

Frenchay Iron Company, 1776-1780

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The Bristol Frome

This small, but still lively, river rises in the basement of Doddington House, some 12 miles to the north-east of Bristol. Along its 16 miles, together with its tributaries which measure another 14 miles in all, it has powered, at one time and another, some 30 mills. Nearly all were grist mills, processing the grain produced on the levels and hill slopes of south Gloucestershire. But in its upper reaches the river also finds its way amongst the sheep country around the Stroud valley and one or two mills were therefore related to the wool trade. As the river nears Bristol, however, the pull of the port industries becomes stronger, and trades associated with exotic imports and imperial exports take a hold: tobacco was brought in, while plantation tools and household necessities went away from Bristol. Even the humble grist mills processed quantities of grain, some of it brought in from other parts of the south-west of England, so that the flour was packed off in war or in peace to foreign parts. The stream could be capricious. As recently as 1965 the River Board recorded huge variations in the river flow, inhibited though this was compared with two centuries earlier, fluctuating between 200 and 2000 cubic feet a second during the course of a December week.

The Mill Site

Frenchay Iron Works has been noticed, and its products variously and often erroneously described, in a number of published accounts. What it really made, and whether it was the only business of its kind to take root in the valley, have been largely guessed at in the past. We can, however, be reasonably sure that it was established in an unpretentious but solidly built workshop in 1761.¹ The original building, of the abundant local Pennant sandstone, stands today (1997) with several brick accretions, some perhaps dating from as early as the period of the present study (1776-1780). However, planning permission has now been given for its demolition.

At the time of its establishment, the mill was a significant addition to the village of Frenchay, but several comfortably-off families owned large houses there, and just across the river lay the extensive grounds of Oldbury Court. The spot was at that time the nearest site on the river to the City of Bristol which offered the possibility of powering yet another industrial business, and was not far from the turnpike road which led there from Gloucester. It also stood immediately above the local river crossing. This was a ford in 1760 but was bridged in 1788. The company contributed to the cost of the bridge and, although communication with villages, and coalfields on the other side of the river were eased, the works was subsequently flooded from time to time as a consequence. The bridge has now been closed to traffic for some years.

One of the many conundrums posed by this little but vigorous business is the manner of its foundation, though the present study picks up some of the threads. In the same way some of the truth about the source and quality of the raw materials which entered the works, and the nature and destination of its products will become apparent, or can reasonably be surmised, as we reach the more gritty details which follow.

The History

We have already referred to C.H.B. Elliott's history of the works at Frenchay, and the construction of what is now known as Frenchay Flock Mill. But the Company came to occupy two mills, so that Frenchay Flock Mill became the Lower Works while Cleeve Mill, an old grist mill, and the next mill upstream, became the Upper Works. Elliott suggests that these designations date from about 1782, though the amalgamation did not formally take place until 1810. In these circumstances it has been advisable to keep an open mind about the actual date of expansion to a second site.

