



NEWSLETTER 63 SPRING 2016

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WINTER MEETING NUTLEY 30TH JANUARY 2016

Andy Margetts, of Archaeology South-East (ASE), gave a presentation to a well-attended meeting on the Watching Brief they undertook in 2014 when West Sussex County Council carried out work to improve the outflow from Ifield Mill pond. The pond was probably constructed in the 16th century when an iron forge was established there. However, Andy's talk began with the possibility of iron-working at a much earlier date. ASE's excavation at Broadbridge Heath, south west of Horsham, in 2013, in advance of the Wickhurst Green housing development, revealed evidence of a Middle Iron Age settlement, the largest discovered in the Weald to date. Of particular interest were the footings of a wooden building which were spiral in shape. The opening faced the prevailing SW wind. Within the feature was evidence of charcoal



The spiral feature at Broadbridge Heath

and fuel ash slag but not iron slag. A feature of similar shape and size had been noted at Bryn y Castell, a hill fort in North Wales, excavated by Peter Crew. There the feature, which was similarly

orientated, did contain evidence of iron working. Was the feature at Broadbridge Heath intended for a similar iron-related purpose?

Further evidence of early ironworking has come from excavations in 2013 that took place at Rathlin Road, Broadfield, part of the more extensive IA and Romano-British bloomery site dug in the 1970s. Recalibration of radiocarbon dates of two furnaces now suggest working as far back as the Middle Iron Age, contemporary with the site at Broadbridge Heath. Also present was evidence of domestic smithing.

The work at Ifield Mill necessitated the draining of the pond, which led to the discovery of the base of a small bloomery. Archaeomagnetic dating pointed to two possible periods when it might have operated: AD 1260-90 or AD 1400-1540. Further



Ifield Forge site during excavation in 2014

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dating of finds will, it is hoped, narrow it down to one of these.

The creation of a new outfall from the pond, to alleviate a possible risk of flooding downstream, caused the excavation of a wide cut through the pond bay exposing the remains of part of the forge building. It had hitherto been assumed that the present mill building had been on the site of the forge but instead it was at the western end of the bay and



The wheel pit serving the hammer and chafery

set back from the present water's edge. One of the wheel-pits was exposed together with remains of one of the hearths (probably the chafery) and the massive base to the anvil. In the wheel-pit fragments of two waterwheels were found together with some iron bars.

These had been tipped in from the side and probably resulted from when, during the civil war, General Waller's troops rode up from Arundel in 1643 to put the forge out of use. A further feature that stimulated some discussion afterwards was the discovery of a narrow wooden pipe with a tampion or plug set in it, located at the side of the pond near the forge, that may have been related to the drainage of water from the adjacent fields into the pond.

The lengthy period of questions after the talk was a testament to the interest that Andy's talk had provoked.

FACE THE IRONMASTER



Thomas 'Customer' Smythe (1522-91)
Owner of Barden Furnace, near Tonbridge

**PAMELA COMBES, FSA
1936 - 2016**

Pam Combes died suddenly on the 16th of February. She had a long association with WIRG both in her own right and with her late husband, David. Living in Crowborough until 1992 and then in Lewes, both were active in the group and among other interests were much involved in the excavation led by James Money at Garden Hill. Pam served on the Committee in late 1970s and early 80s and was Treasurer until 1980. She retired from the Committee in 1984 but continued to retain an interest in Wealden iron, contributing occasional articles to the Bulletin, the first in 1977 and the last as recently as 2011. After leaving the Committee she was active in helping David carry out resistivity surveys, using the WIRG equipment, to the benefit of the wider archaeological community both in Sussex and as well as sites in Sussex they ventured into France. Their survey at Barcombe revealed the villa that has subsequently been excavated. Their move to Lewes propelled her into wider interests: she served on the councils of the Sussex Archaeological Society, of which she was a Vice-President, and the Sussex Record Society, the Friends of East Sussex Record Office and latterly The Keep. Following David's death in 2001 she was made an honorary member of WIRG. With her passing the group has lost a loyal friend.



**JOINT UNIVERSITY OF EXETER - WIRG PhD
STUDENTSHIP**

Ethan Greenwood, who has been awarded the studentship, here introduces his proposed research programme:

The Romano-British Iron Production in the Weald: An investigation into the dynamics of iron production, in terms of scale and organisation, through the analysis of the depositional processes of technological waste, using geophysical and excavation techniques.

