



Newsletter 79 Spring 2024

Editor: Jonathan Prus email jonathan@avens.co.uk

Phone 01435 830155

In this issue:

A FORAY TO MARK CROSS p. 2

HOW CAN WE KNOW HOW THEY THOUGHT? p.3

ROMA OGILVY Watson p.3

FURTHER DISCUSSION OF FINANCIAL AND MANAGERIAL METHODS OF CONTROL IN THE EARLY MODERN IRON INDUSTRY p.4

MINEPITS AT FERNHURST p.5

IRONMASTERS' BUSINESS DECISIONS p.6

A TUDOR FIREBACK REDISCOVERED p.7

THESES AND DISSERTATIONS ON THE WIRG WEBSITE p.8

ANOTHER WEALDEN CANNON IN NEWFOUNDLAND p.8

THE FORMATION OF BLOOMS IN PRE-MODERN SMELTING. SOME POSSIBLE EVIDENCE FROM THE GREAT PARK WOOD EXCAVATION. p.10

Getting in touch with WIRG:

Chair: Bob Turgoose

bobturgoose@yahoo.co.uk

Secretary: Tim Smith

tjsmith560@btinternet.com

Treasurer: Shiela Broomfield

S.b.broomfield@outlook.com

Editor of the Bulletin: Jeremy Hodgkinson

jshodgkinson@hodgers.com

Summer Meeting & AGM

Saturday 27 July 2024

To be held at

**Dallington Village Hall, The Old School,
The Street, Dallington, TN21 9NH, East
Sussex**

10.30 Refreshments – Meeting commences at 11 am

(No car park – please park on road)

A talk entitled '**London and the Iron Trade 1690-1830**'

will be given by WIRG President, Philip Riden,

The WIRG Annual General Meeting will commence at 12-30pm

In the afternoon there will be a site visit to Ashburnham Furnace TN33 9PG the final furnace to close on the Weald in 1813. (Please look out for parking details on arrival).

Visitors welcome but only current WIRG Members can vote or speak at the AGM.

If you would like to join the Committee please contact the Hon Sec, Tim Smith by e-mail at secretary@wealdeniron.org.uk or telephone 01403 710148

A FORAY TO MARK CROSS

Back last June, at the invitation of Joe Gingell, who farms Earlye Farm, Wadhurst, I visited the site of Riverhall Furnace which is on his land. After trying to make sense of the furnace site in what was not the best time of the year to visit it, Joe said he had found places where he thought there was iron slag and took me to see them. They were on land belonging to Frankham Farm, which Joe also farms. The first site was at the north-east corner of Frankham Wood. Some large lumps of bloomery slag were lying in the stream. I made a note of the location with a handy app I have on my phone (GridPoint GB). We drove on in his Land Rover to the next site he had found, spotting a couple of roe deer as we crossed the fields. Where a farm track crossed a stream we stopped and Joe pointed out where other large pieces of slag were lying in the stream bed. Again I recorded the location with the intention of checking the WIRG database when I returned home to see if either of the sites he had shown me had already been not-

ed.

Checking the database I found that there were a dozen or more bloomery sites or slag scatters in and around Frankham Farm. None had been dated and neither of the sites Joe had shown me had been recorded previously. It was going to be worth Field Group members taking a more considered look at these new sites to gauge their extent and, if there was time, to look at some of the other sites as well. So a foray was organised in February 2024 when the undergrowth was low and there was greater visibility than I had experienced in June.

The first site we looked at was the second of the two I had seen last summer. It turned out to be three sites in succession along the stream which runs along the north western end of Sprayfield Wood (TQ 5998 3203 to TQ 6003 3207). Slag heaps were noted cut through by the stream with slag at two of the sites noted on both sides of the stream. At the third site a level platform was noted in the wood some 15m away. The sites have been added to the database as



Field Group members at Frankham Farm

Frankham Farm 12, 13 and 14 although it is possible that they could constitute one continuous site. Only dating would confirm that.

