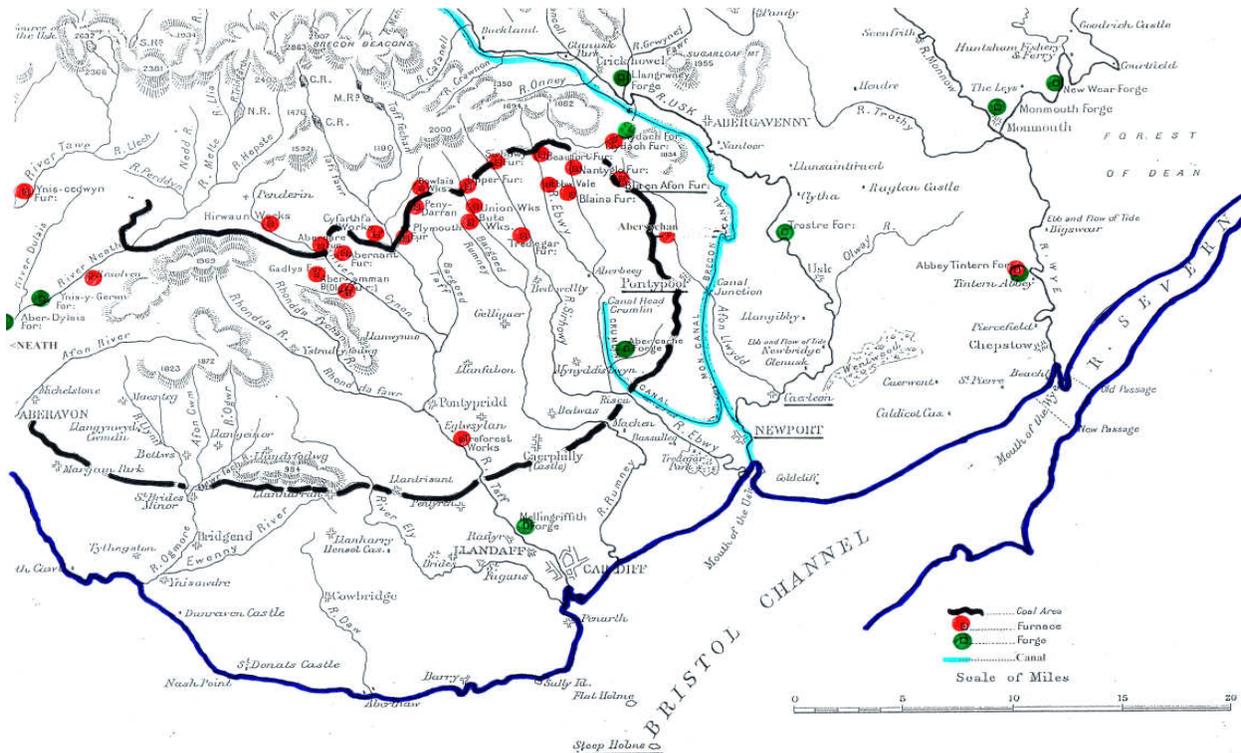


Diary of James Patterson's visit to tinplate works of South Wales January 1828

Presented by Tim Smith at the HMS Annual Conference 16-18 September 2011 held in Cardiff

Comments in (parentheses) and notes by Peter Hutchinson of HMS, Roger Burchell and Tim Smith.



Old South Wales Iron Works 1760 to 1840
(From John Lloyd 1906)

This diary is unpublished work and came to the presenter via a retired steelman, the late Joe Stone, living in Chicago, who was distantly related to James Patterson. The original manuscript is lost, but Joe's father had typed it up – which may partly account for why some of the place names require interpretation. This task was undertaken by Peter Hutchinson, former Secretary to HMS. His additions are within parentheses and his notes as footnotes. Peter lives in Swansea and is well familiar with the South Wales Tinplate industry.

The full diary runs to some 14000 words and covers Patterson's trip to Ireland to see family and on his return to UK visits to ironworks in the Midlands, Manchester, Bristol and London as well as South Wales.

As well as being a record of the technology of the day the diary also supplies insights into the social history of the time, transport and the weather – generally cold and wet according to Patterson not unsurprising since the period of travel included the whole of the winter of 1827-8.

Patterson's spelling and sentence construction have been maintained in the copy with comments added in *(parentheses)* when necessary to clarify points. indicates missing text. Dates are only occasionally stated in the manuscript so have been inferred in the text below from the chronology resulting in some days being absent when a particular visit lasted two or three days.

