cast iron guttering in the 4 in. glazed sewer pipe that was built into the hearth wall to accommodate the tuyere. The gutter pipe was protruding approximately 5mm into the hearth. By now a steady roar could be heard from the fore hearth and considerable smoke was emitting from the chimney. The furnace was then left to its own devices and no further wood was added.

The whole process between lighting and the furnace completely burning out was eight hours. The residue from the burn consisted of a quarter of a bucket of ashes raked from the hearth. It was interesting to note that when we pulled the 3 in. gutter pipe from the tuyere tube we found that approximately 10mm of the tube had melted. As we were burning wood only and no forced draught was being used, this indicates to me we should be able to reach an operating temperature when the correct criteria are in place. It is hoped that when we are able to acquire measuring equipment such as temperature read-outs and air speed and volume measurements we will be able to offer a more scientific approach to any future operations.

With regard to forthcoming events we hope to have more fires lit in the furnace with the bellows operating on the following dates :

29th April 2012 - Countryside and Woodland Show
27th May 2012 - Days Gone By
29th July 2012 - Rustic Sunday
23rd September 2012 - CSVAC Tractor Rally

Gerald Baker

DATE FOR YOUR DIARY
2012 SUMMER MEETING & AGM
Saturday 21st July
Venue to be announced

FORAY TO THE DUDWELL VALLEY December 2011

An almost cloudless sky greeted our arrival at the village car park in Punnetts Town, a pleasant change from the heavy rain of the previous days. A strong team of seven forayers set off on the long trek into the valley, the idea being to follow two streams, one on the north side starting in Milkhurst Wood, and then cross the river Dudwell to follow another upstream through Binglets Wood.

We soon found that the previous few days' rain was going to make for very heavy going underfoot. We slithered to the river, crossed it and started to follow the stream in what I thought was Milkhurst Wood. But we weren't in Milkhurst Wood, and the stream was one I had overlooked in my planning, so we decided to follow it as far as seemed practicable. We split so that half were on each side of the stream with someone looking in the stream itself. It wasn't long before we encountered signs of pits on the bank above the stream where something had been dug out. Tim found a very nice sawpit quite a long way up the slope and I walked over a charcoal burners' platform. I fell in the stream (much to everyone's amusement) and soaked the area I sit on. No slag so we had lunch. We were close to the top so we decided to try and find a way across to the other stream in Milkhurst Wood. Because of substantial stock-proof fencing our route eventually took us through someone's garden. The need to apologise gave me a very good opportunity to let the owner know what WIRG does and he seemed interested but I didn't have a membership form on me. Must remember to take one next time.

We dropped down eventually into the stream we were headed for and up from the stream bed came the stentorian tones of Victor. "Ore, I've found some ore!" It looked rather more like limestone to me, so Victor hammered some into small pieces so he could take a bit home for testing. Brian wanted to roast some which I didn't think a very good idea. We followed the stream down to the Dudwell finding no slag on this stream either. Black soil and another charcoal platform later and we were ready to start following the stream in Binglets Wood.

We then had a very long discussion on a newly-installed bridge with six-foot high sides (to stop horses falling off, we thought). We did discuss the bridge, but more importantly was the fact that the sun was sinking swiftly and we came to the conclusion that this side of the valley merited a search in good light because Dave informed us there was another bloomery site he knew about on this side in Brailsham Wood raising the possibility that Binglets Wood might have something for us to find.

Following the foray Tim Smith undertook a number of tests on the material I thought was limestone and in fact it was mainly sandstone with some limestone present.

David Brown

BLOOMERY SMELTING AT PIPPINGFORD

Resumé of the past 14 years of smelting in the first bloomery furnace

After the demise in 2010 of the old bloomery furnace, which was built in 1996, it had, surprisingly, survived some 36 smelts although with many repairs and alterations. During this time the furnace has, very approximately, consumed:

Roasted ore: 600kg

(roasting the ore reduces its weight by about 30%)

As found ore: 850kg

Charcoal: 900kg

Charcoal wood: 4,500kg

(including pre-heating charcoal to get the furnace to 750°C before charge can be added. Charcoal weight is approximately 20% of the wood weight)