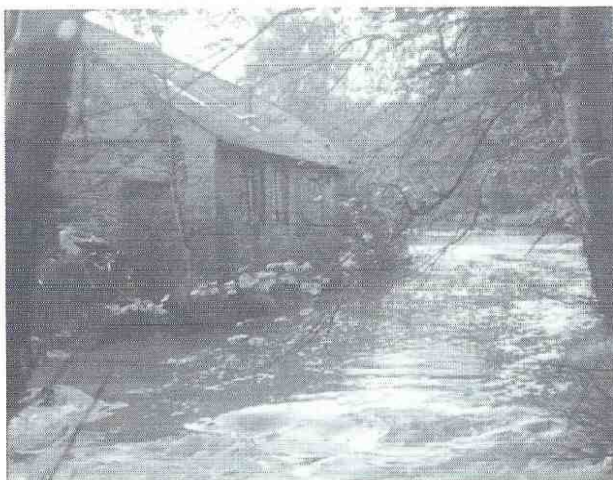
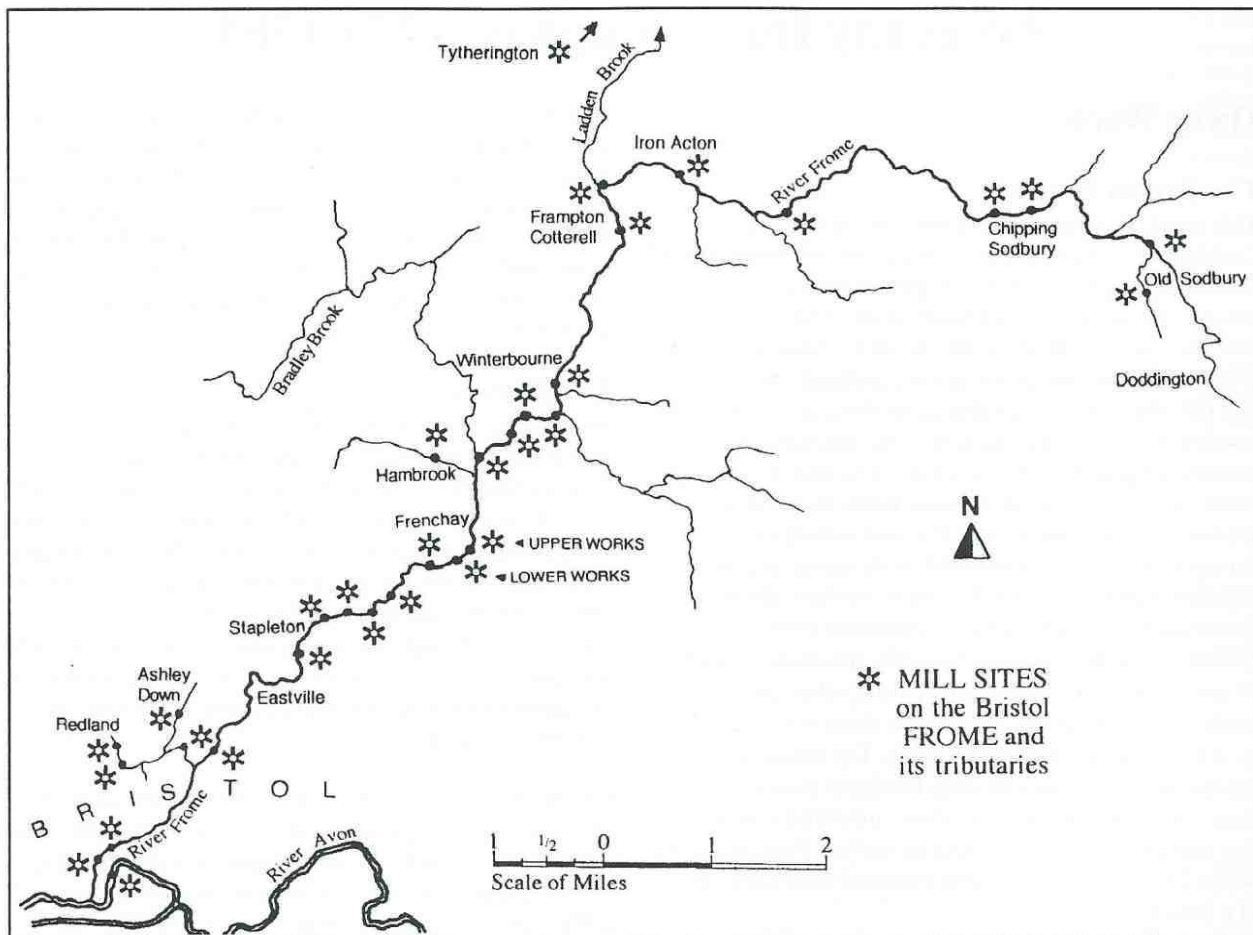
Elliott's history also includes the only published account of the company's produce which is at all reliable. The source was an interview with a descendant of the Hobbs family, a name which we shall meet shortly, and as such it may not be entirely accurate:

The original company, which manufactured agricultural implements, spades, shovels, hoes, etc., had an extensive connection in the British Isles, the colonies etc. Messrs. Bromhead late of Milk Street, Bristol, had specimens of huge hoes, manufactured by the company and exported to the British West Indies for use on the cotton plantations.²

This may not be quite right, since sugar was always the dominant crop on the islands, and this industry certainly called for large hoes, like mattocks, which were used to make the holes for planting fresh cane.

Elliott has one other small piece of information, not obviously important, but which turns out to be valuable evidence in the identification of this site. In or about the seventeenth century, Bristol Corporation, acting as Trustees for Queen Elizabeth's Hospital (Q.E.H.), sold themselves the fee-farm rents of a lot of property in Frenchay, rents which had been presented to Q.E.H. by Edward VI. This meant that the owners of that property, or the occupiers if they were not one and the same, were now to pay their fee-farm rents (similar to ground rents) to the Corporation. In turn many of the owners bought their rents from the Corporation but three, including Frenchay Mill, later on known as the Frenchay Flock Mill, were still paying these rents in 1936. In the case of the Flock Mill the rent was, and probably had been since the 1550s, £1 3s. 8d.

In terms of its historical context, this was surely an enterprising moment to engage in any form of the iron trade.



Frenchay Flock Mill in 1984, seen from the opposite bank of the Frome



The southern aspect of Cleeve Mill, with the attendant cottages on the right, from a postcard postmarked January 1906

C.R. Andrews, in his book on the Wortley Ironworks³, reminds us that the output of iron from British furnaces quadrupled between 1740 and 1788. and even though only the best imported iron and steel was normally bought in at Frenchay, this growth was a symptom of the country's escalating competence and confidence in iron manufacture. Some of the increased output was undoubtedly stimulated by the needs of a country at war, but some was the result of greater and more exacting demands of customers in our colonies overseas. Frenchay, it seems, benefited indirectly during the period of the account book from this latter expansion. as will appear below.

