THE IRON INDUSTRY

The production of iron was not new to the eighteenth century. The Hittites were the first group of people to produce iron. The Hittites were a group of people living in the Fertile Crescent also known as Mesopotamia or The Land Between two Rivers. There two rivers namely the Tigris and Euphrates. They rose in the Armenian Mountains and flowed down to the Persian Gulf. These were very significant rivers and flooding was a big issue but equally they left behind soil that was good for the growing of crops and therefore allowed the development of settlements, crops and agriculture. Things like shadoofs developed, they were essentially wells that enabled water to be drawn and crops to be irrigated. A number of ancient and very significant cultures developed here. The Assyrians were very warlike and they killed many people men, women and children, very little in the way of mercy was shown. Their use of iron (the invention of which was around 1500 B.C.) gave them a significant advantage over rival tribes that used bronze. Bronze is an alloy comprising copper and tin. Iron was heavier than bronze, it could be made both heavier and sharper so that rival tribes could be more easily defeated. The Assyrians were able to capture Babylon in 1595 B.C The Assyrians went on to destroy the first Babylonian state. Iron would be used by the Greeks and the Romans.

The Romans were, of course, to conquer Britain. Julius Caesar landed in Britain in 55 B.C. In the summer of 54 B.C. he returned to Britain again. Caesar abandoned this invasion probably due to problems in Gaul (France). He did not return to Britain, he was assassinated in the Roman Senate. The real invasion of Britain took place in A.D. 43. The Emperor Claudius launched an invasion, this was a force of 40,000 men and was commanded by an experienced General Aulus Plautius. The conquest of Britain was of huge significance and for around 350 years Britain was to develop in ways that would have been unimaginable before these events. Iron weapons were to be of huge significance in all of this.

Moving forward to the early eighteenth century, iron production in Britain was well behind that of Sweden and Germany. However, this period would see Britain become the predominant producer of iron.

There were two main processes relating to the Iron Industry. The first was the mining of the ore. The second was the smelting process whereby the actual metal was separated from the ore by the use of great heat.

Open topped blast furnaces were used. Charcoal was the fuel used to smelt with. Limestone or clay was often used to remove impurities from the ore. Molten iron was channelled into sandy moulds; it was called pig iron because it was thought to represent the way a sow feeds her piglets. This analogy was suitable in early eighteenth century Britain which was still primarily an agricultural country.

Mining and smelting at this stage were often carried out in close proximity to one another. In 1700 the main areas of iron production were Sussex, the Forest of Dean (Gloucestershire and Herefordshire), the West Midlands and the district around Sheffield.

Considering types of iron, cast iron contained a lot of carbon and other impurities and this in consequence make it very brittle in practical terms it could only be used for a limited range of goods e.g. cannon, cooking pots, grates etc…So wrought iron was to assume great significance in the production of a range of goods.

Water power at this time was very important and so metal trades were often located near fast flowing rivers. Birmingham and Sheffield were the main centres of metal working. Birmingham made a wide range of goods e.g. locks, pins etc…Much of this work was done in small workshops. It used to be said that Birmingham made everything from pins to steamrollers! Sheffield also made a range of goods but was most famous for the cutlery it produced, again in the domestic situation of small workshops.

By 1700 Britain was facing a severe shortage of charcoal that was vital in the smelting process. At this time wood was of great significance to Britain not least in the building of ships. Britain then, as now, was primarily a maritime country. Parliament had to pass laws that restricted the felling of trees. By around 1720 there was a decline in the number of active blast furnaces.

In practical terms this meant that much iron ore in Britain was not being exploited. This situation was compounded by the rising demand for iron goods. Britain was too reliant on timber imports from Sweden and Russia. Ths was clearly not a good situation economically and strategically.

Britain was, however, very rich in coal deposits but unfortunately this was not suitable for smelting because of the amount of sulphur it contained, this made the iron produced brittle and not capable of being worked.

Another fuel for smelting was much needed and it is here the role of the Derby family in Coalbrookdale, Shropshire was to be of such importance. In 1708 Abraham Darby I moved to Coalbrookdale. He was a Quaker and he took ever an Ironworks there. He was determined, like many others, to find a fuel for smelting. He used coke to smelt with. It is almost pure carbon but it could be produced cheaply unlike charcoal. It could also be produced in very large quantities.

However, the iron produced was only suitable for casting; the real need at the time was for wrought iron that could be used for a range of products. Abraham Darby II solved this problem, he produced better quality coke. He used coking ovens. He also strengthened the bellows, the pig iron that he produced more suitable for refining into bar iron in the forging process. His work would have a great effect on the Iron Industry.