16 October 1827

Set sail in the Ship Pacific Captain Crooker from New York 16th. day of Octr. 1827 at 10 o'clock A.M. with a fine fair wind - parted with the Pilot at 3 o'clock and lost sight of land 5 minutes before 3 o'clock - but next day the wind changed and we continued to have light head winds the greater part of our time, Nothing remarkable occurred during the voyage. I enjoyed very good health and Mr Large (*Patterson's fellow traveler*) also with the exception of occasional sea-sickness. The first land we made was the rocks on the north aide (*coast?*) of Ireland. We were all awakened about 3 or 4 o'clock A.M. by the noise of putting - about ship. Upon going on deck found we were close to a very large high rock and a very foggy morning. The Captain and mate were both at a loss to say where we were. It yet continued very foggy and calm and about 10 o'clock found

ourselves very close on another large rock and so situated that we could (*neither go ahead?*) nor tack and the ship was backed for some distance and again found ourselves nearing another rock when (*the fog lifted?*) and a little breeze springing up (*we*) stood off and cleared them all. Had fine weather up channel - got some fish and potatoes from an Irish boat and gave them pork &c. in exchange.

11 November 1827

Sunday the 11th was a very fine day, and at about 3 o'clock we came to in the Princes Dock Liverpool- and the. Captain having taken a liking to us and having found (*himself?*) a very fine woman we went with him to the house at which he stopped - a Mrs Richards an American Lady - and found them at dinner.

(James Patterson was born in Killiney and his diary continues with a visit to Ireland to visit relatives. The technical side of the account does not start until his return to Liverpool, from where he travels to South Wales via Birmingham and Bristol - where he visits, but does not describe, some rolling mills. The first description of technical value is of a brief visit to Newport to see iron being forged by hammer and rolling. James Patterson's account continues).

December 28 1827

Bristol is a place of a great deal of trade, The streets are crowded from morn till night with wagons and carts, etc. All appear as if they had business on their hands, In the evening the bells of three or four churches rang and chimed.

December 29 1827

Next morning visited a rolling mill etc., and at 2 o'clock went on board a steamboat for Newport in Monmouthshire. The afternoon was wet and very foggy so we could see but little of the shores as we arrived at Newport 7 o'clock P.M. December 29 (*Saturday*).

December 30 1827

(Next morning) visited a small iron works in the neighborhood and on the next day walked along the canal¹ through the iron yards and were really astonished at seeing immense quantities of iron rolled and hammered of all kinds which are there, and also the quantities of it and coal they were shipping, as well as the immense business they are generally doing. A road occurs along every street² and the canal crowded with boats coming

and going. At half past one P.M. took seats inside the coach as it was raining very hard for Ponty Pool, twelve miles (*north*) from Newport through Caerleon where there are large tinworks. The country wild and hilly, with some very pretty valleys. Arrived at Ponty Pool at half past four in the evening. Took a walk down to one of the tin works belonging to Leigh and George³. Saw them roll, but could not get to see them tin. This is a very good substantial works. They make and finish between 600 and 700 tons every week. (*Probably Lower Works*)..... During a short cessation of the rain were up the river and saw Leigh and George forge, where they make the iron for the tin works. They have five or six establishments. which are all connected by railroads. The forge is said to be the most complete in all England. The dam, building, etc., are remarkably neat. The water wheel, pent stock and roof as well, all the supporters, etc., are of iron. Handsomely and neatly executed. (*Possibly New Forge*). They run two hammers, one for what they call 'stamping', to which are attached two furnaces⁴ in which they use charcoal to burn the carbonated pigs into 'nature' and the other is the forge hammer and connected with which there are four furnaces, three of which are intended for constant use and one alternately is idle for a week to be repaired. Two of them are on one side of the building and two opposite on the other side. These furnaces are similar to or are on the principle of an oven with bottom formed of coke and a blast applied underneath (*the*) coke bottom. The coke bottom burns about 12 inches deep and the coke applied by a hopper fixed on the back side and with these they make 30 tons of iron for the rolling mill of the tin works every week. The forge man told us that the older the pigs and the older the refined iron was the better it became and the better it worked for them. They have very large stocks of all kinds on hand. They have all water tue- irons (*tuyeres?*)

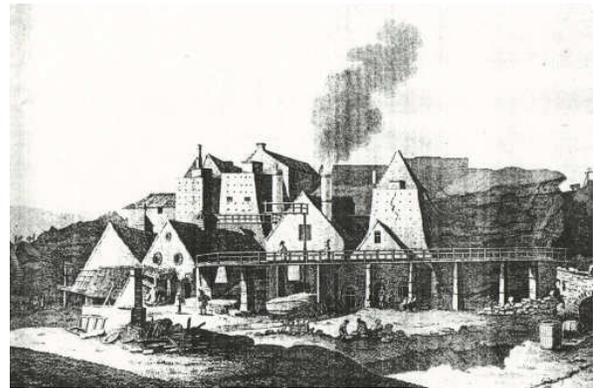
2 January 1828

The next day (*Wednesday*) we walked up the river along the railroad about 5 miles which is a very good one, being near a plane and near a square cast iron bar with a round hole near the end, in which they drive a wooden plug to keep it down. About four miles from Ponty Pool there is a very large iron works where are a great many puddling factories, etc. (*probably Varteg Iron Works approx 5 miles north of Pontypool. In 1826 this works was blowing 4 blast furnaces, output 7800 tons that year; a 5th furnace was added in 1830 when output reached 13,356 tons*) and

where they make a great deal of iron bars, round rods, etc., in the rolls by steam power and a 20 foot wheel by water which works a forge hammer and furnaces similar to those at Leigh & George's and while here the rain came on so heavy we were obliged to put about - stopped at a Tavern where we hoped to get something to eat and a bed for the night, but after remaining until near night, found upon inquiry we could have only bread and cheese to eat and no bed for any price, so although it was raining very hard, and near night, we were obliged to turn out and walk nearly four miles to Ponty Pool, and having but one umbrella with us and no coats, we were, upon our getting to our Inn, tolerably well wet.