The Bought Book

The work which went on in the mill was thrown vividly into perspective through the study in the late 1970s of a 'Bought Book'. This came into the possession of a local antiquarian book collector, who has since sold it, but who readily made it available for detailed inspection whilst he owned it. The book was described essentially thus:

(Eighteenth Century Ironworks): manuscript Bought Book of the Frenchay Iron Works 1766-1780, comprising 360 pages of detailed purchases, a Bought Book, of course, being used to copy in invoices received and to record priced details of goods [supplied] by sub-contractors and others including bar iron and coal; minor purchases such as writing paper and candles; other items for work done such as paid for ale for the men at mending of the crank of the bellows wheel, 1/- or even 3 months keep for the dog 3/4d. Various regular payments are recorded, ... in short a fully priced and unusually detailed record of an 18th century manufactory, 4to.. old vellum boards.

There is no address on the book, apart from the name of the company, but from reading through the entries it became clear eventually that it did belong to what we now call Frenchay Flock Mill. The positive evidence is found in the payments recorded in the book, which include an annual amount of chief rent for the iron works; this amounts to £1 3s. 8d., and is paid to the 'Mayor; Burges and Commonality of Bristol' each year in September. It will be remembered that this unusual payment is precisely that noted by Elliott as due from the Flock Mill.

Negative evidence is also gleaned from the rentals recorded in the book. The only other mill occupied by the Company was the 'Upper Works'. or Cleeve Mill. From a series of papers owned and studied by Terry Bryant we learn that Humphrey Brown owned Cleeve Mill until his death in 1777 and it remained in the hands of his executors until late in 1778 when Sewell Mansell entered the property. The company's Bought Book records payments of £16 per annum rent for this property which it describes as Builder's Mill. It is also recorded that men from the Iron Works occasionally visited Builders Mill to work there. which is clearly therefore not the main subject dealt with in these accounts.

The book is indeed bound in vellum and still has a perfectly preserved cover, though it was perhaps a curious

choice of a soft, white binding for a busy industrial workshop. But this may also have been a time when the office was built on to the works. It survives, on the side next to the road, though the outside stairway by which it was reached has gone, so that it was always quite separate from the workshop against which it stands.⁴

The entries made in the book are neat, legible and easy to understand, with each month beginning on a new page. The only extravagance the clerk was allowed. or allowed himself; was to start each month with a flourishing heading. Month by month a discernible pattern of entries is listed, totalled and ruled off, the whole being written with such assurance that the entries must have been transferred from elsewhere daily or weekly notes, perhaps. And there are bold figures in the margin which have been ticked to show that the figures were cross-referenced to some other form of account book. In January 1778, for example, were purchased a new workman's day book and a petty cash book. Two sample pages from the book which are illustrated here deserve closer attention, although the explanation of some of the detail will become clearer from later entries.

October 1776		
16	Winwood Harvey & Co Bristol 62 bars of Iron 12.3.26 13 ^o - 1.6	
1/40		12.2.20 15/6 39 9.6
21	1 Square bar of Iron 1. 8	15/6 19 10
		20.9.4
30	James Brown & Co Bristol 3. 3 Square files 3. 3 flat files 3. 3 half round do 3. 3 bellows 15 ^o - 07 - 7 7 2 Casks 8	1 1 7
31	James Brown & Co Bristol By error in appearance of 6 ^o Iron bar sent 11 Sept. large 1 ^o a beamish 2. 6	
27	Sundry Expenses Co. 7 May 1/2 doz 4 ^o bundles paid for ale at Mending Forge 10.6 Mill Wrights 1 .. 1 piece of canvas 1 .. 3 ^o Premium for 1/2 in nails 2.3	7-17/9

The page of sundry expenses for October 1776 from the bought book. The ink for the November heading has soaked through from the next page.

Winwood and Harvey were amongst those, usually local merchants, who provided the imported bars of iron and steel. The allowance for 'Bn' must be for bars which were found to be broken on delivery. It is evident that such bits and pieces were of no practical use, though it is also apparent, as can be found from simple calculation, that the bars were not all of one size.

Although at present there is no knowing exactly when Gibbons became associated with the business, there are some hints in the Bought Book that its purchase and origination coincided with the arrival of this new broom. Some of these are to be found in the first batch of sundry purchases, dated May 1776:

16[lbs?] Marling [marline?]	@5d.	6s. 8d.
14 Tar Rope	@4d.	4s. 8d.
a Bought Book		2s.10d.
1 Quire Writing Paper		10d.
¼ 100 Quils		4d.
Sand	1s. 6d.	
Paid Samuel Baun for putting up a boiler and building a necessary		
		10s. 0d.

As can be seen, they included such crucial administrative accessories as pens, paper and blotting sand, which along with the purchase of this substantial new book (the cost of which has risen from 2s. 10d. in 1776 to over £500 two hundred years later!) suggests the setting up of a new office, or at the least a renewed interest by someone in keeping orderly accounts. And the same unfaltering standard of neat, detailed entries was sustained throughout the period covered by the book though the quill was occasionally overloaded for the flourishing monthly headings.