Both the mining and smelting processes would now be located where there were good supplies of coal and iron ore. Hence South Wales, the West Midlands, South Yorkshire, North East England, Central Scotland were now all very significant areas in relation to iron production.

It was Abraham Darby III who built the first Iron Bridge in 1779. This Bridge crosses the River Severn and has, of course, given its name to a settlement there.

The importance of coke smelting to the British Iron Industry was immense. In 1750 Britain produced 30,000 tonnes of Pig iron by 1804 this figure had risen to 250,000 tonnes a huge increase.

With the smelting process solved, the conversion of pig iron into bar iron was essential in terms of speeding it up. Henry Cort had set up a forge near Portsmouth. He was under contract to the Royal Navy. Cort used a reverbatory furnace to help in the smelting process. A coal furnace could be used because a bridge could be used to separate the coal and the pig iron. This meant that the pig iron was not contaminated by the sulphur in the coal.

The next process was called Puddling. This was where the workable iron was formed into shapes by the Puddler. They were then sent to the rollng-mills where the hot iron was passed between rollers that had grooves. These could be set up into predetermined shapes. This would be very helpful in the development of the Iron Industry and the mass production of iron goods in coalfields areas.

A number of prominent Ironmasters emerged. John Wilkinson had a large ironworks at Broseley in Shropshire, plus works at Bersham near Chester and Bradley in Staffordshire. He became very wealthy and diversified; he owned two farms on which he used the first steam-threshing machines. He used his own coinage; in this respect he was similar to some other prominent industrialists of the time.
Samuel Walker in Rotherham South Yorkshire became famous as a manufacturure of cast steel.

Richard Crawshay in South Wales came into prominence. He is often referred to as the “Iron King”. He was based in Merthyr Tydfil and Cyfartha. At the latter location he built himself a mansion referred to as Cyfartha Castle. It overlooked the town where a large number of his employees lived.

John Roebuck set up an Ironworks at Carron near Falkirk. He profited from the Seven Years War. He produced the famous cannon, the Carronade. The name Carron can still be seen on some public letter boxes.

Benjamin Huntsman was a clock maker from Yorkshire. He wanted better quality steel. He used fireclay pots or crucibles. Impurities would be burned away at very high temperatures. The cast steel was of very high quality. Cutlery and all manner of industrial equipment could now be produced. However, this material was very costly and could not be produced in the same quantity as iron. Huntsman’s methods would dominate steel production for many years to come. His factories would be responsible for 40% of the total steel produced in Europe! Today the Crucible Theatre in Sheffield is named after the heritage of steel! Today it hosts World Snooker Championships

Henry Bessemer was at the forefront of manufacturing cheap steel. He came to prominence in the Crimean War where he was employed in trying to make better cannon. In 1856 he developed a way of transforming of pig iron directly into steel.

In 1828 James Nasmyth who was the Manager of Glasgow Gas Works decided to heat the air before it entered the furnace. This was the so-called hot blast and had the

advantage of saving fuel. Another very significant advantage was that very cheap coal could be used because it would not come into contact with the iron.
In 1839 James Nasmyth invented the steam Hammer. This could make goods in far greater sizes than hitherto. Great force was used by the steam hammer. Steel has become of great importance to the modern world. Steel is, in fact, bar iron mixed with a little carbon. This had the advantage of making the steel harder yet still flexible. He used a so-called converter that could be titled for filling and emptying. This produced mild steel that was much tougher. It was, however, flexible and could be applied to making a variety of goods, wherever the shape might be.

William Siemens was German and settled in Britain. In 1866 he introduced the open-hearth process. His work here owed much to French brothers, Pierre and Emile Martin. This process used very high temperature and large quantities of scrap steel that could be converted into mild steel. In 1867 he set up his own works at Landore near Swansea in South Wales.

However, both Bessemer's and Siemen's processes could only be used with iron ore that contained very little phosporous because their processes could not totally eliminate it. Many types of iron ore in Britain contained phosphorous.

Sidney Gilchrist-Thomas had the idea of lining a Bessemer Converter with limestone, this absorbed phosphorous, a by-product was also produced namely calcium phosphate which it was found was a good fertiliser.

His invention benefited Britain but benefited the U.S.A. and Germany far more because they had vast amounts of phosphoric ore that could now be exploited.