3 January 1828

Next morning being fine, we, after breakfast, again took up our march and took care to take both umbrellas, but it being clear and warm, did not take our coats, .We started with the intention of going to the Blaenavon Iron Works which are situate on the west side of the Bloreng Mt. and about eight or nine miles from Ponty Pool. We passed the British Company's Works, etc (*at Abersychan*) with the intention of stopping there as we came back. We got at the British (*Blaenavon*) Works⁵ about 2 o' clock and were very much surprised to see such immense works.



Blaenavon Ironworks in 1798

There are five furnaces in a range and of very great size. They are more like prodigious castles than anything else and are built on the side of the Mountain. They have a very beautiful steam engine made at Neath Abbey of 55 inch cylinder (*Records show it was a 52¹/₂ inch beam blowing engine*) and the air pump twice that diameter and which blows four of the furnaces, four carbonating hearths (*the carbonating furnace or - 'running out fire' - was needed to economically treat the South*

Wales gray pig iron to remove the silicon and some carbon typical of S Wales pig) and seven or eight blacksmith fires, one furnace being always under repair. The iron ore and coal, &c. are all got together in the side of the mountain and it is really astonishing to see the numerous railroads and tunnels in the side of the mountain, some of which run three quarters of a mile into the side of the mountain. (Colebrook states 'The coal and iron ore was brought to the works on tramways which ran through a series of tunnels' Some of these have survived and are now being explored by a local caving club they are known to pass from the Glyn valley south to the Abersychan area). The great piles of coal burning into coke and the fires of the ore roasting, the fires and smoke of the steam engines, furnaces, etc., make the place as if it were Vulcan's Chief Workshop and the great number of men and women with their black and rough cheeks, do not help the appearance of the place. The place looks like a busy, thriving village. From here we went about half way up the mountain till we came to the road which winds round the mountain and passed another rolling mill (*Garnddyrys*), and as we went along had some most beautiful and romantic views of valleys and the neighbouring hills and mountains, About 7 o'clock arrived at the Grey Hound Inn in Abergavenny somewhat fatigued having walked 15 or 16 miles.

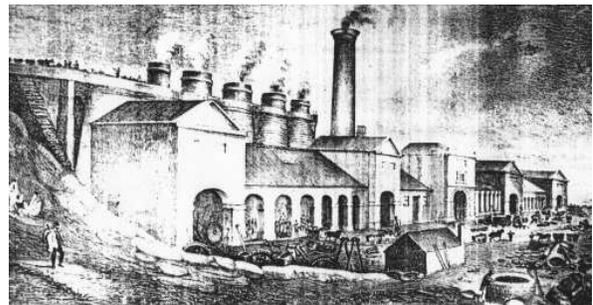
4 January 1828

Next day it rained so hard and so constantly we could hardly get out all day. We, however, in the course of the day, made out to walk through town, where there appears to be a great deal of business done, and all busily engaged at work of some kind. The river Usk runs near the town over which is an old ancient bridge, and a little beyond runs a canal (*the Brecon and Abergavenny*) on which iron, coal, etc., is sent to Newport, etc. and to which a number of railroads run.

5 January 1828

Next morning, being Saturday, we found a fine clear morning and the mountain tops all covered with snow and none in the valley. We got breakfast early and started to go up on top of the Bloreng Mountain (*South west of Abergavenny*). We went up three or four lifts of the railroad called by the people the 'incline of the plain' (*Hill's tramroad inclined plane from Blaenavon to the Monmouthshire & Brecon Canal at Llanfoist approx 2m SW of Abergavenny*) and which is very steep and after leaving it we went up the steep side covered with a long, soft, mossy

grass.....On the very top of the mountain is a great heap of stones – some them large – supposed to be an ancient Cairn raised to the memory of some of their ancient chiefs or leaders who were buried there – came slantingly down the side of the mountains and pursued our way on to the British Company's works (at *Abersychan*) – up a valley to the east (*west?*) of the river (*Afon Lwyd*) up a deep ravine where they are building an immense works⁶ - six remarkably large furnaces - twenty puddling furnaces - &c. two large steam engines are now up and another larger one is being put up to drive the rolling mills, &c, the two engines now up were made at Neath Abby. They have now a very large stock of iron (*ore?*) and coal on hand - a railroad of wrought iron conveys their iron &c, to the canal for Newport - and they have a great many which run in every direction to and for their iron ore and coal &c, - An engine raises the coal out of a perpendicular shaft - both iron (*ore*) and coal of a good quality - the furnaces and rolling mills form one large fine stone building - put up and designed in very good taste - the stack or engine chimney looks more like a large monument than what it is intended for and you might be lead to take it for one did you not see so large a column of black smoke uprising from it. It is, I suppose 200 feet high. They have yet but two (*furnaces*) in blast - the others being not quite ready.