At this moment in time the goals of this project are to develop a clear method for the investigation of technological waste on Romano-British iron production sites, compare and contrast the results

from different sites particularly with respect to scale and organisation, develop a holistic approach to the data influenced by the understanding that technology and human society are an interlinked system and look at the social, economic and political dynamics of iron production in the Weald and compare with other Roman iron production sites beyond.

The method by which this will be done is through desk-based assessments of the sites to see which ones have the potential to give the most information, then geophysical surveys using magnetometry and ground penetrating radar. Once the survey results have been analysed an area will be chosen for excavation. The excavation will involve in-depth recording of the stratigraphy of the waste heap, including drawings, photos and weight measurements, with samples being taken from each stratigraphic layer for post excavation analysis.

There are a number of different discussions that could emerge from this project. The first will be the comparison between the excavation results and the geophysical surveys. This could lead to a clearer understanding of how the waste heap is imaged by the different types of techniques with the potential of being able to link the ground penetrating radar results to specific stratigraphic layers. With the in-depth recording of the waste heap a more accurate understanding of the yield of sites can be estimated, this could lead to knock-on questions such as how much wood was needed and if this could be an indicator of woodland management and how many people would have been needed to run a site? Another question posed could be: is there a difference in the way waste heaps are formed on different sized sites and is there a difference between the eastern and central sites?

I am hoping that this project will bring new information to light that can be applied to the industry as a whole and open up new avenues for future research in the Weald. I am also hoping that that this project will raise the profile of local archaeology and bring in a new generation of members to the Wealden Iron Research Group that can carry on research into the Weald throughout their academic career or just as a hobby.

Ethan Greenwood

WIRG BULLETIN 2ND SERIES 36

The Editor, David Crossley, will be pleased to receive articles for consideration for this year's volume.

Closing date for submission is 31st March.
For contact details see back page.

WIRG'S IRON SMELTING EXPERIMENTS IN

WIRG's three 2015 smelting experiments in a bloomery furnace successfully produced three, large blooms with two successfully forged to produce, respectively, one billet of wrought iron and one of carbon steel, whilst the third bloom has yet to be fully consolidated to a billet. These smelts did not happen without some problems: firstly, the excessively long time to pre-heat the furnace with charcoal; and secondly, the temperamental generator (powering the blower) which is always stopping for some unknown reason but probably old age. The latter has been solved by purchasing a new, 4-stroke, petrol generator ready for next year's smelts. The former problem, to quickly pre-heat the furnace with charcoal, must be resolved because it wastes time - over two hours - and consumes excessive, expensive charcoal.

Changes to the tuyere, charging & slag tapping procedures

The position of the tuyere has been lowered by about 30cm to around 30cm above the furnace bottom but remains inclined down at about 25°. After 1kg charcoal is charged the 1kg of ore is sprinkled in over about a 10 minute interval. Previously, each charge of ore and charcoal was charged in one go. The method of slag tapping has been modified by bricking-up the tapping arch with sun-dried clay bricks though with partly-pierced holes approx 1cm diameter, these being broken through to tap the slag. This greatly conserves the heat of the furnace compared to breaking open the complete, slag-tapping arch. All slags (both tapped and raked from the furnace) have been collected and weighed in order to determine the material balance (a comparison of furnace inputs and outputs) with a theoretical model developed by Alan Davies. Analysis of these slags shows marked differences in composition.

Forging the blooms

Blacksmiths use a horizontal tuyere in a hearth fuelled by coke. Unfortunately, when WIRG uses traditional charcoal fuel it is so light that it is blown away. But smiths in America have overcome this problem by blowing air upwards through the charcoal or coke to the metal. WIRG has tried two schemes for the forging hearth with the tuyere angled at about 60° to the vertical: 1) where a curved tuyere passes below ground and then upwards to blow up through the charcoal to the metal; 2) where the air is *reflected* up

from ground level and through charcoal to the metal. Both methods have proved successful although the latter is much easier to implement. In all forges it is necessary to pass the air through about 50mm of hot charcoal to convert the oxygen to CO & CO₂ which also protects the iron from being oxidised in any remaining oxygen in the air blast.