Other pointers to a new régime included the early provision of a necessary followed by a sequence of running repairs to the machinery in the works. We see these being undertaken by the staff or by specialist local craftsmen or workshops in Bristol. Nevertheless we shall come across a few hints that some contraction of the business took place at the end of 1776, but it is too difficult to assess whether this was part of a process of rationalisation by a new owner, or a consequence of international political and trading turmoil.

Payments for Raw materials iron, steel and timber

Of the regular supplies of iron and relatively small quantities of steel which arrived at the works during the period of the Bought Book, the entire steel supply and about six-sevenths of the iron was bought from either James Browne or, mostly, from William Gibbons.

Some of the detail can be picked up in the first two entries for such purchases. In June 1776 William Gibbons was paid for supplying:

37 bars Twerdisheffs	24cwt 0qtrs 6lbs	
Br ^e	16lbs	
	23 3 18	@16/6 £19 14s. 6d.

Twerdisheffs, as might be expected from a Russia Merchant, was iron from Russia, where:

most iron was known by the names of the owners of the mines, or the names of the overseers in the case of the Government mines, mostly in the Urals. Twerdisheff was born a peasant carpenter but rose to the management of a government mine, possibly unique in that no serf labour was employed there.

Cramond used it to make 'blister steel' it was obtained at Cramond through an agent called Atkins & Co. in 1778.¹⁰

The full allowance for breakage tells us that the broken bars were of no use to the firm, and must have been returned to Gibbons.

In September of the same year, 1776, James Brown provided:

4 bars Lsteel 1cwt 0qtrs 9lbs @32/- £1 14s. 7d.

This steel is described thus:

For the manufacture of steel, charcoal iron of the best quality only is employed. The iron most approved for this purpose is obtained from Sweden and marked with the letter L in a circle, hence called 'hoop L'. When it was cooked into steel the 'hoop L' remained visible.¹¹

Hugh Torrens mentions that 'hoop L' steel was used for edge tool making, and he further explains that the trade mark was that of the Swedish Löfsta Company.¹²

The third supplier selected for attention here was a Mr Lane, from Stratton-on-the-Fosse, near Downside. In the month of May 1776 he supplied 12 doz. bent Crutch trees, 6 doz. striaght -do-, 6 doz. knob -do-, and 6 doz. long -do-. We shall shortly see what these trees were.

Payments to Craftsmen

A substantial proportion of the book is taken up with detailed lists of monthly payments to a number of craftsmen for goods or services supplied by them. It soon becomes apparent that these are, for the most part, the men actually at the iron works, being paid on piece work except when, instead of doing their own job, they were employed on maintenance work around the mill. On these occasions they were paid by the day, or part thereof. Presumably what they produced in the way of goods was governed by the orders which the company received.

At the outset (May 1776) the 'staff' consisted of two platers: Robert Davis and Simon Hoddinott (Simon left, and was replaced by John Watkins in November 1778); one **spade maker**: John Sheldon; one **shovel turner**: William Tuckey; four **pan makers**: John Norgrove, John Howell, Thomas Wilson and John Norgrove jnr (Howell left in Dec 1776, Norgrove jnr did little; George Norgrove then came in January 1778); one **grinder/hallier**: Joseph Hutton (soon replaced by Charles Perry, carman, who only, however, did half-a-dozen journeys per month and was never a full-time employee).

There was one man who was not on piece work. According to Elliott and others the manager of the works was one Samuel Hobbs. And here we find him, paid at the rate of 14/- per week, but paid annually, in arrears, in December. This was half what his workmen might earn, but there may be unidentifiable reasons for this. He was beloved by all his workmen, and respected by all who

knew him¹³.

The men whose detailed accounts have been selected to represent their particular occupation were engaged in jobs typical of their skills. In each case a single list of what they were paid to do during the course of one month is reproduced, as closely as it is possible to do so, to give the reader a flavour of the activity within the mill. Some of the individual entries defy a full explanation without further knowledge or research. Notes, sometimes extended, are added where they are felt to be dependable, or informative, or both.

The Platers

Simon Hoddinott was one of the two platers whose job it was to select bars of iron or steel and to prepare and trim them for other craftsmen to work into finished articles. As with the other workmen, payment was not according to the number of articles produced but the weight of the completed job. The following detail is reproduced from the entry for November 1776, which runs over two pages of the book, and is as typical as any:

	[cwt qtr lb]	[per cwt]£	S	d
Oct 76				
28th	3 doz 9 Coal sho. plate	2 0 16 2/-	4	3½ 1
Nov 76				
2nd	13 doz Tinnors -do	5 2 4 2/-	11	0½ 2
	1 doz 4 br ^t steel -do-	3 7 2/-	1	7½ 3
	5 days mending the forge Hamr and making hoops, pins &c	2/9	13	9 4
9th	1 days drawing 8.2.20 of Old Iron for Pan Handles	2/9	4	8½
13th	11 doz 2 pan plates	6 0 11 2/-	12	2½
	6 doz 5 Coal Sho -do-	3 0 8 2/-	6	1½
	1 doz 3 Iron -do-	1 1 21 2/-	2	10½
	1 doz 7 Steel -do-	2/-		
20th	2 doz br ^t iron -do-	2 0 20 2/-	4	4½ 5
	2 doz br ^t steel -do-			
	5 Steel Bristol Shovells	2d		10 6
	6½ Lade Plates	2 0 1 2/-	4	0 7
29th	10 doz 1 Pan Plates	3 3 17 2/-	7	9½
	1½ doz Sq ^t Steel -do-	3 5 2/-	1	7 8
30th	8 Spade Plates	1 12 2/-		8½
	13 doz br ^t steel & iron -do-	7 1 16 2/-	14	9½ 9
	15 doz iron & steel tin -do-	7 1 27 2/-	14	11½ 9
	12 doz 2 hus ^{by} moulds steel ^d 10	[?] 9d	9	1½ 9
	3 doz So rd Tinnors -do-	1 0 8 2/-	2	4 9
	7 doz 1 Bristol Sho	[?] 2/-	14	2
	¼ day mending bellows wheel & putting in new brasses		6	11 9½
			6	11 9½

Explanatory Notes

- The coal shovels were not, I guess, for householders to use in their back yards, but for coal miners including those in the busy Kingswood collieries across the River Frome.
- Similarly the Tinnors shovels must have been for tin miners, though the nearest mines were a boat trip away in Comwall.
- The bright (?) steel shovels were presumably made of all steel instead of the usual sandwich of steel between two pieces of iron. But the significance of 'Br^t' awaits confirmation.
- Forge hammers take a fearsome amount of punishment. They were working away at a rate of two blows a second for days on end, with a head weighing two or three cwt on a shaft probably 11ft in length and perhaps 10 inches in girth. John Good, carpenter and builder of Hambrook, supplied a suit-

able piece of ash in late October 1776 for £1 0s. 2d., when Robert Davis, the plater, worked on steeling or refacing the old forge hammer. The sundry expenses record the allowance of 1s. 0d. paid for ale at Mending of Forge Hammer which perhaps reflects a bit of unpaid overtime. The hoops and pins would have been used to clamp around the shaft, or helve, of the hammer. The illustration of a hammer used at the edge-tool works at Nans-sous-Ste. Anne (Doubs, France)¹⁴ shows how heavy and well-worn one could be. (See also the supplementary note on the main equipment of an edge-tool works which follows.)

- Bright iron shovels were supplied to James Browne (who was overcharged) in September 1776.
- At 2d per cwt this must have been a very quick job.
- Maybe this should read '6½ doz ladle plates'.
- Although I seem to have recorded these as pan plates, I have no record of pan makers finishing them: I do however see that Wm. Tuckey, shovel turner, made '2 doz square point shovels' in November.
- These items must have been prepared for spades made from a sandwich of iron and steel (see later description of spade making).
- The works produced large numbers of iron and steel husbandry shovels for the predominant local market. John Lucena reminds us that the present market gardens continue a tradition of intensive cultivation on fertile land, now officially classified in the top one percent of the country's agricultural land. Because of this high quality and the growing demand of the Bristol market, this land was one of the first in Gloucestershire to become every year land (dropping the fallow year) concentrating on a six year rotation and using new crops like turnips, peas and beans rather than corn. The pulses were sold to the slave traders for the cargo of slaves and were described as fodder.
- The bellows wheel, and its need for regular repairs, has already been commented on. The illustration of a bellows wheel at the edge-tool works of Finch Bros., Sticklepath, shows how simply such a small wooden wheel might have been constructed.¹⁵

Supplementary note

The main equipment would have been a number of huge, waterpowered hammers. We do not know how many there were, but six or eight is at present a best guess, probably in two sets, of perhaps three or four each.

There were probably therefore two waterwheels. The axle, or shaft of each (perhaps made of oak) was fitted with sets of cams, or cogs which, as the waterwheel turned, bore down on the ends of huge ash beams, or helves. These were pivoted, so that each time a cam came round the nose of the shaft, together with the heavy hammer fitted to it, was raised a few inches above a large anvil set in the floor below it. The anvil was securely set on a block of wood, or iron.

Beneath the tail of each helve was a striking plate, or block, to increase the force and the speed of the blows at the nose of the shaft, while the hammer head struck the ironware being manipulated on the anvil by the craftsman.

In the account book there are a number of clues to the set-up in the workshops:

In June 1776 one Thomas Spicer was paid for sawing a piece of ash for the helve, showing that the hammer shafts, or helves, were made from the baulks of ash which, as we have noted, were purchased from time to time.

In February 1779 John Jones, ironfounder of Bristol, supplied twelve cast iron cogs, after which Robert Davis spent a day putting in a new set of cogs and helping to put up a new hammer helve.