The British Company Ironworks at Abersychan

It being now-nearly dark we turned about and made for our Inn where we arrived after six o'clock having been absent three days and having no worse effect from our journey among the mountains than a most capital appetite. We were very much gratified with our journey – the (*first day*) and next along a great many railroads and of almost all kinds - but the rolled iron one is much the best. If I had walked as much in the U. S. I would have been worn out with fatigue - but here although I had walked sixteen or seventeen miles and part of the way up and down a very steep

mountain - I did not feel very much fatigued - but could have very easily gone farther.

7 January 1828

On next day went up to the End forge above Pontypool belonging to Leigh & George (*End Forge or Little Forge was in fact the very well known 'Osborne forge' thought to be the oldest of the forges in the Pontypool district. A description of the making of 'Osmond iron' here survives dated March 23 1593*) and saw them at work carbonating and stamping and on but one hammer - and tap from the carbonating into the refinery furnace⁷ and have two furnaces of each kind - hammer &c about the same as at the other forge belonging to same company.

From there went to the British Company's works again and went more particularly over all their works. Saw their kiln for making their fire brick of which all their furnaces &c. are made - took a sample of the material of which they make their brick - and which they grind between a pair of rollers. It is all together most astonishing works - the engineers name is Robert Taylor (*possibly a confusion in the name - see note 6*) - the roller a Mr. Jones and the man who attends the furnaces a Mr. Naunsket. The engines, and there are three - were made at Neath Abbey. There are twenty puddling furnaces besides the carbonating and expect to have all in operation next month. Their railroad to the canal is of wrought iron rolled - and they will make about 500 tons weekly of different kinds of iron. They are the broad wheel with a small flange - the broad part bearing on the rail and the flange running inside. We saw here a number of smaller narrow wheels (*with no flange?*) which were intended to run on the rails with a very narrow edge (*flanged plates?*) - and they were thrown aside and the broad ones used. -We also saw a number of very handsome wheels fastened permanently on wrought iron shafts - all very well done and they also were thrown aside and entirely out of use⁸.

From here we came back to P(*ontypool*) - along the Canal and went up the railroads to the (*Blast*) Furnace belonging to Leigh & George where they make their iron for the tin works. It is a single furnace (*probably the Trosnant furnace which was still standing in 1979*) - blown by a water wheel about 30 feet high 3 ft. wide and 12 in. deep in the shrouding - an over shot wheel - they use coke - one carbonating furnace with two blasts - they have here coal mines and a larger place in the form of ovens for making coal & coking thru coal -

It was all day a cold day and found our top coats very comfortable and as we returned about dark it commenced, snowing and continued all night.....

8 January 1828

..... and upon getting up in the morning - the 8th. - found the ground covered to the depth of 6 inches on a level with snow and still snowing moderately. After we had had our breakfast put on our coats and took our umbrellas and walked down along the canal to Leigh & Georges Rolling mill (*Lower Works*) where they roll the iron from the plates as it is sent them from the forge and also into tin sheets for the mill as well as the rolling mill above and also cut in lengths here for both mills. They have four ovens and two reheating furnaces. (*They*) Can drive 4 separate pair of rollers or have others attached to the end of them. They cut and trim all the tin iron they roll. The water is brought in trunk or pipes under ground and then raised up in the building so as to act on the water wheel.

From here walked down the canal and crossed down after going some distance to the tin works next below Leigh & Georges⁹ and walked into the rolling mill where they have two sets of rollers for making the sheets for the tin - and two ovens for the rolling mill and an oven in another department for scaling the sheets. From here we went into the room where two young women were scouring the sheets in water and red sand and then put them in troughs filled with a preparation made of an acid for the purpose of clearing it entirely of all scale¹⁰. When and after being cut to the size - it is taken into another room where it is dipped in the tin and finished. They have 6 places for their tin boilers - five only of which they were using and at which there appeared to be two entire sets of hands where they first took the sheets after being cleared of scale &c and finished tinning it. There were then several women who rubbed and cleaned it with bran - to take off all oil and polish and/burnish it - after which it was taken to another room and assorted and boxed - if any imperfections appear in tinning, too much tin on or anything of that sort, it is scraped and returned again to the dippers - and again undergoes the whole process anew. We were very much pleased and gratified at seeing the process and hope to be able to see it again more fully in some other works.