For heating large blooms and billets a simple, ground-level hearth has been found most convenient rather than use our small, blacksmith's hearth. This is built-up close to the furnace in a few minutes from heavy, fire-proof bricks to form an horseshoe-shaped hearth 45cm wide by 75cm long, with the wall 30cm high at the end through which a 25mm iron tuyere is fixed at an angle of about 60° to vertical. The open end of the hearth allows easy access to the charcoal when raking it to and from the hot iron (Fig.1).



Fig. 1 Bloomsmithing hearth starting

Initial consolidation of the hot bloom is carried out straight from the furnace and before it cools, thus it is not usually weighed. The larger the bloom is the longer it takes to cool, with its hot iron centre glowing red through what is a crumbly surface of slag, unconsolidated iron, slag and charcoal, and this perfectly describes the spongy bloom mentioned in ancient texts.

Provided the roasted ore can be analysed for the percentage Fe available - usually about 50% in a good quality siderite ore - the efficiency of smelting to a billet is given by:

$$\text{Smelt efficiency (\%)} = \frac{(\text{Weight of billet}) \times 100}{(\text{Weight of roasted ore charged}) \times (\frac{\% \text{Fe in roasted ore}}{100})}$$

The weight of as-found siderite ore (FeCO₃) is reduced by about 30% during roasting to maghemite (Fe₂O₃, a magnetic form of haematite) with the CO₂ and moisture being released to the atmosphere. Thus,

knowing the weight of the roasted ore, the weight of as-found ore is given by:

$$\text{Weight of as-found ore} = \frac{(\text{Weight of roasted ore})}{\frac{(1 - 30\%)}{100}}$$

An analysis of the three smelts is shown below whilst Fig.2 is a picture of the resulting iron.



Fig. 2 Iron from three smelts
2015/#1 2015/#2 2015/#3
Scale 20cm

Smelt 2015/#8

The first smelt of 2015 produced a continuous slag-tapping run weighing 5.5kg and a final billet weighing 1.85kg of a low, 0.02% carbon wrought iron as measured by Alan Davies from a small sample of the billet.

By far the hardest task was hammering the billet to shape. This was undertaken by John Baillie. Interestingly, no significant cracks became apparent, negating the need to fold the iron into a sandwich at the crack and then fire-weld the two parts together at a high temperature. We wonder if the low carbon content and absence of cracks was associated with the tapping of such a large quantity of slag!

- Roasted ore weight = 30kg
- As-found ore weight = 43kg
- Billet weight = 1.85kg
- Smelt efficiency = 12.3%
- Pre-heat charcoal = 41kg
- Smelting charcoal = 32kg
- Total smelt charcoal = 73kg

Smelt 2015/#9

This smelt did not behave like the previous one as very little slag could be tapped, probably because the temperature towards the top of the furnace never reached more than 750°C. The resulting billet of iron

was forged from the bloom by a local blacksmith, Josh Hall of Maplehurst, West Sussex. A small sample was found to have a carbon content of about 0.42% and it is suggested that this carbon content may be due to not being able to tap any slag from the furnace. There were signs of cracks in the final billet.

Roasted ore Weight = 24kg
 As-found ore weight = 34kg
 Billet Weight = 1.7kg
 Smelt efficiency = 14.2%
 Pre-heat charcoal = 38kg
 Smelting charcoal = 26kg
 Total smelt charcoal = 64kg

Smelt 2015/#10

This time 1.5kg of slag was tapped, but it has yet to be consolidated to billet due to failure of the generator just prior to the forging process.

Roasted ore Weight = 20kg
 As-found ore weight = 29kg
 Billet Weight = not known
 Smelt efficiency = 70% (to a partly consolidated bloom)
 Pre-heat charcoal = 50kg
 Smelting charcoal = 22kg
 Total smelt charcoal = 72-kg

An important change with this smelt was the placing of the tuyere through the top of the tapping arch which was sealed with sundried bricks of clay. This eased removal of the bloom which now adhering to the bricks rather than the furnace wall where in previous smelts the tuyere passed through the wall at 90° to the tapping arch.

