

Newsletter 69 Spring 2019

Editor: Jonathan Prus email jonathan@avens.co.uk Phone 01435 830155

In this issue:

- p.1 Fri 26 to Sun 28 April WIRG Spring Visit
- p.2 Knepp Furnace Pond
- P. 2 Treading The Wheel some further thoughts
- p. 2 Using Historic Environment Records
- p.3 Review. The Anne Forster Firebacks.
- p.4-5 The Confraternity of the historical investi-

gators of the Sussex Iron Age.

- p.6 Filming at a Furnace
- p.7-8 The death of the Wealden Iron industry
- p. 8 Protection of Iron Industry Sites
- p. 9 Notice of publication
- p. 9 Forthcoming radio programme

p. 10 A failed attempt to revive ironmaking on the Weald

p.11 Adventure in Iron published and available

WIRG contacts:

Chairman: Bob Turgoose. bobturgoose@yahoo.co.uk Hon. Secretary: Tim Smith. secretary@wealdeniron.org.uk Treasurer: Shiela Broomfield. treasurer@wealdeniron.org.uk Editor of Wealden Iron, The Bulletin of the Wealden Iron Research Group: Jeremy Hodgkinson. jshodgkinson@hodgers.com

Newsletter Editor: Jonathan Prus. jonthan@avens.co.uk

Fri 26 to Sun 28 April WIRG Spring Visit

We will be visiting a mixture of sites in South Wales the weekend after Easter with an emphasis, but not exclusively, on tinplate production including visiting a 'modern' continuous coating plant, Tata Steel Trostre, in Llanelli which also has a small museum on site. The plant visit will be from 3pm on Friday 26 April to give time to travel down.

Other sites to visit will be the remains of a tinplate works at Aberdulais, Neath owned by the National Trust (bring your card if a member for free entry) and a preserved tinplate works at Kidwelly, if I can get them to open it for us as it has restricted opening times. Once we are all 'plated out' we will visit 19C works in Merthyr Tydfil and possible a return visit to Blaenavon for those who did not make the Forest of Dean trip or would like to see the works again. Alternatively, 'The Big Pit' is nearby which includes an underground tour for anyone



Cyfarthfa

wishing to look at South Wales' coal heritage.

Expressions of interest to Tim Smith

secretary@wealdeniron.org.uk or Tel 01403 710148

Knepp Furnace Pond

The picture shows Knepp furnace pond drained for dredg-



ing. This indicates how much silt has built up since it was last drained some 75 years ago during WW II to prevent it being used as a navigation aid for German bombers. Knepp Furnace Pond was, until the Ardingly Reservoir was built, the largest open stretch of water south of the Thames.

Until the 1980s the lake used to freeze in winter providing a picturesque skating rink for ice hockey. In the past decade or so winters have not been cold enough for the lake to freeze sufficiently.

Shipley forge pond, a mile or so to the west, was also drained in WW II and was reinstated with a new bay over 25 years ago, and yet is still not shown on OS maps.

Tim Smith is developing an iron trail through the Knepp Estate as part of the Horsham District Council Year of Cultural. Knepp is known for its wilding programme with minimal intervention and free roaming long horned cattle, Tamworth pigs and Red and Fallow deer.

Using Historic Environment Records

Historic England have recently published a downloadable document on the purpose of and access to the Historic Environment Records.

HERs provide detailed information about the historic environment of a given area. They are maintained and updated for public benefit.

Users of HERs typically include developers, planning/ environmental consultants, statutory consultees, property owners, land managers, farmers, academic researchers, local societies, amateur historians/archaeologists, teachers, students and interested members of the public — as well as historic environment professionals working in the public, private and voluntary sectors. Consequently, both conventional and online content may require further interpretation, depending on the user.