In January 1778 John Sheldon, a spade maker, spent of a day making hoops and a tail plate for a new helve: James Browne supplied two 'cast hammers' weighing over 5 cwt between them in April 1778, but it was John Jones who usually provided 'hammer heads', four in January 1777, and two in each of June, August and December 1777, and three more in 1780. Each of these weighed around 3 cwt.

In September 1778 James Browne supplied two spade makers' anvils, each weighing about 2 cwt., though the usual supplier of anvils was John Jones, whose bills regularly included forge hammers and anvil bits, together with anvil bits, blocks and butts.

In November 1777 John Sheldon was paid for '1½ days himself and man putting in two new anvil blocks', for one of which John Jones was paid in the following month. This was clearly an iron block. On the other hand, the small sum of 2s. 0d. was paid for an anvil block, presumably of wood, in March 1777, which is perhaps the kind on which Robert (Davis) and Simon (Hoddinott) (the men were commonly referred to informally by their christian names in the accounts) set hoops in January 1778.

The Spade Maker

John Sheldon was the only spade maker, though he was often employed on other work. In February 1777, for example, he made spades and shovels, but also engaged in a few other jobs:

1 doz Crutch sp. No.4 (@5/-)	1
2 doz nob handl sp. No.3	2
1 doz long crutch sp. No.3	
7 doz Tanners sho.	
4 Budlers sho.	3
1 doz br ^t Garden sp. No.3	
1½ doz blk sp. No.3 (@4/9)	
½ doz br ^t Garden sp. no.3	
8 doz 9 coal sho.	
1 doz br ^t Garden sp. No.3	
The other jobs which he did during the month were:	
16 doz husbandry moulds steel'd	
4 doz coal plate pared	4
6 garden sp. grownd	5
14 doz sp. mo. steel'd (@ 1/6d)	
2 doz br ^t Garden sp. No.3 grownd	

Explanatory Notes

1. Crutch spades have a handle in the form of a Long John Silver crutch, with a Y-shaped grip at the top (see Lane's, suppliers. above)
2. Nob handles and (next item) long crutch handles need no explanation; but there is no specific mention of bent crutch handles, though more of these were bought in from Mr Lane.
3. Budlers' shovels. In 1777 these would have gone to the tin miners in Cornwall. Buddlers did not reach the Mendips until the mid-nineteenth century.
4. Paring was probably done with shears set on the end of the axle from the water wheel. Perhaps John Sheldon took these particular plates over from a plater and trimmed them so

that he could get on and make the shovels which appear in the list above. This was unusual, in that the two platers could normally stockpile plates for the half-dozen finishing craftsmen.

5. I have not been able to establish for sure the location of the mill where finished articles were honed, or 'grownd', but it was not done at Frenchay. Probably it was done at Cleeve, which was connected with the Frenchay company from an early, but unknown, date. Compare the extract from Tuckey's monthly work sheet which follows; there are numerous other references to the grinding mill.

Shovel Turner

The only shovel turner was William Tuckey who, like John Sheldon, also did odd jobs around the mill.

This list is his October 1777 worksheet:

5 sugar shovels	1
2½ doz budlers sho	
5 doz tanners sho	
8 doz br ^t steel sho	
1 doz Spades No.1	
16 doz tanners sho	
1½ doz budlers sho	
3 doz 8 br ^t steel sho	
5 doz 10 large coal sho	
Jobs also done this month:	
1 stamp (JB)	2
20 doz steel sho grown'd	
11 doz iron sho grown'd	
1 days mending the grinding mill hatch etc.	3

Explanatory Notes

1. A few items were made for one or other of the major sugar bakers in Bristol the names of Levi Ames, Edward Brice and Thomas Dean appear from time to time in the roll of local customers. All had connections with the village of Frenchay or the surrounding properties.
2. JB was presumably James Browne, and the stamp was for impressing on utensils made and sold by him.
3. There was evidently no room for a grinding shop, with its own waterwheel, at Frenchay. This is one of many references to it as a separate establishment. There was also a glazing wheel, or polisher, which Rees¹⁶ tells us was made of wood covered with leather, which might then be covered in glue and emery. He has the glazing wheel driven by straps from the same drum that drives the grinding wheel. We see that the company occasionally bought emery, for example, from James Browne in May 1778, and in March 1778 they paid 3d for leather thongs for mending the grinding mill straps. They also had John Good in to round the glazing wheel in October 1776, for the sum of 9d. John Sheldon spent a half a day in May 1779 mending the spindle of the glazing wheel and a month later was paid for grinding, blackg., glazg. and carrying to and from the grinding mill 2 doz axes.

The Pan Makers

One month in the work of John Norgrove is selected. This is May 1776, and it is typical except that the pan makers also made the handles. They worked in a separate panshop for which 24 yards of paving at 6d. a yard were bought in August 1778:

1 doz 2 Short pans 1
 1 doz 11 Long pans
 1 doz 1 Eye pans
 5 doz 4 Eye pans
 11 short pans
 1 doz 9 long pans
 2 doz short pans
 1 day himself and boy Cleaning Mr Brown's pans 2
 1 doz 8 long pans
 1 doz 4 Eye pans
 11 Long Pans

1

Apr 1778 fish skin

6d.