The other site Joe had shown me, now Frankham Farm 11, at TQ 5957 3219, was atop the stream bank and the darker colour of the bank indicated where it had been stained with charcoal. Slag in the ground could be detected above the bank for a short distance suggesting this was a small site operated over a brief period. One particular lump of slag lying in the stream was notable for its size, being about 30cm long and 15cm thick.

We decided to walk up the stream into Frankham Wood but did not encounter any more sites. We then turned our attention to three scatters of slag that had been recorded close to the farm back in the early 1980s, but dense undergrowth, rubbish tipping and landscaping meant that we were unable to find any of the scatters. By that time we were ready to call it a day.

Jeremy Hodgkinson

HOW CAN WE KNOW HOW THEY THOUGHT?

In the last issue of this newsletter, we started a discussion about the thought processes and procedures that accompanied business decisions in the early modern iron industry of the Weald. Further discussion is included in this issue.

We know that some of the things people thought in (say) the 16th and 17th centuries seem a little peculiar today, but my contention is that we can see what they meant. Moreover, we can see how their thoughts contrast with what one might think today. (Note that this is a one-way-street. They could not look forwards and test their ideas against future frameworks. We need not equate peculiar ideas with stupidity.) In fields such as religion, natural science and political philosophy, there are copious bodies of work to draw on. Not only can we see and understand redundant modes of thought in the early modern period, but we can also see how sharply differing ideas interacted and developed.

A difficulty that we face is that ideas are most easily picked out from written evidence. Evidence of decision making in the Wealden iron industry appears to be scant, but maybe that simply means that it has not been collated for the purposes I suggest. Another method of assessing the thinking of

the past in one area (say the Weald) is to look for comparisons with other areas where there is better evidence. This is useful but has to be qualified with the certain knowledge that different areas can develop at different rates. In the heyday of the Weald industry its leading actors often had iron interests with other areas, and *vice versa*, so any comparisons may be useful.

At another level there is also need for considerable caution. We can be fairly certain that we interpret ideas from the past using the ideas that permeate *our* present. There is every possibility that a future generation may interpret past processes and thinking differently. So, whilst we can often trace past thinking and its subsequent development we cannot guarantee a *definitive* set of answers. We do the best we can for now.

In this issue I am delighted to present, first, a piece by Dr. Peter King, one of the few experts in the structure and development of businesses in the early modern iron industry in Britain. Secondly, a note from Bob Turgoose discusses profit margins; these may shed light on some types of decision making.

Editor

ROMA OGILVY WATSON

I was very sorry to learn of the recent death of Roma Ogilvy Watson at the splendid age of 105. She was a very long-standing member of WIRG and had attended many of our forays and excavations and came to the Winter and AGM/Summer meetings until fairly recently. She was always a delightful, friendly, hardworking and interesting person to meet with a broad knowledge of both the Wealden Iron Industry and local history especially to do with Wadhurst. She will be much missed but certainly has left me with some very happy memories.

Shiela Broomfield

FURTHER DISCUSSION OF FINANCIAL AND MANAGERIAL METHODS OF CONTROL IN THE EARLY MODERN IRON INDUSTRY

This response, to the queries in WIRG newsletter 78, relates more to the British iron industry generally than specifically to the Weald, where the heyday of the iron industry was earlier than elsewhere. Much of the detail on what follows will be found in P.W. King, 'Management, Finance and Cost Control in the Midlands charcoal iron industry', *Accounting, Financial and Business History* 20(3) (2010), 385-402 (<http://dx.doi.org/10.1080/09585206.2010.514410>).

I have rarely (if ever) seen any documents soliciting working capital, but some ironmasters borrowed significant sums on interest-bearing bonds to finance their businesses. Where there was a partnership, the borrowing might be by a partner to pay up his share of the capital, rather than by the firm itself. This was a relatively simple way for a person, with a few hundred pounds to invest, to secure a return on their money, with less expense than a mortgage. My main evidence on that relates to the ironworks of the Foley family in the west Midlands and Gloucestershire. The Foleys (at least) allowed themselves interest at the maximum legal rate on their paid-up capital, which would enable them to pay interest to their bond creditors.