The snow being so soft and being obliged in crossing the road from the canal to the tin works almost a mile in a creek of water our boots and

stockings were completely saturated with water and we were obliged to wend our way back to Pontypool to change them, where we got just before dark after travelling through snow and water for about ten miles.

9 January 1828

Next morning took a range over the mountains - a fine cold frosty day - visited two other furnaces belonging to Leigh & George (*probably the Blaendare furnaces. The area was also known as the 'Race' particularly in later years*) where they do all their casting except the chilled rolls which are cast at Bristol. They have also two very large air furnaces - came home through a tunnel under the hill for a railroad.

In the evening Mr Griffith {Mr Leonard's friend} (*an émigré from Wales working in USA*) spent a few hours with us - and (*we*) gave him a letter from Leonard. He was much surprised to hear by his letter that in America it took 32 cwt. to make a ton of iron from the pigs and that a fire there would only make 3 tons a week and (*as*) $22\frac{1}{2}$ cwt should make a ton (*as in Wales*). They have iron bottoms to their puddling furnaces (*in Wales*) which answers a much better purpose than any other and in their ovens where they heat their iron for rolling the plates for the tin the bottoms are made of stone first burnt and then pounded fine. Very great improvements have been made within two or three years in making iron &c. A set of hands will make 24 boxes of tin in a day and get two pence three farthings per box. There are 5 tin works between this place (*Pontypool*) and Newport - two or three in Glamorganshire and two in some part of England¹¹.

In assorting it they make 5 or 6 different kinds in quality. They are very particular in having no sand or anything of that kind in their ovens or furnaces that will vitrify as it acts among the iron and can never be got free of it again. Charcoal costs them a shilling a bushel (*8 gallons or 36 litres*). A cord of wood here is 2ft. 6in wide and the same in height and 7ft long. It is said a hammer man can earn 30 shillings per week working piece work for 12 hours each (*shift*) being 5 shillings a day 12 hours work. They work in double sets - one at night and the other day, and change from night to day and from day to night every week, commencing and ending at 6 o'clock. They are obliged to have a press to box the tin so as to get the cover of the box on.

10 January 1828

Today 10th cold with more snow. Mr. Griffith went this morning to get us liberty to go and see the tin works of Leigh & George, The foreman said he could not give us liberty to go in. That is he could not show us through - but the employer was not at home and if we came and want to go through today we should have no obstruction from him - upon consideration we declined going through the works upon such permission - went again and saw the forge back of our Inn (*Town or Old Forge?*) which belongs to L. & G. and which they are altering and substituting iron for wood. (*There was more than one old forge in Pontypool just as there were two new forges. However we are told by R H Tenison that a 'new forge had been added to the platting mill' in 1824 but due to lack of demand all the alterations; i.e. a new rolling mill, did not get completed until 1832*). The anvil block is of iron and weighs 6t 3(cwt). The arms and shrouding of the water wheel which is to work the hammer weighs (*one side of the wheel*) 3 tons. The hammer water wheel is about 12 feet diameter and has 22 buckets in it. The shrouders and arms are about 3 inches thick and about 12 inches broad.

11 January 1828

Next day again visited the British Co's works (*at Abersychan*) and found their ovens to be the width of 30 bricks - ditto long and $7\frac{1}{2}$ bricks wide inside and the sides the thickness of the length of one brick and a half and use a cast iron plate for the bottom to puddle on - &c.

Their brick kiln is about 10ft. wide and the same height - with ten openings - two feet high 5in. wide and at regular distances apart - and has a kind of cupola at the top in which there are the holes through which they fire as well as at the bottom. At the bottom there is a fire place about 18in. long and. 12in. wide with an ash pit to each opening. The depth of the fire is the depth of the slot - the bottom of which is level with the bottom of the kiln, and they use nothing in making the brick but a dark colored clay which is got with the coal - either on the top of the coal or under it. It is first put into a hopper and hammered down by a man with a sledge and ground between two rollers with grooves cut in them so as to grind it. It then falls between two smooth rollers which squeeze it hard. It sticks round the rolls but is scraped off by scrapers to each roll and is then tempered and worked by a man alongside of the rolls and is then moulded in the common way. They burn the brick with their worst coal - and they appear to be

most excellent fire brick - The wheel which drives the rollers and grinds the clay is an over shot about 30 feet high 3 feet wide with a spur wheel with water wheel shaft 7 feet diameter and 6in, on the log and works in one about 3ft diameter. The rollers are about 3ft long and 18in diameter fixed in a large iron frame and four large bolts through to prevent them forcing apart - the necks of the rollers are about 7in diameter. There is a groove cut in the end of each roller for the hopper to run in to prevent the dirt getting in endways.

The steam engine which the British Co. are now putting up to drive the rolling mill is 45in diameter (*cylinder bore*).