Access to each region is via the Heritage Gateway: www.heritagegateway.org.uk/gateway/

The guide is downloadable from:

https://historicengland.org.uk/images-books/ publications/guide-to-historic-environment-recordsengland/heag266-guide-hers-england/

Treading The Wheel - some further thoughts

Jonathan Prus has offered a possible solution as to how in the dry winter of 1743-4 the ironworkers had to tread the water wheels at three Wealden furnaces. While the physical difficulty of balancing on the furnace water wheel might have been a bit precarious, it may have been possible to tread it from the side, standing next to the bearing and stepping down on the spokes, or arms, in turn. The memoranda that precede the accounts of Robertsbridge and Beech Furnaces in the 1720 mention that the bellows 'puffed' about 12 times a minute, so if each of the two bellows blew six times and there were three cams for each of the bellows on the axletree, the waterwheel would only have to rotate twice a minute - nowhere near the speed of a corn mill wheel. When I first read of this rate of rotation I calculated that treading the wheel in those circumstances would be equivalent to walking briskly upstairs. This might have underestimated the additional effort needed to depress the bellows as the wheel went round, so maybe it took a couple of ironworkers at a time, working in shifts to keep the wheel turning.

Jeremy Hodgkinson

Review

The Anne Forster Firebacks. Jeremy Hodgkinson in *Surrey Archaeological Collections*, 101, 99-114, 2018 When Anne Forster, a mother of seven children, died in 1592, her graveslab, installed in St George's church, Crowhurst, was singularly ornate. Measuring 136 x 53 cm it boasted a twisted rope border (hitherto a fireback device); images of a shroud, two running boys and two kneeling girls; her family's Gainsford arms as well as the Forster's; 76 grape

Chellows.

Subsequently twelve or more firebacks were cast from Anne Foster's epitaph. Despite pattern variations, distinctive decorations and other marks suggest Pounsley furnace, Framfield as the source. The author painstakingly charts their distribution, which followed family members to some extent, by listing the earliest known locations of the surviving fire backs including Weston's Place, Warnham, and Isfield Place. Useful illustrations show the



A grave-slab variant of the motif discussed in the paper reviewed here.

patterned stamps (another occasional fireback motif); and a curious epitaph that includes the assertions: "davghter and heir to Thomas Gaynsford Esqvier ... leaving behind her II sons and V daughters".

This article investigates the Gainsford's complicated genealogy involving remarriages, partial executors and inheritance disputes. Anne's father Thomas was the son of Sir John Gainsford of Crowhurst Place by his fourth wife. He inherited only a lifetime interest in his father's property, after which it would pass to a younger half-brother Erasmus. Thomas's heirs were not included. However Anne eventually inherited most of her father's estate after her only brother John (hitherto judged mentally incapable), died in 1559 and after tortuous negotiations with the Gainsfords. Her uncle Erasmus finally ceded most of the estate, keeping the manor of Crowhurst and an iron forge in the manor of various recasts of the ever present epitaph.

Historians have debated why her family troubled to reproduce her epitaph so often on firebacks and distribute them. It has been suggested that relations with her grandfather's kin were such that her own family still perceived a necessity to reassert the legitimacy of her claim on her father's estate, and therefore her children. Alternative explanations posited include the general popularity of the epitaph pattern, or even decorative indolence on the part of the ironfounder. Hodgkinson's extensive biographical research makes a convincing case for the first opinion, revealing the extent of the antipathy from the Gainsfords. This paper also reminds us how the iconography on firebacks, mundane domestic artefacts of limited interest for many, can contain intriguing stories about past lives. **Helen Pearce**

3

The Confraternity of the historical investigators of the Sussex Iron Age.

Almost 100 years ago, in the early 1920's, a group of researchers were attempting to find the lost iron works of the Weald, lead by writer and illustrator Donald Maxwell (1877-1936). Maxwell was working on his book "Unknown Sussex" when he received this telegram from his companion, Brown :

Eve of great discoveries. Come at once to Pevensey even if you can only spare one day. Lord Carnarvon also ran. Brown.'