All these developments meant that mild steel became cheap and was available in large quatiites. In terms of Railways steel rails could carry much heavier weights. This had implications for heavier locomotives that could now be constructed.
Bridge building was given a major boost. They could now be larger and stronger. These developments had major implications for the construction of ships. Steel girders were used to reinforce concrete. The list of innovations was immense. The Gilchrist-Thomas process, as already stated, helped Germany expand its Iron Industry. There were a number of issues that Britain and Germany were rivals over in the first part of the twentieth century. The rivalry of the building of large warships referred to as Dreadnoughts was one significant example. Rivalry over industrial supremacy was significant. Equally rivalry over Empires was significant. All of these factors helped to contribute to the outbreak of World War One in 1914.
The significance of steel to the modern World cannot be overestimated. Taking just one example, building in New York. Land is a precious commodity and businesses built upwards rather that outwards. Huge steel girders and concrete made this type of construction possible. On a different level small items like steel nibs for pens replaced quills to write with. Professor Carl Chinn on B.B.C Midlands spoke about steel nibs as having a huge effect on helping to spread literacy not just in Britain but around the world. I remember at Hope Church of England Primary School writing with these. Nibs came in boxes of different types and children could choose the nibs they wanted to suit their style of writing.

When I taught at Ludlow Church of England School we used to make a trip to Ironbridge and Coalbrookdale with our Year 9 History students during the Autumn Term. I remember talking to one gentleman from the U.S.A. and specifically from Pittsburgh. He was completely fascinated by this experience. I said to him that from Pittsburgh such a huge steel producing area this must seem small scale. He made the point that this was where it all began and in this context so important to him and others.

The Iron and Steel Industry created a number of thriving communities; an example is Port Talbot in South Wales. The Margam Steel Works extended for a significant distance. We had a field trip from our College to Durham University in 1972. We used to visit Consett Steel Works at Consett County Durham. Like Margam it was a vast enterprise employing huge numbers of people. It closed some time ago taking with it a large number of jobs. Visiting Consett was a very great experience. One of the things that struck me was the huge pieces of steel that had had been forged and were left to cool.

We walked through what I can only describe as a causeway on a metal bridge that went through these banks of cooling steel. I distinctly remember the sole of my shoes heating up even though I had substantial shoes on. We were told to keep moving and not to dawdle.

The Steel Industry was nationalised and British Steel was formed. This company was referenced by the pop group XTC (a group from Swindon in Wiltshire they were part of post punk and new wave genres; in the song "Making Plans for Nigel", written by Andy Partridge and Colin Moulding. In the song Nigel's future was firmly with a British Steel. (A point of grammar I was baffled to see the use of the indefinite article "a". I spoke to Mr. Dave Merrick, a former colleague of mine from Ludlow Church of England School. I taught Dave G.C.S.E. History but he is an English specialist and indeed an excellent Teacher whose opinion I value in a variety of contexts. We drew a blank on the use of the indefinite article in this context. I thought that I might have been missing some kind of sub-cultural points). Interestingly, the song commented that Nigel's future was as good as sealed. This song was published in 1979. Now there is much less of this once great industry left, Consett, as already stated, has been unfortunately closed for a number of years now. As stated in my article on the Coal Industry, ways of life and cultures with their own characteristics developed. BBC Wales produced a series of programmes The Welsh Way of Life. One of the programmes Temperance and Temptation dealt with pub culture and the opposition to it in some quarters and the issue of Sunday closing of pubs in Wales. BBC Wales, as I have stated in a previous article, very kindly made a copy of this from me as I wanted to do some lessons based on this pub culture and potential conflict with Chapels and a more religious way of life.

Pubs in these areas opened earlier and men would pour in from the mines and the mills where they would replenish the fluid they had lost in the working day. Port Talbot in West Glamorgan, South Wales is still a significant area for steel production. The original works was established in 1901. The Abbey Steel Works was planned in 1947 and today is currently owned by Tata Steel Strip Products U.K. Port Talbot Works. It is thought to be named after the Cistercian Margam Abbey, a small amount of this still remains.

Port Talbot Steel Works is currently owned by TATA steel an Indian Company. China, as stated, is a very much the dominant nation in steel production.

There is a huge legacy of nigh quality steel production in the United Kingdom. Goods, for instance, produced in Sheffield were renowned for their quality. The Sheffield cutlers had what one might describe as a culture and lifestyle all of their own. Before the introduction of large scale production in factories many goods were produced in the domestic setting where the whole family was involved in production. Discipline was seemingly very strict because the family depended on everyone making the required effort.

What the future of Steel production might be in the United Kingdom is very much open to question.

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