Roasting and pre-heat wood: Many tons... all naturally fallen

(this weight was not measured)

Bloom iron: c.20kg

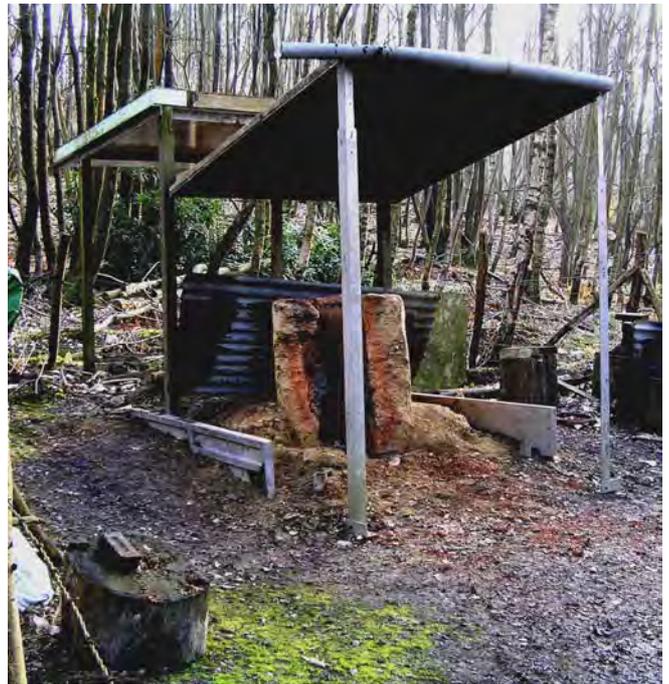
Unfortunately, our difficulties with forging a bloom into bar iron before shaping it into something useful has meant that some blooms just oxidised away during the too-numerous reheatings and hammerings. Because smelting iron ore in a bloomery furnace is the only way to procure blooms of wrought iron it is a necessary step in the very long bloom-smithing learning curve.

Sectioning the walls of the furnace

Photographs of sections across the wall of the first furnace were taken during its destruction to make way for a new design of furnace structure. Plan "A" was to use a chain saw to section straight down the furnace wall; this was soon abandoned after it clogged-up then seized-up, but not written off.



Plan "A" in action



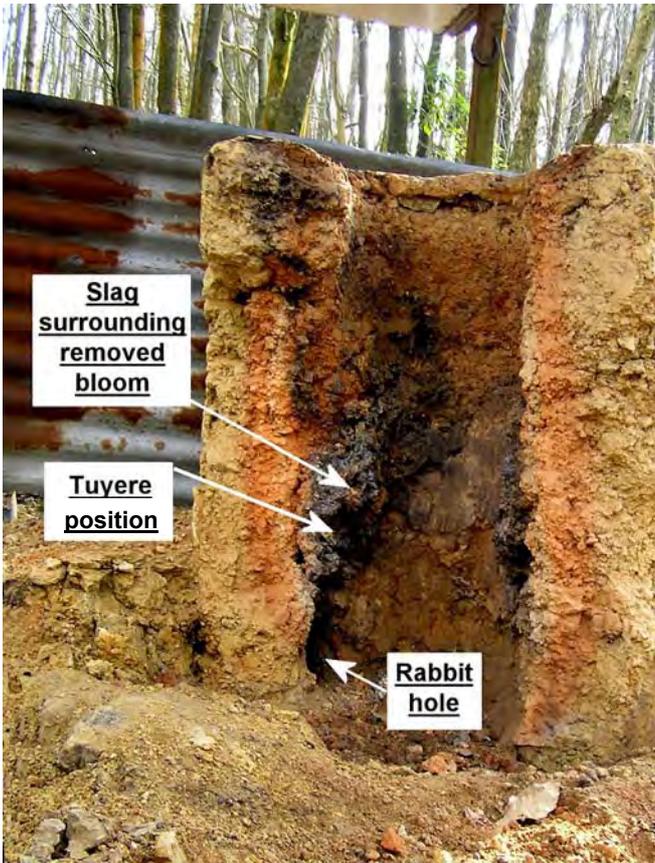
The sectioned furnace and new shingle boards

To keep the furnace drier the platform was elevated for the first furnace. This was never level and the wood sides had deteriorated so new gravel boards were used and material from the furnace has now been used to make the platform level. The hinged roof is shown (above) in the "furnace operating" position, it hinges down (hence the gutter) between smelts to better protect the furnace from the weather, whilst corrugated iron sheets protect around the outside; the closed-roof height is a limiting factor in the height of any new furnace design.

