

THE WHITECLIFF IRONWORKS IN THE FOREST OF DEAN

I.J.STANDING

PART ONE 1798 to 1808

Summary

At least two and probably three coke fuelled blast furnaces were built at Whitecliff, near Coleford, for the purpose of smelting iron ores. The initial impetus seems to have come from Shropshire at a time when demand for iron was high due to the Napoleonic wars. The Shropshire interest was short lived and the concern was operated by at least two further partnerships. The noted metallurgist David Mushet was associated with the concern by 1808 and became a partner in 1810, when he left the Alfretton Ironworks in Derbyshire and settled in Coleford. The second part of the history will cover the period 1808-1816 when major rebuilding and investment took place.

The Background

In 1709 Abraham Darby made, in his Coalbrookdale furnace, good quality pig iron using coke as a fuel instead of charcoal. This technological advance did not immediately alter established charcoal pig iron production. By 1750 coke fuelled blast furnaces were beginning to be built and from then on ever increasing amounts of coke pig iron were made. By 1790, 72 such furnaces had been built and they produced annually an estimated 90,000 tons. Meanwhile the numbers of charcoal blast furnaces had diminished steadily and by 1790 only twenty-four were still at work, contributing about 10% of the national pig iron production, (1), (2). Clearly the days of the charcoal blast furnace were numbered.

In 1790 the Dean had no coke blast furnaces but no fewer than five charcoal blast furnaces continued to operate in the area. These were at Bishopswood, Flaxley, Lydney, Redbrook and Tintern. The Dean, although the premier iron producing district of the realm in earlier centuries, was thus so far almost unaffected by the new technology. A traveller in 1781 described the charcoal blast furnace at Redbrook as follows (3):

"... and in my way, passing by an iron furnace, I entered therein, and was well received by the devils who can bear the infernal heat, which soon drove me forth: they showed me the iron melting, and the immense bellows moved by water, eternally keeping alive the monstrous fire; for they work day and night, and make about 4 tons in 24 hours".

Production at Redbrook was thus about 25 tons per week.

There were several reasons why the Dean failed to attract any coke blast furnaces before the last decade of the 18th century.

One factor was that much of the land belonged to the Crown and in consequence there were few large scale private land owners. Two of the largest, both with mineral resources, were the Bathursts of Lydney and the Gages of High Meadow. Both had charcoal blast furnaces which were leased and operated by third parties. Although coal had been tried in these furnaces at various times, none of the existing charcoal iron masters ever ventured into the new technology using coke. Another factor was that most of the minerals lay beneath Crown lands and were claimed and worked under the customs and privileges of the Dean freeminer. As a result most mineral working was essentially small scale in operation. Only towards the late 18th century did a class of wealthy coal owners begin to emerge and thus investment capital from this source was not available until relatively late.

The building of three coke blast furnaces in the Dean commenced within a very short space of years. These were at Cinderford in 1795, Whitecliff in 1798 and at Parkend in 1799. Of the furnaces at Cinderford and Parkend almost nothing is known about their early years.

More was known about Whitecliff on account of the writings of Mary Howitt, (1799-1888), and the later connection of David Mushet. Various accounts of Whitecliff have been published by Miss Mushet, 1877(4); Mary Howitt, 1889(5); Osborn, 1951(6); Parr, 1965(7); and Hart, 1971(8). Much of the information presented dealt with Samuel Botham.

In 1970 a collection (9) of 170 letters written to David Mushet was discovered amongst family papers relating to the Rev. John Pye Smith. These presumably derived from that family's connection with the Sheffield company of Samuel Osborn & Co. Over half the letters cover the period 1808-1810 and were written to David Mushet by Thomas Halford and others. They concern the ironworks at Whitecliff and many other topics of interest such as collieries, tramroads and a colour and paint works at or near Whitecliff. There is also much information concerning ironworks beyond the Dean. This collection makes another group of documents (10) at the Gloucestershire Records Office of much greater relevance for although they chiefly relate to Bixslade collieries, they extend the Halford-Mushet correspondence to 1813. Much new information has thus been available for study and the results are presented here. New and interesting facts about the first tramroad in Dean have also emerged and a paper on "Mr Teague's Railway" appears in this Journal. Part two of the Whitecliff History and an account of the colour works are in the course of preparation.