The interest rate was reduced from 6% to 5% in the 1710s. It had been higher still under Elizabeth. Payment of higher interest was regarded as usury and illegal. Where a landowner, who had been operating an ironworks himself let it to his manager (or another), he might effectively include his working capital in the deal. In this case the tenant would sign a bond to secure this. In a bankruptcy, bond creditors had 'specialty' and ranked as creditors before simple contract creditors.

The document for a bond was a relatively simple one, commonly on a single sheet of paper. The top part being the bond itself (usually in Latin until 1733), usually for double the amount borrowed. This entitled the creditor to obtain judgment at Common Law, as there was no defence other than that the debt had been paid. The bottom part was the condition, which declared the bond void if the condition was fulfilled, in this case repaying the debt with lawful interest. Earlier bonds were written on strips of parchment with the bond on one side and the condition on the other. If the creditor sought to exploit the full penalty, the Court of Chancery would intervene to enforce the condition. Survival of these bonds is poor, perhaps because a simple means of cancelling a bond that had been paid was to burn it. Bonds were also used to secure the performance of contracts (and conveyances), again with the penalty being double the consideration, in which case the condition was to perform the covenants etc. in a pair of indentures (or articles) of even date.

Pollard is wrong in saying that double entry bookkeeping was a 19th century innovation in the iron industry. John Fell & Co of Sheffield were using the Italian Method of

double entry bookkeeping (with a journal and a ledger) from the 1690s, possibly from 1675 (but nothing survives), as were the Cheshire Ironmasters. The Coalbrookdale Company used such a system from 1718, but with three books, a cash book (for all cash payments), a stock book (concerned with production and sales and purchases), and a ledger (which does not survive, but whose existence is implied by references in the others). The Foley family used a system where there was just a sort of ledger. Often what survives is only the accounts in an annual report to the partners, which does not indicate what kind of more detailed accounts lie behind the annual account.

If the accounts are prepared in a suitable manner, for example by treating a furnace in the ledger as if it were a person, its costs can easily be extracted from the ledger. This means that separate management cost accounting was unnecessary. The difficulty with the Italian Method is that checking the accuracy of the bookkeeping, by taking a trial balance is an onerous task, leading to more foolproof financial accounting methods being developed in the 19th century, but these needed there to be separate cost accounts for management purposes. Ironmasters seem to have monitored the yield, the quantity of raw material consumed per ton of product.

I have not seen routinely seen anything about depreciation, but I have occasionally seen amortisation of capital expenditure: the premium for a lease or building works on leased property being written off against profits by equal annual instalments over the duration of a lease. For a steel business at Sheffield, accounting between two related partnerships included an allowance for the cost of a vault (over a cementation furnace) apparently according to the estimated life of the vault. However capital expenditure rarely appears as a separate item. In some cases, this can be conceptualised as a rent paid to a partner who had invested capital in setting up the business.

I found a case (a lead smelting business in the 1680s) where aristocratic financiers failed to understand the difference between capital and revenue, probably because they were only used to estate accounting using charge and discharge accounts, rather than recognising that they were invested in a profitable business where their capital needed to stay invested until the profits were sufficient to repay it.

Peter King



MINEPITS AT FERNHURST

This remarkable photo, taken from a drone, shows a part of Minepit Copse south west of North Park Furnace (the pond can be seen in the top right corner), which was felled recently revealing the surface pockmarked with the filled-in minepits sunk into the Weald Clay that gave the wood its name. Views like this are rare with either trees normally obscuring the view or centuries of ploughing levelling out the ground surface. The profusion of pits is reminiscent of those excavated a few years ago at Rose Mead, Horam, and reported in *Wealden Iron* in 2022. We are grateful to Fernhurst Furnace Preservation Group for sharing this picture with WIRG.