In the section overleaf, a small pick hammer was used to produce a realistic surface to photograph and the colours enhanced by spraying water onto the surface, although it was still necessary to electronically enhance the pictures later by increasing the contrast to bring out the subtle colours. At the centre of the wall the material was a pale pink colour, just visible as a darker grey. This pink colouring is consistent all around the furnace and for much of its height; this suggests a similar burden temperature around the furnace.

The removed bloom was surrounded by much slag; that above the tuyere is solidified, once molten, ore (wüstite - FeO) which would have dripped down past the tuyere's air blast to form a bloom which always seems to be attached to the wall just below the tuyere.

The slagged wall, below and well above the tuyere, is consistent with Pleiner's description of the operating temperatures within a bloomery furnace. The highest temperature, at about 1600°C, is produced just beyond the tuyere where the molten wüstite is produced, a funnel-shape of reducing temperatures then pass up the furnace, although the funnel is tilted to the right.



A section through the tuyere area

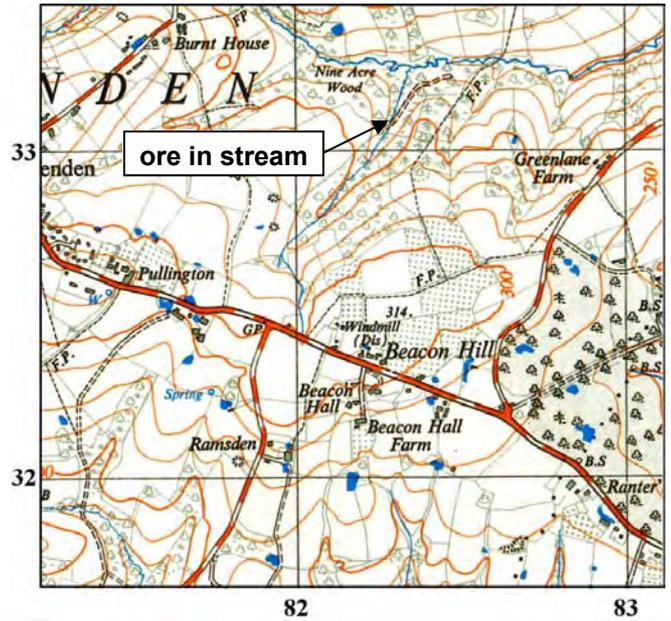
One surprise find was a rabbit burrow at the back of the furnace; this went for quite a distance but, fortunately, no sign of its tenants were found.

Pleiner, R, 2000, *Iron in Archaeology, The European Bloomery Smelters* (Prague, Archeologický ústav AV ČR).

AN EXPEDITION TO COLLECT SOME "IRON ORE OF KENT"

Victor Kellett, from Dingleton in Kent, knows many people in his area and has access to many fields and much woodland. During one of his expeditions east of Benenden and north of Beacon Hill (see map), he discovered a great deal of siderite iron ore and this was analysed by our contact Alan Davies, whom we met at the Museum of Rural Life Centre, Tilford, Surrey, during the 2011 AGM. His analysis proved that the ore was rather better than that from Sharpthorne Brickworks because there was much less limestone (CaO), a result of Cyrene bivalve shells, which in some cases had been ground down to be virtually invisible.

The ore is about 30m below the top of the Wadhurst Clay and lying in the stream at TQ8232 3311, this is at a higher level than that found at Sharpthorne Brickwork, our usual source; it is guessed that there are many tons still remaining.