The Beginnings

Information relating to the origin of the ironworks is supplied by Mary Howitt (4) and (5). Although writing late in her life, she records important details of events which took place at the time of her birth. Her father was Samuel Botham, a land surveyor of Uttoxeter in Staffordshire. When surveying in Shropshire he had become acquainted with the Friends of Coalbrookdale and first became interested in iron forges. He married at Swansea in 1796 and was described as an ironmaster in the certificate. In 1798 he agreed to a proposal from his Partners, the

Bishton brothers of Shifnal, Shropshire, to exchange his share in their ironworks for a principal share in an ironworks at Coleford, Forest of Dean (11).

Mary Howitt relates (4): "In 1798 he removed with his family to Coleford...for the purpose of establishing an ironworks there. The works were commenced and considerable capital embarked in them... The weather towards the close of this year set in with unusual severity, deep snow fell followed by such heavy rains that the brooks swelled and rose like rivers, not only flooding all the works, but in one night carrying before them the labour of months. The money embarked in this concern was swept away in a few hours. Nothing could be more gloomy than the prospect before us."

"Mr Botham had been induced, somewhat against his will, by his partners in South Wales, the Messrs. Bighton, to make this adventure in the Forest of Dean at his own cost, and now his immediate anxiety was increased by the unwillingness of his partners to advance the necessary capital to restore and carry on the works. His all was embarked here, and for the moment he saw himself and all those who were dear to him as life, stand in the face of ruin..."

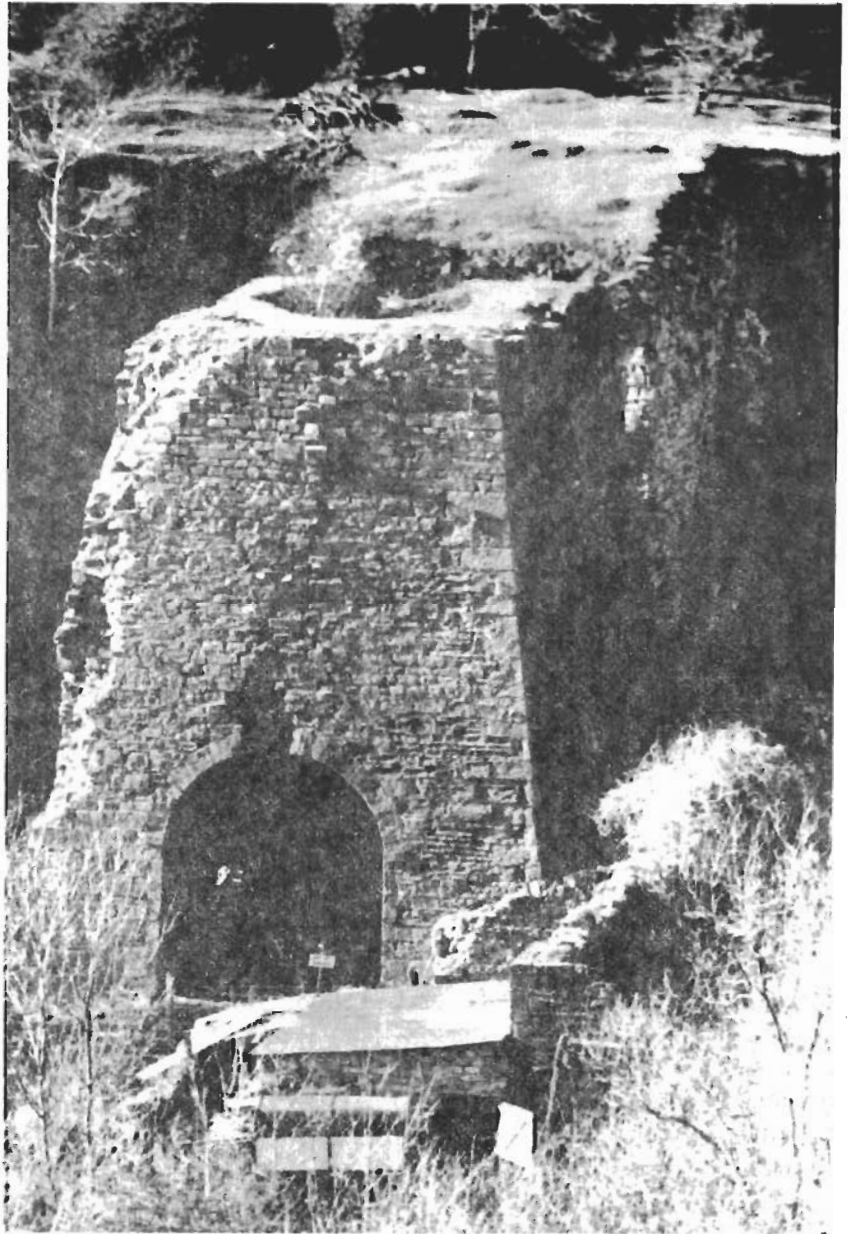
"In the course of this same year, it having been decided that the ironworks which were so unfortunate should be taken under the management of the South Wales partnership, Mr. Botham returned to Uttoxeter."