From his friend's 'facetious allusion to Lord Carnarvon', Donald Maxwell anticipated a discovery exceeding the opening of Tutankhamen's tomb. The two men met up in Sussex and journeyed to Ashburnham where they proceeded to investigate the landscape features left by the old furnace and forge, Maxwell making many sketches.

As a topographical artist and detective he sought and sketched many of the former iron working sites in the Weald over the following years and his exquisite drawings and paintings have left us a valuable record of the landscape ---- descriptions of sites even before Straker's explorative work. Ernest Straker did in fact acknowledge Maxwell's research at Buxted.

Maxwell and his companion Brown worked on maps, place names and documentary research prior to their field excursions. They found numerous old furnace and hammer ponds, bays and mill sites. Many of these are illustrated in Donald Maxwell's books; Unknown Kent (1921), Unknown Sussex (1923), Unknown Surrey(1924), History with a sketchbook (1926) and A Detective in Sussex (1932).

Brown and Maxwell delighted in finding the new uses that ponds created for the iron industry had been put to, such as harvesting water lilies and making electricity (the Wire Mill at Woodcock hammer) and growing watercress (Abinger Hammer).

Brown seems to have been a true enthusiast for historical research in the direction of iron. At times he was joined by other 'brave spirits' who showed an interest. Besides Brown and Maxwell, these were; Eve (Maxwell's wife), Audrey and Veronica the Maxwell daughters (always referred to in their father's books as Scylla and Charybdis) and a naval man called Captain X. The group called themselves the Confraternity of the Historical Investigators of the Sussex Iron Age.

By one summer in the very early 1920's, more volunteers were enlisted as historical researchers.

Eve had found eight people with cars interested in the scheme; Scylla 'produced a legion' of fellow Girl Guides; Charybdis came 'armed with a swarm of Brownies, some several feet high'; Captain X brought two juniors and a car; Maxwell had produced a consulting engineer, someone from the Ordnance Survey, another artist and the great nephew of an iron founder.

With everyone assembled, Brown set the scene and organised the group into five 'Departments'.

1. The Water Power Department: Captained by Maxwell, to look into hammer and furnace ponds, sluices and mills that may once have powered iron works.

2. The Nomenclature Department: To verify clues found on maps such as Cinderhill, Forge Farm, Culver Wood, Thunder Hill and Boring Farm.

3. The Geological Department: Determining the nature of formations in iron country as well as slag heaps and deep ponds which could be in former ore pits.

4. Local Intelligence Department: Their job was to interrogate village inhabitants about the iron industry and find traditional stories. Carried out by Scylla, the Guides and Guide Captain.

They even 'ran down a man whose grandfather had worked in the last blast furnace in the south, closed down in 1825.'

5. Tombstone Department: This task was given to Charybdis, the Brownies and Brown Owl; to go into every churchyard and report on the date of every iron headstone.

Brown sat at GHQ for three days receiving reports. Donald was sent to Wadhurst to sketch some tombstones but on the arrival of a telegram from Scylla about high embankments in woods at Little forge near Buxted, he and Brown



set off to find the place. They were soon joined by most of the other departments who assisted in taking measurements and conjecture as to where the forge had stood.

On the fifth evening of the group campaign everyone assembled on the banks of a hammer pond where, within the walls of a ruined oasthouse, Brown had made a large relief map of the Weald out of earth, ashes, moss and pieces of glass. All the known furnaces were shown as small smoking fires.....'the Lost Iron Age in full blast.' Donald Maxwell's painting of Brown's fiery image is printed in his book "Unknown Sussex" (see above).

Brown and Maxwell went on to search for iron working sites in Kent and Surrey too, and had planned to produce a book called 'The Lost Iron Age of The Weald' concerning the history from Roman times to the Nineteenth century.

So who was Brown ?