Records are plotted on an Excel spreadsheet taken during these smelts; temperature, ore & charcoal charges etc. and graphs plotted against time this helps us improve our understanding and, hopefully, get consistent results in the future.

Changes to the furnace in 2016

Alan Davies is able to theoretically analyse this recorded data and suggest refinements and improvements. Unfortunately, he requires the volumetric air flow (litres/sec or m³/sec) during smelting and this is causing a problem. With the previous furnace structure having a 30cm-diameter central hole (since destroyed because it was impossible to repair - after 36 smelts), numerous experiments suggested that the volumetric air flow should be between 4 and 6 litres/sec. The original air flow instrument, designed and built by the writer,

required to be calibrated against a standard that was limited to 7 litres/sec. A new design of furnace was built some five years ago where the inside diameter was increased to 60cm at the tuyere but tapering to 30cm inside diameter at the top. As the diameter has increased by a factor of 2 the area increased by a factor of 4, requiring the volumetric air flow to be increased to 16 to 24 litres/sec, but preheating the furnace with charcoal blowing up to 40 litres/sec is necessary.

This increased volumetric air flow may be measured using a rotating anemometer. This is effectively a fan blade forced to rotate when used to measure wind speed, and this sells for about £80. Some minor changes are required to enclose the anemometer mechanism (fan blade) within the air-blast piping to the furnace. This scheme has been suggested to the distributors of the anemometer, PCE Instruments, but they have given their reasons why they do not think it feasible; however they did recommend a much more expensive instrument!

It is always difficult dislodging the bloom from the furnace wall before removing it via the slag tapping arch, this being much easier than lifting it out from the top of the furnace. A refinement to the furnace structure is already in hand to enlarge the slag tapping arch. A firebrick tapping arch held up by two side pillars, will provide a larger aperture but still be capable of supporting the furnace structure above. The arch will be in-filled with several courses of sun-dried, clay bricks, as successively tried in 2015, where partially perforated with 1cm diameter holes which can easily be broken through to allow slag to flow. This is, however, rather hit and miss when deciding which hole to open-up. These holes are also useful to pass a substantial rod through to perforate the bloom's thin, outer case of consolidated slag to release the molten slag inside, although, again, not always successful. It now a simple matter to pass a metal tuyere through any sun-dried brick or even change its position during a smelt.

Bloomery furnace structures that have been excavated seldom show evidence of tuyeres or even tuyere holes. It has recently been suggested that this is because the tuyere passed through the tapping arch infill which would have been destroyed when the bloom was retrieved.

Brian Herbert

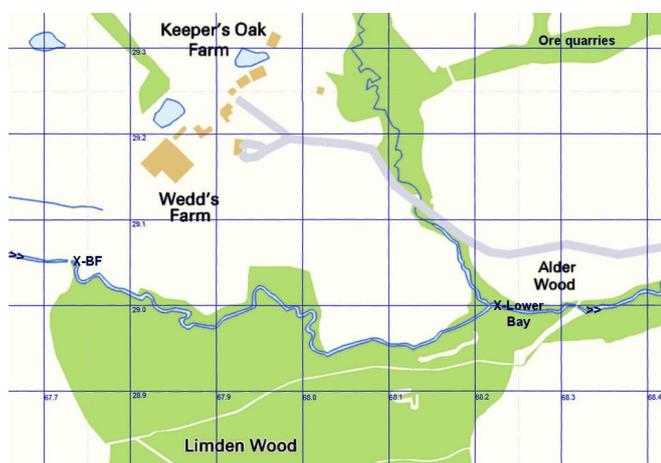
PREHISTORIC METALLURGY (EXPERIMENTAL ARCHAOMETALLURGY) COURSE

to be held at Butser Ancient Farm, Petersfield, Hampshire, UK between **13th-16th May 2016**
 Contact: simon.timberlake@gmail.com or fergus@fingerbuster.com for further details.

AN UNRECORDED BAY AT EAST LYMDEN

Located some 2km SW of Ticehurst, E. Sussex, is the site of East Lymden blast furnace. This was recorded by Straker – and its impressive bay, some 107m long and rising to 3-4m in height, is adjacent to a later track, so difficult to miss. The small amount of slag in the working area and sparse documentation suggests the site was only occupied for a short period with circumstantial records so far found dating activity between 1549 and 1552.