In 1801 Botham was appointed one of two surveyors for the disafforestation of Needwood Chase. This together with repayments of their debts by the Bishtons finally resolved his financial difficulties. (11).

Whitecliff furnace is marked on a map of 1801 (12). This same map also depicts "engine and pits" and "Mr Teague's Railway" leading from them in an enclosure called the Buckhold, to the north-east of Coleford.(13). In 1803 Thomas Rudge's History of the County of Gloucestershire was published. This records "At Whitecliff is an iron blast furnace belonging to Teague and Co." Rudge's History is sizeable and this note must have been compiled sometime before the publication date of 1803. A letter written by David Mushet in 1808 (14) refers to "the experience of six years" with regard to the concern. This, together with Rudge's information suggest that the works had been rebuilt, and a furnace blown in, at least as early as 1802, and probably earlier.

Partners 1798-1802

The writings of Mary Howitt suggest unequivocally that the original partners in 1798 were Samuel Botham, Bishton(s) and her "South Wales partnership". Her writings are not always quite consistent in detail and some name spellings vary. Her use of the term South Wales is probably more of a vague geographical reference to the Forest of Dean than an implication that ironmasters from South Wales were partners. A letter of 1810 (15) lists parties who were to sign replacement deeds for the ironworks following loss of the original deeds. The parties included Bishton, Botham and Phillips all of whom lived beyond the Forest of



Whitecliff
Furnace
in 1980

Dean, but who were visited in one journey by a solicitors clerk. These same parties, with the exception of Botham, were also partners of James Teague of Coleford in collieries and Mr. Teague's Railway in 1801-2.

The building of a coke blast furnace and ironworks represented a major investment and would impose several requirements. These would include expert technical knowledge, expert local knowledge and connections, access to minerals, access to markets for the produce and considerable capital. From the evidence so far assembled it may be reasonably concluded that the partners in 1798 consisted of Botham, Bishton(s), Phillips and Teague. Botham's misfortunes in the concern have already been described. Clearly his role was as a supplier of capital and the director of building operations.