Maxwell's friend who inspired and accompanied him on so many adventures, besides those into former iron works, is never given his real identity in the books. One might be mistaken for thinking he was just an alter ego of Maxwell.

A clue that Brown was a very close friend or even family member is hinted at in the book "Unknown Suffolk" when sailing up the river to Blythburgh. Maxwell writes 'Our party consisted of the full compliment of the Penguin; Brown, Eve, Scylla, Charybdis and myself. Maxwell's assistants, playing the part of Watson to his Sherlock Holmes as he liked to believe, were always referred to as 'Brown' whoever they were.

In 1995, Michael Ffinch, a son of Veronica Maxwell, produced a stunning book on the life and art of his grandfather. [Donald Maxwell 1877-1936, published by the Maxwell Estate]. The family knew that 'Brown' was not always the same person but Ffinch simply states 'quite often Brown was Donald Maxwell's younger brother Gordon who shared many of his adventures.' Both brothers were keen sailors and had served in the RNVR in the North Sea Patrols during the First World War. Gordon had a long career in the Navy but was also an author. I found in his book "The Fringe of London" (1925), the proof that he was 'Brown'. He writes 'The story of these old iron workings is a romantic one that fires the imagination and many delightful days have I had with my brother in searching for traces in the woods and villages of Sussex when he was working on his book 'Unknown Sussex.'

I suppose the answer to Brown's identity lay before us all the time......a confraternity is a brotherhood.

Geraldine Crawshaw

Filming at a Furnace

I was recently asked if I would take part in the filming of an episode of *The Antiques Road Trip*, a television series in which a pair of antiques experts vie with each other in making purchases at antique shops and then selling them at auction in the hope of making a profit for Children in Need. In each episode the experts leave off their search for bargains to visit a site of interest in the area where they are being filmed. The series is produced by Scottish TV and eral; then a more detailed explanation of how the site operated and how that related to the remains. What will probably last five minutes on screen took the best part of two hours to shoot, with several retakes of each shot, extra shots from different angles to catch reactions, close-ups, long shots and even filming of feet walking in the mud! The whole process was in the charge of the director, who doubled as cameraman, and his two assistants.

Interpreting the remains, which largely comprise the outlines of the wheel pit, is difficult at the best of times but as they are partially concealed, at present, by two large pipes



A view from above of North Park Furnace showing the pipes diverting the water away from the remains

broadcast on BBC2.

On this occasion the site that was chosen was North Park Furnace, near Fernhurst, in West Sussex, owned by WIRG members Robin and Carla Barnes. North Park is one of only a very few furnaces in the Weald where there are visible remains of structures, and some readers will remember visiting the site when WIRG's Summer Meeting was held at Fernhurst in 2007.

Filming took place on a windy day in mid March. A few weeks earlier, I had discussed with Danny, the production company's researcher, how the furnace site represented what had happened in the Weald more than 250 years ago. From that a report was prepared which guided the crew as to what the content of the series of filmed sequences should be: a general chat between me and the visiting expert, auctioneer Catherine Southon, about the iron industry in genthat are currently being employed to divert the flow of water from the furnace pond past the remains, use was made of a working model of the furnace, its water wheels and bellows, to explain to the visiting expert how the furnace operated.

After I had finished my contribution, filming continued with blacksmiths, Robert and Carol Smith, whose mobile smithy has been a part of the Fernhurst Furnace Open Days, forging a knife for Catherine to take away. The next Open Days will be on the 14th and 15th September 2019, and broadcast of the episode of *The Antiques Road Trip* is likely to be in the Autumn.

Jeremy Hodgkinson

The death of the Wealden Iron Industry

This note is another excursion into the published literature of the iron industry.