From B. Co. works came down to Leigh & George's upper forge (*Little Forge*) and spent an hour or two in seeing them working. Their carbonating fire is situated so as to tap the mettle (*metal*) to run in the stamping fire - and they say 24 tons (*must be cwt!*) of pigs from furnace will yield after carbonating and stamping one ton of iron for the forge where it is drawn into kinds of slabs for the rolling mill to be rolled into tin plates - By this way of tossing from one fire into the other they save iron and a great deal of coal, and can do more in a day¹². Say from 10 to 13 tons per day. They take a heat out of the stamping fire at one time from 2-½ to 3-½ cwt. - on a small iron truck - and under the hammer is stamped into a flat ragged plate about one inch and a quarter thick - and they then while red hot throw it into cold water - and after remaining there some time it is broken up into pieces about 4in wide and the length it will allow of¹³ (*ie piling ready to forge into a composite bar of wrought iron*). Their charcoal is very small and poor and they do not apparently care for it being wet. The Anvil Block is a very heavy piece of iron and is fixed on a solid bed of timber about 5 feet deep. This tin works (*this must mean all of the works together*) of Leigh & George is said to be the largest in the world. They work up between 150 and 200 tons every month. The proprietors of the tin works meet once every three months and arrange and decide what the price of the tin shall be for the next three months.

Went again and saw Leigh & George's upper forge - the hearth of the carbonating and stamping fires are a plate of iron about 2in, thick and about 2 feet by 18in, and the fire place about 10in, deep and the sides are also composed of cast iron. There is a span underneath the hearth plate of about 5 inches deep all under in which they occasionally during a heat, throw under

some water by means of a pipe that keeps it from burning. The bottom plate when it gets rough they have to exchange for another which is the case about every three weeks. When it gets rough the iron adheres to it and gives the foreman more trouble and does not make so good iron¹⁴. They all speak of the way of working being so much superior to the old way which was similar to our American Plan. Measured the hammer handle &c, [See Plan] (*Not present in surviving document*).

Saw Mr. Leonard [cousin to the Mr. Leonard now in U.S.] and had some talk with him. He would go to U.S. if sufficiently encouraged. He has the character of being a very good workman and a very sober, steady man. He says the iron losses in converting the iron from the furnace pigs into iron for the Balling furnace or forge from four to five cwt, out of 25 cwt. Visited also today the lower forge (*in the Lower Works?*) belonging to Leigh & George, which is fitted up in the old manner with the wooden hammer handle &c, where they have two puddling furnaces and one hammer upon the old plan. They take the iron as it comes from the stamping hammer and pile it up on a bar and put in the furnace and take a good welding heat on it and then draw it out into a slab. Then cut it in two across the length and put one piece on the other and again put it in the furnace and take another welding heat on it and again draw it out into a slab two feet long, four in. wide and an in. and a half thick or thereabouts when it is sent to the rolling mill and a welding heat is again taken on it previous to its being rolled into flat bars for the other rolls which roll it into sheet iron for the tin. A heat is taken on it when in the flat bars previous to its being put in what they call their breaking down rolls - and when they have reduced it to a certain size there it is again heated and goes through the roller repeatedly which reduce it to sheets for tin¹⁵. The forge looks poor and shabby when compared with the others we have seen.

14 January 1828

Monday morning took our seats in the coach and after paying our bill £9.9.2 and 12/- to servants, started for Caerleon where (*we*) arrived about 9½ o'clock and put up at the Black Bull Inn, and after putting our trunks in a room went up to a tin and mill works a short distance above Caerleon¹⁶ which we went through. I first went in the scaling house and saw them scaling¹⁷. Had some talk with the scaler, He gets 4³/₄ (*d*) per box for scaling them and he must make them thoroughly clear of all scale. He takes the sheets immediately after

being rolled and cut to the size - and his boy bends them 6 or 8¹⁸ at a time in a kind of low form where they are dipped in a solt. (*solution*) made of one part of oil of vitriol (*sulphuric acid*) and three parts of water (*this is very strong*). They are then put in the oven with the round part up and the ends resting on the oven bottom, and when they become red they are taken out and as they become cool scale very handsomely. If the sheets be made too hot- and scale while hot they must be dipped and scaled again. When they have become sufficiently cool they are straightened and a man takes 8 or 10 of them between a pair of tongs and heats (*hits or beats?*) them on an iron plate which throws off all the scale. If there should however any scale remain he bends the sheet backward and forward in his hands which makes it fly off - After he has them completely clear of scale another man takes them and runs them one sheet at a time through a pair of rolls to straighten (*flatten*) them - and put a smooth skin on them - after which they went to a man who (*immerses them?*) and works them about in what they said was only hot water. - He then handed them to women who scoured them with sand and water. The tin man (*tinner - the man in charge*) then takes them and dips them in the tin and after being in some time he takes them out with a thick coat of tin on and very rough looking and a yellowish color (*due to tallow used as a flux*) - they are then taken to another man who is called the wash man who dips them in a very warm (*tin - this pot is usually cooler than the first*) and fine tin out of which they come very smooth and white¹⁹ - he after having allowed them to drip in a rack in which he places them over his boiler (*no - this is the final stage referred to at end of para*) (*he*) hands them to a young man (*the grease boy*) who dips them in a very warm tallow (*to remove excess tin and melt the tin remaining*) and (*out*) of which he raises them very slowly and steadily and he hands them to a boy (*the list boy*) who dips the side of the sheet about ½-an inch in tallow not so hot (*but with ¼" or so of hot tin in the bottom to melt the 'list edge'*), and which sticks in a liquid state to the sheet - he then gives a blow with a small stick which makes (*the excess tin fly off*) the tallow fly all over the sheet in small spots - he then dips it in hot water and then throws it on the bran to a woman who rubs it with the bran - another woman takes it from her and also rubs it with bran (*should be cleans the bran off it with hemp or flannel*), after this a man examines it, all that is perfect and good he takes into another room where it is assorted and boxed, and that which is rough and has any lumpy places on he