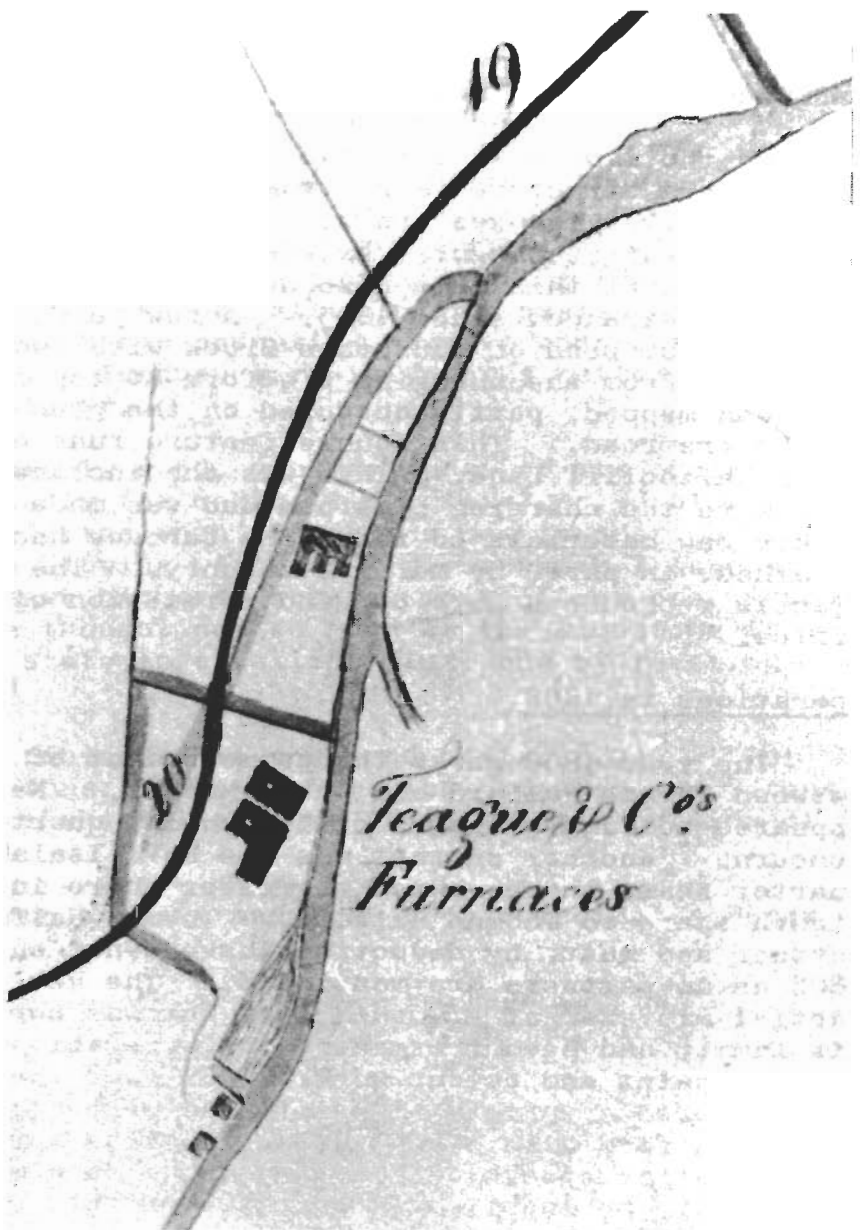
The Bishton(s) were Shropshire iron masters and presumably contributed both technical knowledge and capital. Mr Barrie Trinder has commented (16):

"This will almost certainly be the Bishton Family of the Lilleshall Company, but it is difficult to be certain which. John Bishton I seems to have been the first member of the family to be involved in the Shropshire iron trade, buying up Donnington Wood and Snedshill works when their owners were in difficulties in the 1790s, starting up Wrockwardine Wood in 1800-01 and then taking most of his interests into the Lilleshall Company in 1802. He had been agent to the Marquess of Stafford since 1802. He died some time between 1802 and 1806, and was succeeded as agent by his son John Bishton II and then by another son George. William Phillips was associated with him in several of his ventures".

There is less information concerning Phillips. It seems probable that he was the William Phillips, associate of the Bishton family of Shropshire. It is reasonable to accept that he was the same Phillips referred to by the 1810 letter and that he was also in partnership with Teague in the collieries and Railway. Phillips is, however, not a rare surname and the Halford Mushet letters frequently refer to Phillips over the period 1808-10. Quite which Phillips is uncertain, because a firm of Monmouth solicitors, Philips and Estcourt, were active in tramroad promotion (17) whilst a Charles Phillips was a subscriber to the Severn and Wye Tramroad and in 1809, appointed its first clerk (18). In 1814 a Thomas Phillips was developing the Hopewell Colliery.