The purpose of this was finally confirmed for me by a note in the Nevis Historical and Conservation Society Newsletter for November 1995, where there is a reference to '*scrubbing the entire house ... the hard, dried skin of the old wife fish was used to remove stubborn stains*'. After this a number of references were found, which (in date order) told of fish skin being imported from Lisbon in 1479¹⁸; in 1759 the *Oxford English Dictionary* records that '*a piece of old wainscot was smoothed with fish-skin*'; in 1886 Blakely¹⁹ has '*the skin of some species [of shark] is used by native workmen in India for polishing wood and ivory*'; the current *Chambers Dictionary* knows that the Old Wife Fish ... '*skin granulated like a file*'. So we must presume that the fish skin was used for smoothing and polishing the handles of the spades and shovels.

Explanatory Notes

1. The 'short', 'long' and 'eye' refer to the handles, not the pans. The panmakers made the handles in batches of anything from one to thirteen dozen. The eye handles were perhaps either simply handles with holes in the end to hang them up by, or else loop handles attached directly to the pans, although there is also one reference to 'ear pans'.
2. There are very few references to the boys, but we do find, for example, at Christmas '6d. for the boys: 2s. 6d.', and occasionally they are paid at the rate of 6d. a day for helping one of the men. C.R. Andrews¹⁷ noticed that at Wortley in about 1900 'there were also a number of boys and youths working as assistants but as they were paid by the workmen they assisted their names did not get into the wages book'. Nearly all of them were sons of the men. One of the boys at Frenchay did get into the Bought Book. In January 1778 we find 'paid for Rum for the boy going to the infirmary; 6d'. But the rum was not a special treat, it was an anaesthetic. In February we also see that the works 'gave Alex. Holway at the Infirmary per J. Brown's order, 1s. 0d'. So the name of the unfortunate lad does come down to us as the result of an accident serious enough to land him in hospital; this is the only accident which can be read into the accounts.

Consumable Supplies

The principal consumable supply was coal, smith's coal being mentioned often. Nearly all the coal came from Charles Bragge, much of it from Staple Hill, and brought by 'halliers' who were paid monthly. Between October 1775 and March 1776, for example, he supplied a total of 210 quarters of 'smith's coal', whilst from December 1775 to October 1776 he sent in 5 quarters of 'Bigg coal' each month, the latter coming from New Level. Bragge was not the local coal merchant, but the colliery owner and heir to two and a half manors (Mangotsfield, Frampton Cotterell and half of Bitton) but who then married into the Lydney family of Bathurst whither he eventually retired. Bragge's bills were paid every six months, in arrears.

Other regular requirements can be drawn from the Sundries accounts as, for example:

17 June 1776	6 [lb?] packing twine	4s. 0d.
22 July 1776	1 piece of cloth for frying pans	1. 0s. 6d.
	3 empty casks	@ 2/6 7s. 6d.
27 Aug 1776	1 doz long straw	2s. 0d.

All these items I assume to have been for packing the carefully sharpened and cleaned utensils for their distribution.

June 1777 paid Mrs Gwynn's maid for 20lb grease 2d.

Lubrication would otherwise have had to have been by the use of expensive train oil.

Conclusion

The study of this small account book is a constantly rewarding and frustrating exercise. So much can be gleaned from it, but so much is left uncertain or simply incomprehensible. Comparison with local historical knowledge and the information which is available on the techniques which were in use elsewhere have all helped to put the contents of this book into context. It would be an unique resource if industrial archaeology could offer, in its turn, shape to this colourful enterprise.

Though no detailed records survive, it would seem that the company worked on in both Frenchay and Cleeve Mills until about 1885, when both were closed in the wake of a protracted legal suit in Chancery. The principal defendant was evidently a descendant of Samuel Hobbs who was works manager in the period we have been discussing, but the nature of the dispute has yet to be discovered. At all events the outcome was a disastrous one for the business which was sold to pay legal expenses. The machinery seems to have been stripped out of the mills, the Upper Works becoming a tea garden and the less glamorous site at Frenchay was taken over by a flock mill, not using the water power. This business lasted until 1963, since when the building has had variety of occupants or none at all.