scrapes and makes even and smooth and has it again dipped in the tin and gone through all the different operations again. Previously however to being dipped in the tin at all it is put in warm tallow where it is suffered to remain till it becomes warm and then dipped in the tin which also has the tallow on the top of it - and after being sufficiently long in the tin he takes it out one sheet at a time and puts it on his rack over the boiler - the watchman (*wash man*) instead of putting his sheets on a rack takes them out a sheet at a time and rubs the tin off with a soft brush when he hands it to the (*grease*) boy who dips it one sheet at a time in the hot tallow.

Mr. Large was seeing the wire drawing while I was in the tinning departments - from here went up to the tin works above²⁰ - looked in at their scaling oven, &c, &c, and in the tinning department (*but they*) shut the door on us which we took as a broad hint we were not welcome and came out and as we came out met the foreman to whom I spoke and a short way behind him was the proprietor who looked as if we were most unwelcome. The rough reception so very forbidding made us full inclined to go no farther particular as we were becoming too well known as being from America in and through that part of the country²¹- we therefore returned to Caerleon - got dinner and afterwards got an old man to carry our trunks²² and we walked with him to Newport where we arrived that evening.

15 January 1828

Next morning at 7 o'clock took passage inside for Bath as the snow had turned to rain..... We propose leaving here in the morning for London - where we shall be able to see some American Newspapers which will give us some little news from home and I hope we shall hear no bad news.

Genealogy added by Joe Stone USA

James Patterson - Great Grandfather of Louise Patterson Leedy.

Mr. Large James Patterson's Father-in-Law and Louise Patterson Leedys children's Great Great Grandfather.

His Father their Great - Great - Great Grandfather.

Eliza Large wife of James Patterson

Sarah his Sister.

Notes by Peter Hutchison HMS

References are:

'Chronology of the tinplate works of Great Britain', E.H. Brooke, Swansea 1944 and its appendix. (The major source of tinplate works information)

Metallurgy, Vol II, H. Percy, London 1864

'Twenty by Fourteen', Paul Jenkins, Llandyssul 1995 ISBN 1 85902 203 0

'History of the Iron, Steel Tinplate and Kindred Trades', C. Wilkins, Merthyr Tydfil 1903

'Tinplate', W.E. Hoare and E.S. Hedges, London 1945.

Illustrations 'Historical Industrial Scenes – Wales' by D. Morgan Rees published by Moorlands Publishing Company Ltd., 9-11 Station Street, Ashbourne Derbyshire

Maps used:

The South Wales Iron Industry 1750-1885 by L Ince (Map of Monmouthshire Ironworks)

The Early History of the Old South Wales Iron Works 1760 – 1840 by John Lloyd P.P. Pub 1906

Notes:

1 - The Monmouthshire Canal. Served most of the heads of the valleys where the major iron works were but by 1827 was seriously overloaded.

2 - Streets of houses were often built along the South Wales tramroads (and canals), not vice versa. They were often for the workmen. In many places the houses still stand with a road replacing the tramway.

3 - George was Watkin George and he remodeled the works and made it more efficient. A Watkin George was the "mechanical genius" at Cyfarthfa when the big waterwheel was built. Watkin George (senior) died August 19th 1822 aged 63. His wife then took over his interests in the Pontypool works. The partnership was dissolved on January 1st 1830 the partners then being: - Capel; Mrs George and E H Phillips. Watkin George (junior) was therefore the WG that Patterson met. Watkin George (junior) died September 4th 1854.

4 - There must have also been a 'carbonating furnace' (running out fire) somewhere to carry out the two stages of the Welsh process (see also note 12).

5 - This is either a slip of the pen or a typo. They passed the British works on the way. There is no doubt that the description is of the Blaenavon works. At that time Blaenavon had only one blowing engine wrongly identified as being a 55 inch cylinder; it was purchased from the Neath Abbey works in 1819 as a standard 52¹/₂ inch beam blowing engine.