The ore was easily picked-up from the stream and about 25kg was put into each of 20 animal-food bags and then carried 15m up the bank to the trackway; here four bags were barrowed 30m before continuing about 50m up an incline of about 1 in 4 to where a 4 x 4 (courtesy of Jonathan Prus) was waiting to take the ore to Pippingford. It was this incline where ingenuity was used rather than brute strength, which still reduced after each load. A rope was tied to the barrow's wheel support and trailed half-way up the hill - where a single sheave, or pulley block, was attached to a tree and through which the rope was passed - whereupon one or two people picked up the rope and just walked down-hill, passing the barrow coming up, with a third person just lifting, guiding and pushing a little. The first time this operation was carried out the "pullers", who were down hill, could not see that the "pusher" had to quickly duck under the rope or face a rope burn; this was not repeated a second time!



Passing point - second time

On arriving at the sheave the rope was removed and carried up to a second sheave and the process repeated and, after a breather, the four bags were lifted into the 4 x 4, a process that was repeated five times.



Having a breather

Although pulley blocks are envisaged with several pulleys, to produce a mechanical advantage, our simple system gave no such advantage, save that the rope-pullers were walking downhill.

Two groups of pits, both higher up in the Wadhurst Clay, were seen but what they sourced is unknown. A cursory glance for bloomery furnace slag in the streams proved fruitless but, considering the unstable land surface any slag may well have been washed away. Also, it would have been wiser to build the furnace on the dryer, sandy soils.

WIRG thanks Edward Barham of Hole Park for allowing access to the area and removal of this valuable source of good quality iron ore; also to Alan Davies from the Museum of Rural Life Centre, Surrey, for analysing the ore.

Brian Herbert

**SAVE POSTAGE
RECEIVE YOUR NEWSLETTER BY EMAIL
IN COLOUR!**

Contact the Hon Secretary
(details on back page)

THESES ON-LINE - <http://ethos.bl.uk/>
Rodney Clough; *Iron: Aspects of the Industry during the Iron Age and Romano-British Periods*, London University PhD 1986
Jaime Kaminski; *The Environmental Implications of Romano-British Iron Production in The Weald*, Reading University PhD 1995

**BREDE HIGH WOODS
ARCHAEOLOGICAL PROJECT
January 2012**

On a cold but beautifully sunny day about 25 volunteers gathered in Thorp's Wood, near the confluence of two streams to investigate an early iron working site, a bloomery. Members of the WIRG Field Group joined other volunteers to relocate the bloomery site discovered several years ago. Various lumps of slag and parts of the furnace lining, helped to confirm the site.

It was not possible to lay out a conventional grid to carry out the magnetometer survey owing to the tree cover but the magnetometer was run over the survey area and any places where a high reading was found were recorded and plotted. The high readings may indicate the location for furnace sites.

On the northern side of the stream a few volunteers helped record a plan of a more levelled area in the woodland which may have been some kind of working area.

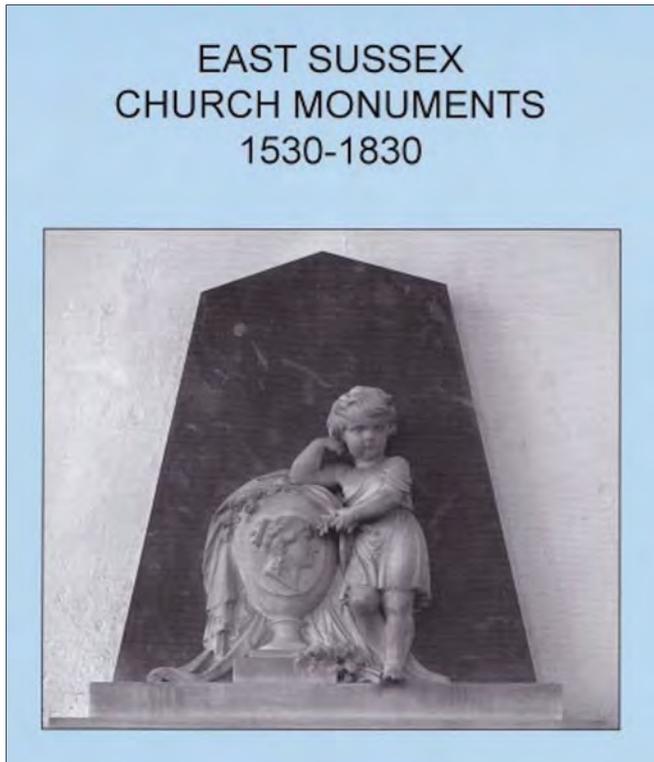
Another group headed off northwards to the site of four Hop Picker huts which had only been recorded on a 1929 map. The area was covered in bracken, thankfully mostly lying flat, but no evidence was found of these hut foundations. Any artefacts found were picked up, bagged and a record made of where they were found. The same process was carried out in the woodland below the hut area as it had been noted that there were a fair number of surface artefacts including a lot of mainly broken glass bottles, various bits of iron work and some pottery. A small dump was found where there was a concentrated amount of mainly broken glass. A small trial excavation trench may be dug in this location to see whether the finds are deeper than just on the surface. Some of the conservation volunteers then helpfully removed a small tree that was obscuring the site.