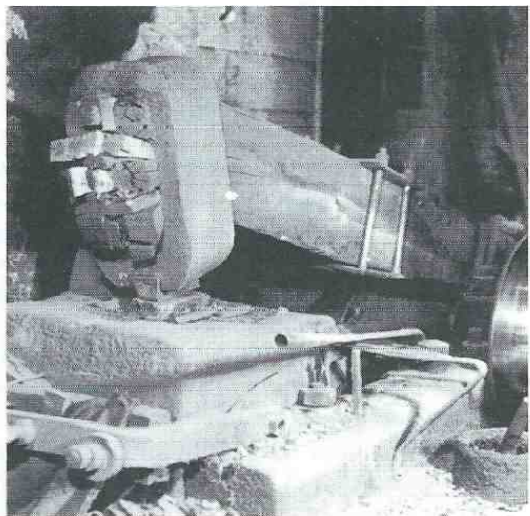
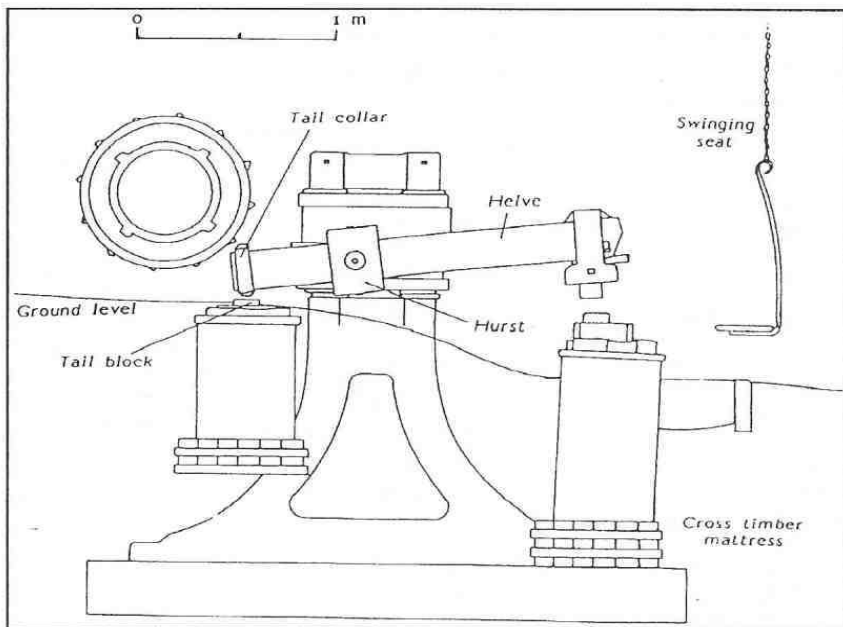
Acknowledgements

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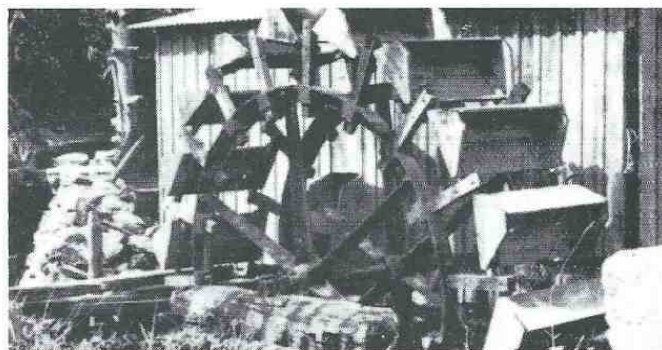
References and Notes

1. Elliott, C.H.B., *Winterbourne, Gloucestershire* (1936: re-printed 1970); Elliott himself owned Frenchay Mill, the next mill downstream, and he evidently had access to deeds and other documents relating to local properties which he seems to have used with great care.
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3. Andrews, C.R., *The story of Wortley Ironworks*, (Sheffield, 1975) 44.
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5. Rolt, L.T.C., *Victorian engineering*, (Hammonsworth, 1970) 68.
6. Smith, W.A., *The Gibbons family*, (PhD. thesis, Birmingham, 1977).
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8. Smith, note 6; 'The contribution of the Gibbons family', *West Midlands Studies*, 4 (1970/71) 46.
9. Ashton, T.S., *Iron and steel in the Industrial Revolution*. (Manchester, 1924) 66.
10. Personal letter from Douglas Braid, 28 November 1982; Cramond will be referred to again later in the text.
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13. Elliott, note 1, 63.
14. Brelot, Cl.-Isabelle, *L'industrie en sabots: la taillanderie de Nans-sous-Ste.-Anne*, (Paris 1982) 171.
15. Major, J.K., *Finch Brothers' Foundry, Okehampton, Devon*, (Newton Abbot, 1974) 10.
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17. Andrews, note 3, 7.
18. Carus-Wilson E.M., ed., *The Overseas Trade of Bristol in the Later Middle Ages*, (Bristol, 1937) 234.
19. Blakely, E.T., *A Popular Technical Dictionary of Commercial and General Information*, (1885?), 289.

The plating hammer in Middle Mill at Belbroughton. The massive construction of the foundations is calculated from the part of the equipment which is above ground together with recollections of its construction. The cross-section of the water-wheel shaft shows that it is clad with a crown, or collar, in which the cams are set. This will probably have been the case at Frenchay, though it is never mentioned: from 'Belbroughton: a water-powered edge tool district' by David H. Jones, in *Transactions of the Eighth Symposium of Mollinology*, 20.



The tilt hammer which was still at work in 1982 in an edge-tool works at Grand-Comte-Châteleu (Doubs): from *L'industrie en sabots*, 171



The water wheel at Finch's Foundry, Sticklepath, for driving the fan or blower: from J. Kenneth Major's booklet on the Foundry