The cause of the death of Wealden Iron production is still a matter of debate but recent research can, at least, rule out some of the more hackneyed answers. Richard Williams (2013, 2017) has published two articles that explain the chemistry and the industrial dynamics of Abraham Darby's use of coke to smelt iron for casting. Darby began in Colebrookdale in 1709. From the point of view of understanding the impact of Derby's innovations on the Weald, the key point is that this was a pot-casting business started at an existing charcoal blast furnace similar in shape, form and size to those in the Weald. Instead of charcoal he used coke as the fuel. Apart from the use of coke, his process incorporated the use of sand moulds from which he obtained thin-walled castings. Williams argues that the key technological problem facing Darby was filling the moulds with liquid iron before it started to

solidify. The use of coke permitted a longer retention time for the furnace charge and so, crucially, time for the iron to take up additional carbon and silicon. The combination of iron, carbon and silicon produced a liquid that was more runny than it would otherwise have been at that temperature.

Darby's pots were cast in green sand moulds which were cheaper than the loam moulds that had been used until then. Loam pot moulds had to be pre-heated to produce a thin-walled pot from charcoal-furnace iron *or* the pots had to be cast with thicker walls. His combination of innovations was a money-maker, but cast iron-coke was still only of limited use.

The iron produced at Coalbrookdale was "grey cast iron". This metal is characterised by the presence of graphite plates which form during the cooling process. It was, at that time, rather difficult to refine grey iron into wrought iron, and finery forges tended to reject it as a feedstock. Finery forges needed white cast iron pig: white cast iron



tended to have a lower carbon content, and that carbon formed an alloy with the iron. It was not until the period between 1745 and 1750 that coke-smelted iron began to be made and used widely in direct competition with the sort of charcoal-smelted iron produced in the Weald.

The work of Peter King (2005) contains the best estimates of blast furnace iron production in the Weald The trajectory of Wealden iron production is shown graphically in the chart on the previous page. IThis chart was prepared by WIRG Hon. Secretary Tim Smith, but paints the same picture as King's tonnage-output tables.) It is quite clear that the industry was in terminal decline before coke smelted iron became a direct competitor. This does not mean to say that the coke industry did not deliver the *coup de grace*. It is, however, compelling evidence that Darby's innovations did not cause its decline. We probably need a multiple-

cause explanation.

Readers of this newsletter may ask the editor for help in locating the articles referred to above.

Jonathan Prus

References:

Williams , R. (2013) A question of grey or white: Why Abraham Darby 1 chose to smelt iron with coke. *Historical Metallurgy Vol. 47.2* and

Williams, R. (2017) The performance of Abraham Darby 1's coke furnace re-visited, part 1: temperature of operation. *Historical Metallurgy Vol.* 51.1)

King, P. (2005) The production and consumption of bar iron in early modern England and Wales. *Economic History Review* Vol. 58.1

Protection of Iron Industry Sites

At Beckley one end of a bay has been destroyed during construction of a pair of garages (see photo). The development received planning consent and as part of the process the County Archaeologist was involved and insisted on shallow foundations. However, no conditions were attached to the consent to protect nearby earthworks, a significant omission for a site at which a forge, a blast furnace, and a corn mill had relied on water from the Tillingham. The banks and ditches built to channel water from the river to the waterwheels and back into the river are important for a full understanding of the site and should receive the same protection as buildings.

In the last few days WIRG has been made aware of a threat to the Lamberhurst furnace site from a proposal to construct a swimming pool. If planning consent were to be granted an underground conduit which was part of the system that took water from the river Teise to the furnace would be destroyed. We have written to Tunbridge Wells Borough Council objecting to the proposal, with a copy to the County Archaeologist. A decision is expected in early April. We are most grateful to the Lamberhurst Historical Society for alerting us to the threat.

Continuous vigilance is required to prevent destruction of the limited remains of the local iron industry. There are too many planning applications each year for WIRG to monitor them all. We would need a full-time scrutineer. Protection of sites is therefore dependent on WIRG members and local history/archaeology groups acting as eyes. If a site with iron industry remains is threatened please inform the committee so that WIRG can raise an objection with the planning authority and the relevant county archaeologist.