A small sub-circular earthwork was noted in the same woods, a hollow with a bank partially around it. With typical archaeologists enthusiasm it is hoped that this may be a hop picker's toilet in the wood and would therefore also be worthy of excavation. Meanwhile pictures were being taken of the various activities which were being carried out.

The next event taking place is likely to be at the beginning of March when a magnetometer survey will be carried out on the site of Brede High Farm, where it is hoped that we will be able to lay out a grid successfully and we will be able to get a print out of the recordings made.

Vivienne Blandford

BOOK REVIEW



Nigel Llewellyn, 2011, *East Sussex Church Monuments 1530-1830* (Lewes, Sussex Record Society Vol. 93); ISBN 9780854450756; £29.50

This is a volume which should be of interest to students of Wealden iron in that it provides a wealth of information about the locations of memorials of individuals and families, many of whom were associated with the iron industry. It covers the historic eastern half of Sussex, essentially the parishes in the Rapes of Hastings, Pevensey and Lewes. Following an extensive introduction and a large number of coloured photographs of a selection of the monuments described, the main body of the book is a catalogue, in alphabetical order of parish, of those memorials to found inside the churches there.

As well as visiting the churches concerned, the author has surveyed many published and unpublished descriptions of church interiors that have recorded memorials subsequently removed or covered by pews etc. In this respect his coverage of the iron memorials found in many Sussex churches is not consistent. Although citing frequently Rosalind Willetts' seminal paper on the subject in *Sussex Archaeological Collections* 125, of 1987, the crucial catalogue for which was only provided on microfiche, and published in printed form in *Wealden Iron* the following year, there are some inexplicable omissions. Most notable is the mural iron slab of Jhone Coline in Burwash, reckoned to date from around 1536 and probably the earliest iron memorial in the country. Perhaps the author was relying on the out-dated notion, propounded by Lower in 1849 and

perpetuated in Burwash church, that the Lombardic lettering on the slab was evidence of it having been cast in the 14th century. Also omitted are the slabs for Peter Gower in Penhurst church, recorded by Willetts but now concealed beneath a carpet, and for Lucy Stevens at Salehurst. Nor has the author consulted later volumes of *Wealden Iron* in which the slabs in Laughton church, for the daughters of the gunfounder, William Bengé, are described, although these are still visible in the church. Two of the firebacks cast with the memorial inscription from the iron slab over the grave of Anne Forster in Crowhurst church in Surrey are included as memorials in the entries for the respective churches of Ardingly and East Grinstead where they are displayed. The author, however, seems ambivalent as to their status, referring to the earlier use of the example in East Grinstead as a fireback, which is what it was made to be, but describing it as a duplicate of the original graveslab, which it is clearly not.

This will undoubtedly be a very useful volume, but the errors and omissions noted above in respect of iron memorials that have been well documented, leave one with the nagging doubt as to how many other such errors there may be. Images from the book can be accessed on the Sussex Record Society's web site: sussexrecordsociety.org/ESM.asp.

JSH

RECENT PUBLICATIONS

T Birch, 2011, 'Living on the edge: making and moving iron from the 'outside in Anglo-Saxon England', *Landscape History*, 32 (1) , 5-26.

The paper discusses the organisation of iron utilisation in Anglo-Saxon England.