It cannot be proved that James Teague of Coleford was an original partner in the iron works but all the evidence suggests that he was. As a local coal owner and an undoubted free miner of the Dean, he would be well placed to provide local knowledge and connections. Together with his brother Peter Teague, several collieries were being worked by him at this time. These included Potlid (Teague's engine and Railway), Hopewell and works at Surrige. He also owned shares in coal works at Bixslade, Prosper Work at Coalway, and the Gentlemen Colliers' Colliery. Their coal works were even more extensive in later years. In 1838 James and Peter Teague leased land which they owned, upon which stood part of the Cinderford Iron Works (19). Were they perhaps connected with the establishment of those works in 1795? A brother of James Teague was associated with the Neath Abbey Ironworks circa 1809 (20). In 1808 James Teague owned a quarter share of the ironworks at Whitecliff (21). He may have lived at Whitecliff Farm adjoining the works. The Teague family warrant more research.

To summarise, the impetus for the building of the ironworks clearly came from Shropshire and the works were well advanced by late 1798. After flooding, the works were carried on in 1799 most probably by Teague & Co. A blowing in date of 1801 or 1802 is likely. It is interesting to note that almost identical partners were concerned not only with the Whitecliff Ironworks but also with extensive coal works at exactly the same date. Was there, perhaps, only one company - that of Teague and Co, with interests in coal, tramroads, and iron smelting?



Plan of 1808
in the
Gloucestershire
Record Office

Apart from slight retrospective mentions in the Halford Mushet letters, there are no direct records for the years 1803-1808. During this time it appears that Bishton and Phillips withdrew and new partners took their place.

The Whitecliff Ironworks in 1808.

The year 1808 produced a plan (22) of an "Intended Railway from Wimberry Slade to Redbrook". The projected course from Coleford to Newland passed just behind the furnace site at top level. The ironworks was numbered 20 on the plan and labelled "Teague and Co's Furnaces". The schedule accompanying the plan lists Teague and Co. as both owners and occupiers. Land to the north-east, numbered 19, was owned by Sam Symonds and occupied by James Teague. This included the house and buildings of Whitecliff

Farm now long since demolished.

On the ironworks site two structures are shown side by side. The eastern structure is rectangular in plan and is clearly a furnace whilst the western structure is of similar proportion but has a lateral rectangular extension. As the labelling is so clearly plural this must also have been a furnace. Clearly the works had expanded since 1803. A few yards south-west is a small reservoir or pond on Thurstans Brook with two small buildings beyond. From the charging platform at top level a double feature has been mapped, partly obscured on the plan by the projected line of the tramroad. This double feature runs east through plot 19 to reach Whitecliff Lane. This was the inclined way from valley bottom to the charging platform and was made on an easy gradient to enable raw materials to reach the furnace head. It survives to-day retained, in part, by massive masonry. The relevant portion of the plan is reproduced here by kind permission of the Glos. Records Office.

Operations in 1808

The year 1808 marks the commencement of the correspondence between Thomas Halford and David Mushet. New partners have appeared but James Teague still owned a quarter share of the concern. Another partner was the Rev. Isaiah Birt who owned a quarter share but he owned a greater share in 1805 when he sold one eighth share to Thomas Halford. Thomas Halford is the third partner and must, by deduction, have owned one half of the works in 1808 as no partners are mentioned. The Rev. Isaiah Birt was a Baptist minister at Plymouth Dock but was born in Coleford where his family had been freeminers for generations (23). He also owned a paint and colour works at or near the ironworks and these manufactured a variety of paints and pigments. James Teague and Thomas Halford also owned shares in these works. Thomas Halford was a wealthy stockbroker of London. Much more bibliographical detail will be supplied in part two of this paper with regard to Birt and Halford. Teague, Birt and Halford all had shares in various coalworks. Some of these belonged to the iron concern and some did not. (24).

Halfords Description of the Works in 1808.

In March 1808 Halford wrote to David Mushet, an eminent iron maker and metallurgist. At that time Mushet lived in Derbyshire and worked at the Alfreton Ironworks. Halford wished to improve the methods of production at Whitecliff. He describes the works, operations and produce (25).