IRONMASTERS' BUSINESS DECISIONS

In Newsletter 78 (Autumn 2023) the Editor raised a number of questions about decision taking by ironmasters in the early modern period. In response in the same Newsletter Jeremy Hodgkinson reminded us that "the past is a foreign country". In the context of business organisation one major difference is the absence in the 18th century of limited liability for most businesses, including the iron industry. At that time limited liability could only be secured by obtaining a Royal Charter, such as that held by the East India Company, or through a private Act of Parliament, the course followed by canals, turn-pikes and, in the 19th century, by railways. Royal Charters and Acts of Parliament were only available to the well-connected and the very wealthy.

A consequence was that ironworks were owned by single individuals or families or by partnerships, each of which would have a small number of partners. The partners would have had a high degree of trust in each other, each would need to be kept aware of the success, or otherwise, of the ironworks, and each would have been involved in major investment decisions. With a limited number of participants there would have been no need for formal accounts to be prepared. It was only in the mid-19th century when limited liability companies with large numbers of shareholders were permitted that it became a requirement for companies to prepare accounts and have them audited.

Profits of gun-makers

The Editor's note and Jeremy's Hodgkinson's response both raise the profitability of Wealden ironworks. The Editor asks if profits were so high that forward planning was unnecessary. The response suggests that ironworks in the ordnance trade (gun-makers) could set their own prices in war time. This implies that they collaborated to extract high prices from the Board of Ordnance. In modern terms they formed and maintained a cartel. Information on prices and purchases of iron cannon by the Board of Ordnance from Wealden gun-makers between 1700 and 1770, presented in an article by Tomlinson in the *Economic History Review* in 1976, throws some light on whether the gun-makers achieved higher prices.

Wealden gun-makers were well placed to form a cartel. They were few in number, Tomlinson indicates that at any one time there were only four or five major suppliers to the Board. They were geographically concentrated and often had family connections making collaboration easy. A frequent cause of cartels failing has been the actions of entrants attracted into an industry by the higher prices. Wealden gun-makers had little to fear from new entrants. A potential entrant would have had to overcome many obstacles, for example securing a site with adequate water resources, as well as access to ore, charcoal and skilled labour.

However, the gun-founders had only one customer, the Board of Ordnance which procured cannon on behalf of the Army and Navy. Purchases of cannon by merchant shipping were small compared to the demand of the Board. Exports were either banned or restricted. The Board held a strong

negotiating position against the gun-makers and would have had the ability to keep prices low.

However, relationships between the Board and gun-makers need to be considered against a broader background. It is suggested that in its negotiations with the gun-makers the Board would have had regard to national strategic objectives of ensuring the maintenance of sufficient gun-making capacity in the Weald to meet future requirements of the Army and Navy. Britain pursued aggressive commercial policies in the 18th century and was engaged in many wars and skirmishes.

In this respect the Board and gun-makers had common interests in ensuring sufficient capacity was retained in the Weald. Tomlinson divides the period from 1700 to 1770 into 27 war years (1702-1713, 1739-1748, and 1756-1763) and 43 peace years. During the war years the Board purchased 28,500 tons of cannon at an average price of £19/ton. In the 43 years of peace purchases totalled 12,700 tons at an average price of £17/ton. Annual average purchases varied between 1050 tons in times of war and 294 tons in peace time.

The prices reported by Tomlinson give no indication that the Board paid excessive prices for cannon. However, the Board may have supported gun-makers by making purchases greater than its immediate needs during peace years to keep sufficient furnaces in working condition. One measure of the success of its policies is that during the seven years' war (1756-1763) it was able to buy 14,300 tons of cannon, about one third of its total purchases from 1700-1770.

Questions for consideration

Did the tensions that must have existed between the Board and the gun-makers surface in any public debates in Parliament or the press during the 18th century?

Is there any evidence of the gun-makers actively lobbying to secure larger orders or more favourable prices?

Were there any public discussions which recognised the strategic nature of cannon manufacture and the need to provide support during years of peace?