Absent from the record, however, is a second bay – almost as large – some 470m downstream of the furnace bay. Yes, downstream, so evidently not a pen pond bay. A small amount of blast furnace slag found in the stream where it cuts through the northern end of the bay suggests it was built around the same time as the blast furnace.



The site of East Lymden Furnace and the newly-recorded bay

It is postulated that this site may have been intended for a forge that was never completed because of lack of output from the furnace. A search of the area below the bay was unable to find evidence of forge slag. Finds of blast furnace slag at forge sites are not unusual as the slag was an ideal material to build or repair a bay and make-up working platforms.

Ore pit quarries were also located about 300m north of this downstream bay in a strip of woodland.

The discovery was made by Victor Kellett and John Veysey .

Tim Smith

SERIAC 2016

South East Regional Industrial Archaeology Conference

Saturday 23 April 2016

Holy Cross Preparatory School, Kingston upon Thames

Details from: R Bryson, 6 Wycheml Rise, Guildford GU1 3TH

RECORD OFFICE NEWS

HELP NEEDED UPDATING THE EAST SUSSEX RECORDS

WIRG is working with the East Sussex Historic Environment Record (ESHER) to update their records with sites from our online database. A great many sites that WIRG has recorded are not on ESHER and need to be entered onto its database so that it can aid researchers and inform planners, and the help of members is requested. It would involve spending some time at The Keep, Woollards Way, Moulsecomb, near Falmer, inputting data into the HER computer. It would be an excellent opportunity to become acquainted with the iron sites of East Sussex. **If you have some spare time and would like to participate in this project please contact Sophie Unger, HER officer, on Email: County.HER@eastsussex.gov.uk, or Telephone: 01273 336378.**

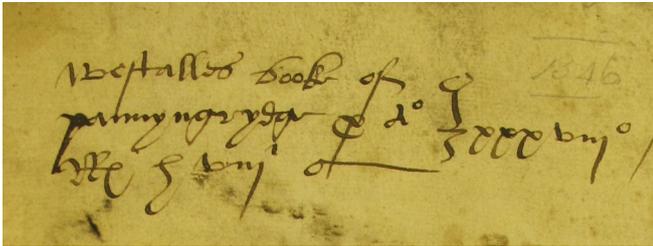
CATALOGUING THE FULLER PAPERS

In November 2015 WIRG received a request from Christopher Whittick, Senior Archivist at East Sussex Record Office, for a grant to produce a detailed description, to be mounted on its online catalogue, of the contents of ESRO SAS/RF 22, an unlisted bundle of over a hundred letters and papers derived from Stephen Fuller's trade in casting guns for the Board of Ordnance between the death of John Fuller in 1755 and 1758. Stephen Fuller took on the management of the family's ironworks following the death of his brother John in 1755 before, and for a while after, the return of his older brother Rose from Jamaica. The papers include contracts, specifications, correspondence with the Board, its officers and agents, other ironmasters and local landowners, and relate chiefly to the proofing of ordnance at the Tower and to the efforts of the county's gun-founders to present a united front to the officers of the Board when negotiating contracts for guns.

The Fuller archive is the most important collection of papers relating to the Wealden iron industry in the eighteenth century. It includes accounts and letters, some of which were published in 1991 by the Sussex Record Society in an edition by David Crossley and Richard Saville, and some of which are in Second Series vol. 1 of the WIRG Bulletin (1981). But parts of that archive have never been adequately catalogued to give researchers a comprehensive description of what they comprise. The work, which the Committee agreed should be funded to the tune of £500, has resulted in a detailed

summary of each of the documents in SAS/RF 22, which should be available online by the time this note is published at www.thekeep.info/.