"Our coal, ore and ironstone, which we use as a flux we get from the Forest of Dean, Gloucestershire and as our materials, I may almost say, are inexhaustible, we only require skill to make them productive.

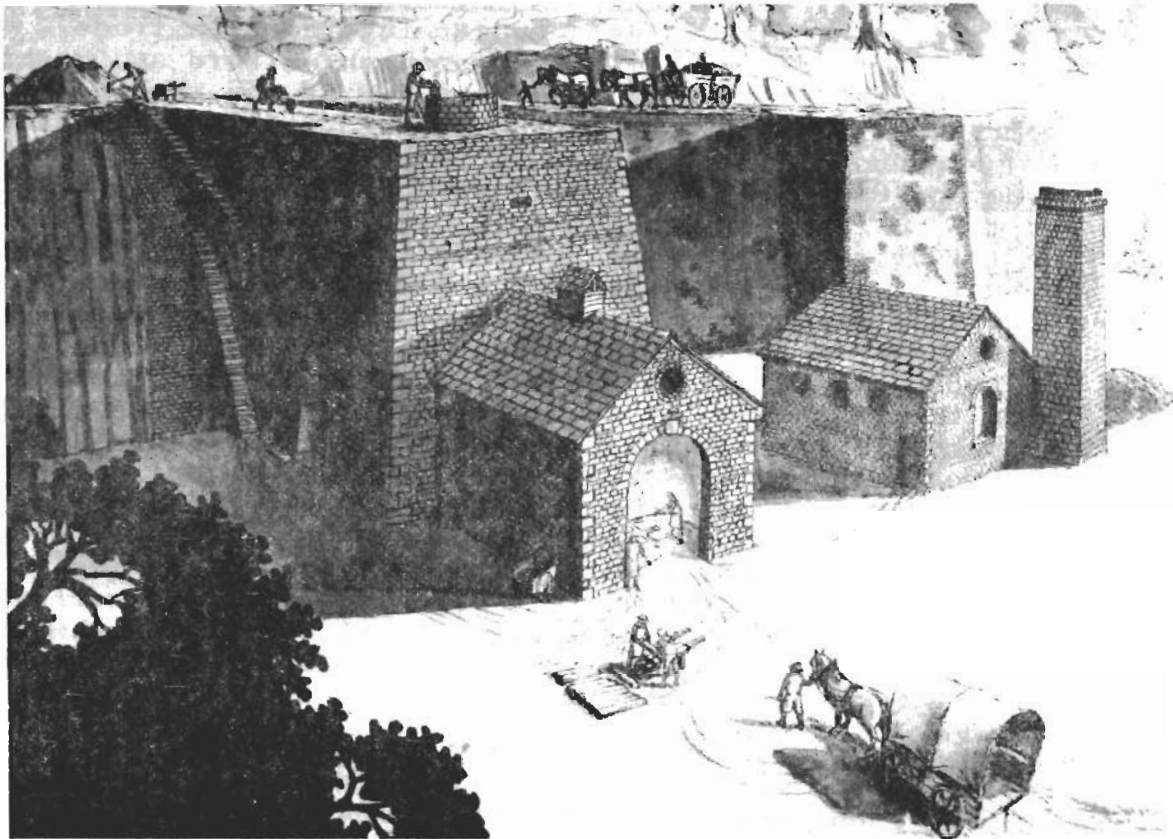
"We have been and are using for making one ton of iron $3\frac{1}{2}$ tons of ore and about 6 tons of coal, sometimes more of the latter when the cokes have not been well made which has been too much the case, but we have used as little as $5\frac{1}{2}$ tons of coal.... Our make for the last two months has averaged about 18 tons of iron per week. We

have made as much as 27 but I fear our great error in not producing a greater quantity of iron has arisen from using too much rich ore. As we do not analyse the ores etc. before they are put into the furnace I fear we shall not be able to exceed about 25 tons per week when possibly we might reach 40. We certainly possess great advantages of situation and it would be very desirable to reap the fruits of it. Our coal when a railroad of about $\frac{1}{2}$ a mile is made (26) will cost us 2/6 and the ore 7/- per ton in the furnace yard. We have these last three weeks been altering our system of burdens by taking off half the rich ore and using what we consider some considerably poorer. The furnace certainly works better and makes a greater quantity of cinder...