Bob Turgoose

Notice of publication:

Prehistoric and early medieval landscapes at North Park Farm, Bletchingley, Surrey

by Nick Marples and Rob Poulton SpoilHeap Monograph no 21 ISBN 978-1-912331-10-9 210 pages, 114 illustrations Price £20 + £3.50 p&p Available through: www.surreycc.gov.uk/scau

Excavations at North Park Farm Quarry, Bletchingley, between 1997 and 2014 revealed the development of a landscape through ten millennia. An array of Mesolithic treethrows and purposefully dug pits was identified in the areas surrounding the enormous flint scatter that lay within a valley hollow. It is unclear whether intensive usage ceased with the last of the Mesolithic hunter-gatherers, but much flintwork of Neolithic date, deriving from once intact surface scatters, was recovered, as well as an important feature with



Prehistoric and early medieval landscapes at North Park Farm, Bletchingley, Surrey

Nick Marples and Rob Poulton

placed deposits of Peterborough Ware vessels. Such ritual activity may be continued by Bronze Age cremations and a probable ring-ditch, but the evidence of scattered features

and flintwork also points to more regular agricultural activity and settlement at that period. Important and rare evidence of Early Iron Age ironworking was identified but there was little later Iron Age or Roman usage of the locale. There was a greater amount of earlier Saxon occupation, indicated by a well and a number of pits. In the early medieval period trackways and a field system, integrated with discrete areas of industrial and domestic activity, were developed. The eastern side of this regularly divided landscape was marked by a green lane, several roadside ditches of which were identified, and it seems likely that this route had been used from the Bronze Age onwards (perhaps even as far back as the Mesolithic period), as part of a transhumance economy, linking the North Downs and the Weald. The fields and settlements were obliterated with the creation of the North (deer) Park, probably in the later 12th century. The park included evidence for a pillow mound (rabbit warren) and associated vermin trap.

Forthcoming radio programme

Radio Four's *Open Country* is running an iron-themed programme about the Sussex countryside. WIRG members Jeremy Hodgkinson and Jonathan Prus were interviewed on-site at the Newbridge Furnace and Forge site by *Open Country* presenter Ian Marchant.

It turns out that Ian thinks that he is descended from a French iron worker who appears on the denization rolls. The database *wirgdata.org* gives details of a finer at the elusive Robertsbridge Forge in 1549 called Hugh Marchant.

The programme is scheduled for Radio Four at 3.30 on the 2nd. May 2019.

A failed attempt to revive ironmaking on the Weald

61 years after the closure of the last furnace on the Weald in 1813 - Ashburnham Furnace - the Brighton Guardian newspaper of 4th November 1874 reported on the setting up of a company to exploit the remaining ore bodies on the Weald, estimated to extend over 1000 square miles. A letter by a Mr W Figg, a surveyor by profession, argued that the conditions that led to the ending of ironmaking on the Weald were; 'of a past period and now have totally disappeared'. He continues: 'Sussex fuel was formerly confined to the charcoal from surrounding forests, and all carriage was by water, as no real roads existed passable by other than bullock waggons, and then only with light loads.' The advent of railways from the 1840s now opened up the region to which coal could be brought to make coke iron. Figg argued that improvements in furnace design had reduced the amount of coal required per ton of iron from nine tons in 1781 to five tons in 1851 and just 1.1 tons in 1871. Further, Figg claimed coal consumption could be reduced as low as five to six cwt (0.25-0.30 ton) by the substitution of coke by gas as fuel – a remarkable claim bettering the performance of modern blast furnaces. The gas required, he says, 'is produced abundantly from chalk, by the use of the waste gases of the furnaces. Nine tons of chalk and one ton of carbon suffices for the production of four tons of iron; and it is estimated, and fairly so, that the lime produced will pay for the carbonic *acid gas.* 'The 19th century term 'carbonic acid gas' refers to carbon dioxide which is produced by the calcination reaction of chalk or limestone at about 800°C:

 $CaCO_3 \rightarrow CaO + CO_2$

At a more elevated temperature around 1000°C, in the presence of carbon, $\rm CO_2$ can be reduced to carbon monoxide by the reaction:

 $C + CO_2 \rightarrow 2CO$

Carbon monoxide, which acts as both a fuel gas and a reducing agent, was named 'Carbonic Oxide' at this time. The above reactions readily take place at the upper and mid-levels respectively of the blast furnace shaft, but Figg is evidently advocating the production of additional CO_2 in a separate furnace since he comments that the lime produced would be a valuable by-product and that the heat could be supplied from the waste gases of the blast furnace. Indeed, such shaft furnaces, utilising the furnace waste gases to calcine ore, were a common feature of Swedish blast furnaces at this time.

Technologically, Figg's proposal to inject CO_2 into the blast

furnace is unfeasible. The reaction for the reduction of CO_2 to CO is endothermic and so would chill the furnace, and the addition of excess CO_2 as proposed would also require the addition of more carbon thereby negating the claimed fuel savings. Indeed, if his proposal could work, the modern steel industry would solve its CO_2 emissions by recirculating top-gas and could offer to take CO_2 from other emitters such as power stations to reduce global warming.

Figg describes the local ore as containing 36-42% iron content (which agrees with other analysis) and says that for the most part the ores are in shallow deposits avoiding the expense of underground mining making extraction half the cost of underground mining as practiced in the North of England. He mysteriously also claims that the ores are suitable for making malleable iron and cast steel direct from the ore, thus doing away with refining the furnace iron as, for example, in the, by then, recently established Bessemer process. Indeed, the production of malleable iron, direct from the ore is a much sought after technology still unsolved today.

Figg's enthusiasm in reviving the iron industry was no doubt sparked by the formation of the Wadhurst Ironstone Mining Company around 1857. A supposedly rich seam of ore had been found during the construction of an extension to the South Eastern Railway branch line to Wadhurst in 1851-2. To exploit this, the Weald's only underground iron ore mine was commenced in Snape Wood in August 1857 the plan being to send the extracted ore to Shropshire for smelting via the railway. However, frequent faults in the ore bed and the lack of a rail siding to load the ore resulted in this being a short lived attempt, the mine closing just a year later in September 1858. The quality of ore was also questionable being low in iron and high in silica. A study of 1908 to consider reopening the mine gave a negative report and again, during WWI, re-opening was investigated but considered unviable.

Should anyone have come across other references proposing the injection of 'carbonic acid gas' into the blast furnace please contact me at secretary@wealdeniron.org.uk

Tim Smith

For pictures of Snape Mine visit:

http://www.subterraneanhistory.co.uk/2008/07/snapemine-east-sussex.html



PART ONE

Adventure in Iron

The blast furnace and its spread from Namur to northern France, England and North America, 1450-1640; a technological, political and genealogical investigation

by Brian G. Awty

ISBN 978-1-9160423-0-8; case bound in two parts; 977pp; 302mm x 216mm 37 black and white illustrations and maps of sites; two appendices; detailed contents pages, footnotes and bibliography; general and names indexes.

Making extensive use of British and continental archival and published sources, many previously unexplored in this context, *Adventure in Iron* describes the way in which the early history of the indirect ironmaking process in England is integrated into the parallel story on the Continent, and provides a detailed biographical approach to the migration of ironmasters and workers from the Continent to South East England in this period.

'A major contribution to understanding the process of technological diffusion in early modern Europe. The book breaks out very successfully from the strongly Anglo- centric tradition in studies of the early modern iron industry in this country and puts England fully into a European context'. Philip Riden, Nottingham University

Published April 2019 in a limited edition of 350 copies by the Wealden Iron Research Group **£45.00 + postage & packing.**

Only available from **www.wealdeniron.org.uk**