The production of iron in Anglo-Saxon England is little understood due to the lack of evidence. There are less than a dozen iron smelting sites known. This is a distinct contrast to the wealth of evidence of iron smelting during the Roman period. Should we believe that the Anglo-Saxon world was relying on recycled Roman iron? The absence of evidence should not be taken as the evidence of absence. Instead, we can look towards contemporary archaeological examples and ethnography to try and explain the production of iron and the movement of ferrous objects. This paper argues that the production of iron was located outside the settlement. Not only does this activity occupy the periphery of the physical and cultural landscape, it was embedded in the liminal zone between reality and myth. Blacksmiths were feared for their art was associated with magic. The evidence of their mobility in north-west Europe emphasises how marginal they were in society, along with their goods. The value of items coming from the 'outside' was heightened as they came from the distant unknown, the unfamiliar. In order to understand the dynamic role of iron in Anglo-Saxon society, we must review the negative

evidence of iron smelting, and the evidence for smithing. This should be considered with reference to the literary evidence available to us in the context of the Migration period in north-west Europe. Iron production in early Anglo-Saxon England should also be sought after using archaeological prospection techniques.

http://www.landscapestudies.com/index_files/Page573.htm

L Bray, 2010, 'Horrible, Speculative, Nasty, Dangerous': assessing the value of Roman Iron'. *Britannia* 41, 175-185.

The Vindolanda tablets provide a rare opportunity to explore some economic and social aspects of iron use during the period of Roman occupation.

The economic aspects of metallurgy in the distant past have been relatively little studied, largely owing to the absence of detailed records for periods preceding medieval times. This paper takes advantage of a rare survival, an account from the Vindolanda tablets in which a price for iron is recorded, to explore some of the economic characteristics of the metal during the first and second centuries AD in Britain. The inherent difficulties in employing evidence of this kind are examined before looking at the price information from the rest of the Vindolanda tablets to assess the value of iron relative to other commodities at the fort. The value of the metal is then examined compared with that of labour, thus illuminating the potential economic opportunities that became available to iron producers following the establishment of Roman rule in Britain.

D. Sim and J. Kaminski, *Roman Imperial Armour: The production of early imperial military armour*; 180p, 148 b/w & colour illus, 27 tables (Oxbow Books, 2011). ISBN-13: 978-1-84217-435-7

The Roman Empire depended on the power of its armies to defend and extend the imperial borders, enabling it to dominate much of Europe, Northern Africa and the Middle East. Success was, in large part, founded on well-trained, well-disciplined soldiers who were equipped with the most advanced arms and armour available at that time. This is the story of the production of that armour. *Roman Imperial Armour* presents an examination of the metals the armour was made from, of how the ores containing those metals were extracted from the earth and transformed into workable metal and of how that raw product was made into the armour of the Roman army. The policing and protecting of such a huge empire required a large and well-organised force and the book goes on to consider the organisation of the army, its size, composition, the logistics involved in its deployment and provisioning and the training, remuneration and benefits offered to its men at arms.

SUBSCRIPTION REMINDER

Subscriptions will rise on 1st June 2012

| | |
|--------------------|--------|
| Individual | £9.00 |
| Retired (optional) | £8.00 |
| Family | £12:00 |
| Institutions | £10:00 |
| Students | £3.00 |

Please pay by standing order if possible, and update your order before 1st June.

UK tax payer? Please consider Gift Aid
(if you have already completed a form you need take no action).

FERNHURST FURNACE OPEN WEEKEND

8th and 9th September 2012

*Step back in time to an age when Fernhurst was home to important iron works which manufactured cannons – the **Fernhurst Furnace***

Join us for this unique, free, historical event at the site of the Fernhurst Furnace featuring:

- Guided tours of the remains of the furnace site
- Musket, cannon and longbow demonstrations by the Sealed Knot
- Guided walk from Fernhurst Furnace to Shulbrede Priory exploring the archaeology and natural history of the area
- Demonstrations by Gosport Living History Society
- Artisans demonstrating skills of the time: pole lathing, charcoal burning, spinning, blacksmithing, walking stick making, bow and arrow making
- 'Local' Lamb Roast and a Vegetarian Option
- Chair making
- Flint knapping
- Refreshments including Coffee, Tea and cakes, Soft Drinks and Local Beer
- Activities for children including the Butser Ancient Farm, Den Building
- Future plans for the Furnace site
- Tombola
- Books for sale
- Souvenirs
- ...and Much More

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