"The iron is uncommonly good, you may judge of its quality when it is used principally for making Tin plate. We blow with one tuyere through a $3\frac{3}{8}$ ths inch pipe but a new founder who is coming to us recommends blowing with two tuyeres which I suppose will be adopted. We have hitherto roasted most of our ore, which our people have of late thought not so good as the limestone it contains is in its raw state an excellent flux, but by roasting becomes cold and hard."

More details were contained in a second letter (27). "Our last weeks make was 21 tons. The quantity of ore used was 3 tons, 17 cwt. and coal $6\frac{3}{4}$ tons which I presume is to greater portion of each...

"The quality of iron we have made has been principally Forge



A reconstruction of the Whitecliff Ironworks about 1807
By John Belcher 1980.

and occasionally a casting of Foundery which sells for £1 per ton more. We have a refinery therefore dispose of ours mostly as refined metal which we have found very serviceable for when the furnace has been out of sorts and white iron made, the mixing it with good grey, it all went off at the same price. As our iron is principally used for making Tin Plates you must be a better judge than myself what kind would be the most profitable for us to make.

"We have it in contemplation to erect a forge for making blooms (the engine for which we have had by us for this year past), in the summer when the forges near us are short of water. We could sell a tolerable quantity of blooms when we can't sell our metal. They might be manufactured as to show a Londoner a profit. The price for tin blooms is £16 per ton...

"We use but little limestone - the poorer ore contains a great portion of it. It is procured close to the furnace... I shall be very happy to hear from you when it is probable I shall have the pleasure of seeing you at Coleford..."

David Mushet accepted Halford's invitation to visit Coleford and to consult and advise on the works. They met in April 1808 and evidently spent some days at the works and elsewhere in the Forest. The meeting must have been a great success because Mushet immediately became Halford's advisor and great plans for enlarging and improving the works were laid. Halford subsequently bought the shares belonging to Birt and Teague whilst Mushet finally decided, in October 1809, to leave Alfretton and settle at Coleford as a partner with Halford. From the two year period between 1808 and 1810 some 75 letters survive, providing infinite detail about the works, the partners and all manner of business concerning the iron trade, collieries and tramroads. The future for both Halford and Mushet seemed assured. The story will form part two of the history of the Whitecliff Ironworks and will appear under the title "Dear Mushet".

Notes on Coal and Ore Supplies

At first sight, the choosing of the Whitecliff valley to place a major ironworks in the last years of the 18th century seems curious. Perhaps plans were already formed for the projected tramroad to pass through the valley when the works were planned. If this was not the case the site would have little to commend it in 1798. On the other hand it could be argued that it was placed at exactly the position where supplies of coal and iron ore could conveniently reach the works. Calculations based on Halford's burden figures show that in order to produce 20 tons of iron per week, the works had to be supplied with about 80 tons of ore and 120 tons of coal. Thus 200 tons of materials needed carting to the works each week, long before any tramroads served the valley. This makes fair sense provided that the natural outlet for the iron was down valley to Redbrook where tinplate works were in existence. (28).

There is some evidence to support this theory in so far as a "capital newly erected iron forge" was advertised for sale in 1802. (29). It stood in the Valley Estate, below Newland and en route to the Redbrook works. It may have been built to process Whitecliff coke iron bound for Redbrook.

The sources of coal were the Coleford High Delf above Coleford, doubtless from Teague's pits in Wimberry Slade and at Mile End before 1808. The iron ore is less certain but a plan of 1801 (30) marks one iron mine close by Lower Perrygrove Farm. A plan of 1809 (31) shows a mine pit on Clearwell Meend, possibly the New Dun Pit, served by a branch of the projected Monmouth Tramroad. Alternative sources of ore lay beyond the Scowles at Crows Nest to the north of the works but there is no documentary evidence for working here at this period.