Bob Turgoose

A TUDOR FIREBACK REDISCOVERED

In his pioneering paper ‘Iron Works of the County of Sussex’, published in 1849, Mark Antony Lower included an illustration of an interesting fireback which he stated was at Misfield Farm, Worth (Fig. 1). In fact Misfield should have been written Miswell, which lies just to the north of Turners Hill, along the road from where I used to live and work. Needless to say, I called at Miswell to see if the fireback was still there but it wasn’t. The illustration showed that the fireback featured a lengthy inscription: THOMAS VNSTE AD ISFILD AND DINIS HIS WIF ANO DOMINO 1582. It also bore the initials I and A and several heraldic stamps. I have searched for a Thomas Unstead and his wife with no success.



Fig. 2 James and Joan Hide’s fireback, 1582



Fig. 1 Lower’s image of the Miswell fireback, 1582

Lower also published the picture of another fireback (Fig. 2) with the same initials IA and date. Its inscription told of James Hide and Joan his wife. This couple I was able to trace to their marriage in Horley in October 1579, she being Joan Blackefane. Lower placed that fireback at a house called Sutton Hurst at Barcombe. It was still there in 1893 but the house was later demolished. That fireback has not reappeared.

Back in January this year an email came out of the blue from Beth Lintin, a Welsh speaker living in Yorkshire, who had seen an article in Welsh by the author, Geraint V. Jones, in *Gwreiddiau Gwynedd Roots*, the journal of the Gwynedd Family History Society, about a fireback that had been discovered behind a later fireplace in Gwesty Seren, a hotel in Ffestiniog, and enquiring if anyone knew any



Fig. 3 Thomas and Denys Anstye’s fireback, 1582 (photo: Geraint V. Jones)

thing about it or its origin. Beth sent me this photograph (Fig. 3). Very clearly it was the fireback from Miswell that Lower had illustrated. She had tracked it, and me, down from an image of Lower’s picture on my Firebacks website (hodgers.com/firebacks).

Delighted at this rediscovery I noticed that the inscription on the fireback differed from that shown on the drawing in Lower’s paper. The artist had copied it incorrectly and it actually read: THOMAS VNSTE ALIS FILD AND DINIS HIS WIF etc. Beth had already done some research among the online records of Sussex parishes and concluded that this was Thomas Anstie alias Field and Denise his wife, an initial V having been inadvertently substituted for the A of

Continued on next page

Anstie. This seemed entirely plausible to me; the Anstie surname was common in the Ansty area around Cuckfield and is noted in parish registers as Anstie alias Field and Anstie alias Holcombe. With a bit more research I was able to discover the marriage of a Thomas Anstye and Denys Joyner at Wivelsfield in June 1564, very probably the couple for whom the fireback was subsequently cast.

The Miswell fireback is one of a large group of backs that share combinations of decorative stamps and date from the mid- to late-16th century. I have recorded 63 firebacks in this group indicating that their origin was a prolific source of castings, the products of which include several sub-groups such as the Anne Forster epitaph backs, the John Harvo armorial series, and this 1582 series in which there are another two backs. The probability is that the furnace where these firebacks were cast also cast guns because of the higher degree of moulding skill available in the workforce. John Harvo cast guns at Pounsley Furnace in Framfield, a likely candidate.

So how or why did this fireback get from Worth to Ffestiniog? In 1902 Sir Weetman Pearson Bt, who, eight years earlier, had bought the Paddockhurst estate of which Miswell was by then a part, had the Tudor farmhouse enlarged, adding a new range in front and gentrifying it. Updating the fireplaces, it was probably at that time that the fireback was taken out and sold, to be purchased subsequently by Lord Newborough for his home at Bryn Llewelyn, the hotel's former name, in what was then Caernarvonshire.