WESTALL'S BOOK OF PANNINGRIDGE 1546



The sixteenth-century accounts of Robertsbridge Forge and Furnace and of Panningridge Furnace, when operated during the ownership of William Sidney of Penshurst and later of his son, Sir Henry, are comparable with the Fuller Papers in the detail they provide about the operation of ironworks. Most of the papers are held in the Kent History and Library Centre at Maidstone, and David Crossley edited them for the Royal Historical Society in 1975. But two volumes became separated from the others: a book of receipts and payments for Robertsbridge and Panningridge for the year 1547, which is at East Sussex Record Office, The Keep, Moulsecomb, Falmer (SHE 6/1/11), and 'Westall's Booke of Pannyngridge 1546' which is in the Henry E. Huntington Library in Pasadena, California. A rather poor microfilm copy of the latter is available at The Keep but on a recent visit to Pasadena to catalogue in greater detail the Battle Abbey estate papers there, Christopher Whittick was able to photograph Westall's 1546 book so that it is much more legible.

If a WIRG member with experience of reading sixteenth-century handwriting would be interested in transcribing this volume of 32 handwritten pages, with a view to them being published in the WIRG Bulletin, the Editor can provide copies of the image files.

PETER GOODALL

We were sad to be informed of the death, in January, of Peter Goodall. Peter, formerly of Forest Row, passed away at the Royal Star and Garter Home in Brighton. Although unable to take part in the group's activities in recent years he remained a member and enjoyed reading of WIRG's activities through the Bulletin and Newsletter. Generously, he has left the group a bequest of £500 in his will. Our sympathies go to his family.

ORDNANCE NEWS

A WEALDEN CANNON IN THE WINDWARD ISLANDS ...



WIRG member Peter Hutchison took the above picture on the West Indian island of Dominica (lucky fellow), and sought identification of the markings that appear clearly on the barrel. From his archive of records of the Board of Ordnance, Charles Trollope has identified it as a 24-pounder Borgard pattern of 10ft cast in about 1720 by Samuel Gott, probably at the Gloucester Furnace, Lamberhurst. The numbers



Detail of the 24-pounder showing the Rose and Crown badge

inscribed near the touch hole show that it weighs 2 tons 11cwt 1qr 7lbs. The price paid for 24-pounders at that time was 18 shillings a hundredweight, so the piece cost £46 3s 7½d. It was shipped to Dominica in 1763-4.

Borgard pattern guns were the last to use the Rose and Crown that had identified guns cast for the government since Tudor times. From about 1727 a royal cipher replaced the badge.

... AND ON A GREEK ISLAND



Gerasimos Livitsanis has written inquiring about the possibility that the 24-pounder shown above might have been made at Hamsell Furnace, Robertsbridge. He relates that it had been on HMS Restoration when it was wrecked off Livorno in Italy in November 1711. Salvaged and sold to the Venetians, the gun was then used by them in their war against the Ottoman Turks in 1714-15, ending up on the Ionian island of Ithaca.

Again, Charles Trollope was consulted and he states that the only gun of the same size and weight (2 tons 7cwt 1qr 26lbs) of the period was one that was supplied to the Board of Ordnance by Peter Gott in 1706. However the design of the cascabel neck and button at the rear of the gun are unlike those cast by Gott, or by John Fuller or Maximilian Western, who were other founders at the time, so is likely to have been cast by Robert Baker at Hamsell Furnace, which ties it in to the very clear HF mark on the right trunnion.



THE EARLIEST IRON SMELTING FURNACE IN BRITAIN?

A report in the January/February 2016 edition of *British Archaeology* describes the discovery of what may well be the earliest bloomery furnace so far discovered in these islands. Excavations at Greetwell Hall Farm, Messingham, about 4km from Scunthorpe in north Lincolnshire, have revealed the truncated remains of a horseshoe-shaped furnace about 1.3m long and 1m wide. Carbon dating of charcoal samples from the remains have given a date range of 780-590BC, in the earliest part of the pre-Roman Iron Age. The amount of slag associated with the furnace suggests modest production estimated at around 140kg, with smithing probably taking place at a nearby Late Bronze Age settlement. Extensive early ironworking is already known from the Wolds of east Yorkshire - www.ironmasters.hull.ac.uk/.



Excavating the Messingham bloomery

TEBBUTT RESEARCH FUND

Grants are available towards research into any aspect of the Wealden Iron Industry or subjects pertaining to it. Applicants may be individuals or groups, and the application can include any associated expenses, such as travelling and photocopying. The applicant should write a letter giving details of themselves together with relevant information concerning the research envisaged.