Acknowledgements

The results presented here rest heavily on the previous researches of Dr. Cyril Hart and Mr. Harry Parr. In addition to their published works both have supplied much additional information and encouragement. The Records Offices of Shropshire, Staffordshire and particularly Gloucestershire have supplied material and in the case of Gloucestershire, permission to reproduce the plan of 1808 and material from the Halford Mushet letters. Mr Barrie Trinder has helped with the Bishtons whilst the Rev. C.S.Hall of the Baptist College, Bristol, has located fascinating material on the Birts, much of which will appear in part two. Mr Gordon Clissold has spent many cold weekends surveying, in great detail, the actual site at Whitecliff and the results will appear in part two. To all of you, my most sincere thanks.

References and Notes

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2. Riden P., 1978. Eighteenth Century Blast Furnaces - A New Checklist. Hist. Metallurgy, Vol.12, (1), 36-9.
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4. [Miss Mushet], 1877, Something about Coleford and the Old Chapel. pp 24-26. Based on notes from Mary Howitt and Samuel Bothams wife. Much of this charming book was reprinted in 1980 entitled Colefords Churches by H.Bright. F.O.D.Newspapers Ltd.
5. Howitt, M., 1889. Mary Howitt - an Autobiography.
6. Osborn, F.M., 1951. The Story of the Mushets.
7. Parr, H.W., 1965. The Great Western Railway in Dean. pp 102-3.
8. Hart, Ind. Hist. op cit pp 129-30.
9. The Pye Smith Collection. Glos. Records Office D2646.
10. G.R.O.D637/11/7/B1.
11. Information from Mr. Milligan, Library of the Society of Friends. Kindly supplied by H.W.Parr. There is much further information on the Botham family.
12. G.R.O. Q.RUM. 5. Plan of a Proposed Railway from the Forest of Dean to the Severn and Wye. Surveyed by H.Price, dated 1801.
13. See the paper in this journal on Mr. Teague's Railway.
14. G.R.O. D2646/38.
15. G.R.O. D2646/112.
16. Letter from Mr. Barrie Trinder, penes me. Further information appears in his book The Industrial Revolution in Shropshire. Similar details appear in The Lilleshall Company 1764-1964 by W.K.V.Gale and C.R.Nicholls.
17. Parr, Gt. W. Rly. op cit pp. 89,93,& 161.
18. Parr, H.W., 1963. The Severn and Wye Railway. p 26.

19. Hart, Ind. Hist. op cit p 125-6.
20. G.R.O.D. 2646/29.
21. G.R.O.D. 2646/27-29.
22. G.R.O. Q RUM 30. Plan of an Intended Railway from Wimberry Slade to Redbrook. Deposited in 1808.
23. Memoir of the Late Rev. Isaiah Birt by the Rev. John Birt. Baptist Mag. 1838, pp 54-9 and 107-116. This was the funeral sermon given by Isaiah's son John who managed the iron works circa 1806-1808 before being called to the ministry. More details in part two.
24. G.R.O.D. 2646. general. See also the paper on Coleford Collieries in this Journal.
25. G.R.O.D. 2646/8.
26. The reference by Halford to this $\frac{1}{2}$ mile of Railroad (a tramroad) is of interest. It may have been a tramroad connecting a colliery to a convenient road. Another possibility is that it ran from the charging platform of the furnaces towards Coleford thereby allowing a much easier gradient than the existing inclined way. A plan of 1809, G.R.O. Q RUM.34 shows a mapped feature which could represent just such a tramroad.
27. G.R.O.D. 2646/13.
28. Hart. Ind. Hist. op cit p. 171.
29. Gloucester Public Library, Gloucestershire Collection: 9699/RF 214.9. Particulars of a freehold estate at Newland 1802. Lot 3 included "a capital newly erected forge but the proprietor reserves to himself the option of taking it on a lease..."
30. G.R.O.Q.RUM 5 op cit.
31. G.R.O.Q.RUM.34. A Plan of a Proposed Railway in and from the Forest of Dean through Coleford, Newland and Redbrook...

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