Jeremy Hodgkinson

THESES AND DISSERTATIONS ON THE WIRG WEBSITE

Continuing our effort to give access to research about the iron industry to our members, two major pieces of work which have recently been completed have been added to the Research page of the Group's website:

www.wealdeniron.org.uk/research

The first is a thesis on the *Medieval Iron Industry of the Weald*, which focuses on the production sites at Roffey, near Horsham, and Tudeley, near Tonbridge. It is the work of Jack Cranfield, who was a recipient of a studentship part-sponsored by WIRG at Exeter University, and who from it has gained his PhD. *Riots and the Wealden Iron Industry in Sixteenth-Century Sussex* is the subject Rob Selvey-Clinton's recent dissertation for his MSc at Brasenose College, Oxford, which he has generously offered to WIRG. Both pieces of work are available in their entirety.

ANOTHER WEALDEN CANNON IN NEWFOUNDLAND *continued on next page*



Fig. 1 Gary Kett examining the Ferryland cannon.

Continued...

Gary Kett has sent these photographs, taken by Neil Burgess, of a cannon that had fallen from the top of the cliffs at Ferryland Head about 50 miles south of the island's capital St John's. It landed upside down so it is not possible to see a cipher, read the cannon's weight or tell whether it has a vent block, the last of which would identify it as of the Armstrong pattern which was introduced in 1727. The gun is a 9-pounder, the bore being measured at 4.1ins. (10.5cm). The left trunnion broke off, probably when it fell, but on its right trunnion the maker's mark is a clear 'A' in a form that was in use in the mid-18th century when

Crowley and Co. were operating the furnace at Ashburnham.

Gary writes that a Return of Ordnance for Newfoundland in 1815 states that two serviceable 9-pounders were then in position at Stakes Point Pass Battery, part of a defensive plan in response to the threat from privateers during the War of 1812 between Britain and the United States. They were placed in the charge of a Justice of the Peace and intended to be manned by local volunteers.

Jeremy Hodgkinson



Fig. 2 An inverted image of the trunnion mark for Ashburnham Furnace.

WEALDEN IRON, WIRG Bulletin vol. 44, 2024

Articles are invited for this year's WIRG Bulletin. The Editor, Jeremy Hodgkinson, would like to receive submissions by the end of April.

Send them to jshodgkinson@hodgers.com

THE FORMATION OF BLOOMS IN PRE-MODERN SMELTING. SOME POSSIBLE EVIDENCE FROM THE GREAT PARK WOOD EXCAVATION.

It is usually asserted that iron in bloomery furnaces does not enter a liquid phase during its formation. It is self-evident that it is the slag that runs away as a liquid and that, in successful smelts, the bloom of iron does not collect as a puddle at the base of the furnace. However, it is quite possible to get bloomery iron to run as a liquid. Numerous experimental smelters report this happening. As early as 1864 John Percy (Metallurgy, Vol. 2.) reported that some Indian smelters accidentally produced liquid iron but classified it as "bad". "Bad" because such iron has a high carbon and silicon content and cannot be worked in a forge; it is too brittle.

We can easily envisage iron forming in tiny particles within a bloomery. It is less easy to see the process and to imagine the stages through which these particles pass to become lumps of relatively pure iron. Happily, last October, the excavation at Great Park Wood produced a specimen that may shed light on the process. An exceptionally dense lump of slag was identified: it was just possible that it contained fragments of bloom iron. Fig. 1., below, shows the outward



Fig. 1 Great Park Wood; dense slag

appearance of the specimen.

No bloom appeared when it was cut. However, it was strongly ferromagnetic and when part-ground, small flakes of iron became visible. Fig. 2 shows these shiny flakes. The part of the specimen in Fig. 2 is 15 mm. long.



Fig. 2. Part-ground part of specimen shown in Fig. 1. Shiny flakes of iron visible.

We have seen this flaky iron produced experimentally, but (I stand open to correction) this may be the first time that it has been recorded from an archaeological context in the Weald. This may allow us to infer that formation of discrete flakes was part of the historic smelting process.

A further observation is that the specimen sparked when ground, which may indicate that the iron particles have a moderate carbon content.

Unworked bloom iron from archaeological contexts can contain slag inclusions that are spherical. Whilst it is easy to imagine liquid slag forming a sphere, working out how flakes of iron coalesce around that sphere is more problematic.

Jonathan Prus