Applications to the Hon. Secretary

FERNHURST FURNACE OPEN WEEKEND

Sat 10 & Sun 11 September
10.30am – 5.00pm



Free Entry • Free Parking • All donations are welcome

Step back in time to an age when Fernhurst was home to important ironworks which manufactured cannons – the Fernhurst Furnace.

Dog owners be aware of muskets and cannons being fired.

All proceeds go towards the conservation of Fernhurst Furnace.

The site is one mile west of Fernhurst. Grid Reference SU 879 283, postcode GU27 3NJ and will be signposted on the day.

01428 654088 or fernhurstfurnace.co.uk

- ✦ GUIDED TOURS OF THE FURNACE SITE ✦ SEALED KNOT – FIRING MUSKETS AND CANNONS ✦
- ✦ LONG BOW DEMOS ✦ GUIDED WALK FROM FERNHURST FURNACE TO SHULBREDE PRIORY ✦
- ✦ GOSPORT LIVING HISTORY SOCIETY ✦ LOCAL LAMB ROAST (VEGGIE OPTIONS) ✦
- ✦ CHARCOAL ✦ BLACKSMITHING ✦ SPINNING ✦ GLASS-BLOWING ✦
- ✦ BUTSER ANCIENT FARM ✦ CHAIR MAKING ✦ POLE LATHE ✦ FALCONRY ✦
- ✦ LOCAL BEER ✦ REFRESHMENTS ✦ CHILDREN'S GAMES & DEN BUILDING ✦



SOUTH DOWNS
NATIONAL PARK



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EDITOR'S NOTE

Thank you for your contributions and please keep them coming. Newsletters are published in March and November each year. Items for publication, normally not exceeding 500 words, should be received by 14 February and 14 October, respectively, for inclusion in the forthcoming issue. Please send by email preferably, by CD or hard copy; I can work with most PC formats. Line drawings and photographs are welcome (colour or monochrome; the newsletter is published and emailed in colour but printed in monochrome). **Please send images as separate files, not embedded in the text. Captions should be included with the text, not added to images.** Digital images need to be at least as big as their expected published size (column width 86mm), ideally at 300 dpi or more.

PUBLICATIONS FOR SALE

	PRICE	
	BY POST (UK)	AT MEETINGS
<i>British Cast-Iron Firebacks of the 16th to Mid 18th Centuries</i> , J. Hodgkinson (2010)	24.99*	24.99*
<i>The Wealden Iron Industry</i> , Jeremy Hodgkinson (2008)	15.99*	15.99*
<i>Excavations of a Late 16th/Early 17th c. Gun-casting Furnace at Maynard's Gate, Crowborough, Sussex, 1975-1976</i> , O. Bedwin.	2.00	1.50
<i>A Middle-Saxon Iron Smelting Furnace Site at Millbrook, Ashdown Forest, Sussex</i> , C. F. Tebbutt.	2.00	1.20
<i>The Fieldwalker's Guide and an Introduction to the Iron Industries of the Weald</i> , B. K. Herbert.	4.00	3.50
<i>Metallurgical Analysis of Ferrous Alloy Produced in a Primitive Furnace</i> . R. C. D. Sampson & B. K. Herbert.	5.00	4.00
<i>The Penhurst to Ashburnham leat: a first foray + map</i> (2007)	2.25	1.50
<i>The Penhurst to Ashburnham leat: a second foray + maps</i> (2007)	2.25	2.00
<i>The Penhurst to Ashburnham leat: the flow rate + graphs + map</i> (2007)	3.25	2.50
<i>Fernhurst Furnace</i> . Chichester District Archaeology No. 2, J. Magilton (ed.).	14.00	12.00
<i>Second series Bulletins: -</i>		
Volumes 1 to 24 (1981 to 2004)	each 2.00	1.50
Volumes 25 to 35 (2005 to 2015)	each 2.50	2.00
<i>Note: Vols. 5, 10, 15 & 20 have 5-volume cumulative indexes. Vols. 21 onwards are separately indexed</i>		
<i>Index for Wealden Iron</i> , WIRG Bulletin 1st ser. Vols. 1-17 and 2nd ser. 1-20	2.50	2.00

Publications are available from the Publications Officer, Brian Herbert (see Contact List above)
Cheques payable to **WIRG** (except where marked* - payable to J. S. Hodgkinson)