6 - The British (works) at Abersychan was still marked at SO257036 on the 1966 OS Map 1/63360 (1in = 1 mile) sheet 154 (Cardiff). Two 52¹/₂ inch beam blowing engines of 8ft stroke were purchased from the Neath Abbey works in 1826. Although Patterson has much to enthuse about the works it had in reality only just started to produce iron and only shows shipments of 113 tons for 1827. Hence the very large stocks of iron – ore, only 2 of its 6 blast furnaces were in production in 1827/1828. It is interesting that Patterson states 3 engines at this site all from Neath as Ince in his 'The Neath Abbey Iron Company' 1984, Eindhoven, only mentions two at that time. However Colebrook lists a 54in engine in her work as the number two blowing engine, so presumably Patterson was correct. The directors names were Robert Small; James Henry Shears; and John Taylor. Possibly Patterson confuse the names to come up with 'Robert Taylor' as the engineer.

7 - These seem to be the puddling furnaces.

8 – The Monmouthshire tramroad had recently converted its lines from plateways to railways making unflanged wheels redundant overnight. They were however a ready source of cast iron for recycling. This could be why so many were present. Blaenavon tramway, however, remained an edge railway for many years. It was probably converted about 1829. Following the conversion the permitted wagon weight rose from 56cwt in 1811 to 61cwt in 1828. [Hadfield ,C 'the canals of South Wales and the Border' David & Charles, Cardiff, 1977 2nd Ed p132].

9 - Probably the Ponrhydyrun (or Pont Rhyd yr Un) Tinplate Works, later the Edlogan Tinplate Works. Two mills in 1876. Proprietors - B. Conway in 1811, Conway Brothers by 1851.

10 - It was usual to pickle the sheets, then scour them, and then store them in water before tinning

11 - Maybe that is all he knew about. Brooke records tinplate works as:
Glamorganshire 6, Carmarthenshire 2,
Monmouthshire 8, Breconshire 1
Gloucestershire 2, Midlands 6 or 7 (One could have been out of use) Yorkshire 1

12 - The 'carbonating furnace' or 'running out fire' - was needed to economically treat the South Wales pig iron. According to Crawshay it's invention was at least as important as Cort's invention of puddling. It removed the silicon and some carbon from the gray iron usually produced in South Wales.

13 - Patterson missed something here. When the plate is finished they stamped grooves into it about 4" apart with a bar laid on top. It was broken with a shaped sledge-hammer or a hammer and wedge. It was usual to wet the charcoal to slow the burning down.

14 - As described in Percy Vol 2 page 581ff. A good drawing there.

15 - Patterson does not seem to have noticed that the sheets were cross-rolled from the tin bar. He does not mention 'doubling' the sheet for rolling, which was essential to produce tinplate sufficiently thin. If he saw them rolling the blackplate and they were doubling he could not have missed it or did not appreciate what was going on. It is unclear when doubling was first introduced but they were piling up to 40 sheets under the hammer from the early days. Later on at the same plant he describes what could have been opening a doubled pack.

16 - Possibly the Caerleon Tinplate Works owned by Fothergill and Jenkins as it is marked as tin and wire mill on the OS map. Old established - 1750 Two mills making only charcoal plates. The account of the process is very confused and Patterson does not seem to have grasped what was happening. Alternatively it may have been the Pontir works known as 'Caerleon Mills' although actually located 1 1/2 miles from Caerleon. The owner was a John Griffiths in 1755, he later emigrated to America; another John Griffiths then manages the works, possibly his son. It is probable that the forge was located at Caerleon at a site on the Pontir road still called

by that name. Coxe visited the works in about 1801 and remarked :- "The machinery of the mill is worthy of notice; it is wholly iron; the two flywheels, with the waterwheel and their combined powers, weigh seventy-five tons, and make forty-five revolutions in one minute."

17 - This is called scaling and removes the scale but also must soften the hot rolled sheet. Hot rolling in the hand mills always finished below the recrystallisation temperature, so work hardening the sheet. More modern annealing is carried out at a lower temperature for a longer time than true annealing.

18 - There are perhaps several operations here. Maybe opening a pack of eight sheets, bending them for the scaling furnace and putting them in a rack for pickling.

19 - The tallow on the tinpot has to be partially burnt to work as a flux, hence the yellow colour. The wash pot has clean fresh tallow because it is not needed as a flux.

20 - The other tinworks in Caerleon was Ponthir a two mill plant owned by Jenkins, (maybe & Conway). Est 1747. Only one brand of charcoal plates is recorded.

21 - This may have not been because they were American. Anyone not local (or maybe anyone at all) was probably unwelcome.

22 - We must suppose on a handcart. When I was a boy you could hire a man and a handcart. The local builder used no other transport that I can remember.

Comments

This seems to have been a singularly unsuccessful trip.

Whether Patterson was the right man to send or whether he was coming anyway we do not know. When he eventually got into a tinhouse he does not seem to have found out what was going on.

There does not seem to have been any attempt to use whatever information he gained to set up a tinplate works. I suppose the rolling and forging he saw might have been of more use.

The first American tinplate seems to have been made in 1858.