



WEALDEN IRON INDUSTRY

Iron was smelted, forged and cast in the Weald for about 2,500 years, although obviously its importance fluctuated. The peak periods seem to have been during Roman and Tudor times. We have patchy knowledge of the Saxon period. Possibly during the Middle Ages the Black Death affected the workings.

The early method, from the Iron Age, was to produce wrought iron by means of a bloomery. A round shallow hearth was dug out, clay hard-packed to line it, then layers of hammered ore and charcoal were put down and the whole lot covered by a clay beehive structure, with holes at the side for the insertion of bellows. The problem with this method was that the heat could not be controlled so the iron extracted was a spongy mass - or 'bloom' from the Old English 'bloma'. Bloomery slag still contains a considerable amount of iron and when the more efficient furnaces were used sometimes the bloomery slag was reused for further extraction to take place.

Bloomery slag is lumpy and dull; by contrast the furnace slag is shiny, with no sign of ore remaining and looks rather like obsidian (it is produced by something like similar methods!). The Romans could use top-loading furnaces but the bloomery method seems to have continued in the Weald down to Tudor times, perhaps even later, although the output was very small - everything had to cool down before the iron could be retrieved.

In the late 15th century the blast furnace was introduced from France. The blast furnace is a fire in a hearth completely enclosed at the bottom except for the 'Tuyeres' ('Tweers' - or blast holes, through which the air is blown).

The fuel for the fire and the ore to be reduced to metal are fed in from the top, together with fluxes to aid the chemical reaction in the furnace. At the high temperature reached inside the furnace the ore becomes completely molten and impurities combine with the carbon in the fuel to produce waste gases and slag; the slag forms as a scum on the molten iron and can be drawn off separately before the iron is 'tapped'. In the old furnaces the smelting process lasted for about two days, then the blast was started and gradually increased in intensity over a period of 6/10 days. After the first casting the whole process was repeated without letting out the fire.

The molten iron was traditionally allowed to run off into shapes, moulded in sand, which resembled a sow and her sucklings, hence 'pig iron'. It was soon realised that other shapes could be cast in this way, ranging from cannons and cylinders to complicated decorative articles, so this form of iron became known as 'cast iron'. It is a crystalline

metal which can be cast into almost any shape but cannot subsequently be worked into other shapes because of its brittle nature. Cast iron still contains a proportion of about 4% carbon which has to be removed by further processing to produce 'wrought iron', i.e. capable of being worked.

Gun casting A model of the gun barrel was made by winding hay round a cylindrical piece of wood. This hay would be coated with layers of a dressing of manure, clay and hair until a replica of the desired gun barrel was obtained. This model was then usually dressed with ash and further coats of the dressing were added and secured with iron hoops. When dry the wooden spindle, hay and early dressings were knocked out leaving a mould. To this would be wired similar moulds for the breach ends and gunhead (a solid block of metal projecting beyond the barrel and used to collect impurities from the molten metal and to allow for contraction). This gunhead was sawn off when the casting had cooled.

The mould was lowered into a pit, gunhead uppermost, in front of the furnace, packed tightly with earth and the molten metal run into it. When the metal had cooled the mould would be knocked off and the gun bored.

Originally the guns were cast hollow but in Sussex they were bored by the late 17th century. Guns supplied to the Ordnance Board had to be 'proved' at Woolwich. If they proved unsatisfactory they were returned to the maker who could sell them as 'refused guns' to a private buyer.

There is a problem understanding how the mould was lifted because no cranes have been discovered. At Scarletts there is a stone floor by the pit and it is assumed the mould was lifted and gradually lowered onto this.

Guns were transported by horse or ox-drawn carts and then by river.

All the time charcoal remained the only fuel used, the iron industry in the Weald continued with its peaks of activity, during which considerable wealth was made. The Weald had all the vital ingredients, ore, trees, water, access to markets. It seems that in choosing a site water was the deciding factor rather than the proximity of the ore. Water powered the hammers which crushed the ore, and also worked the bellows for the furnaces and the hammer in the forge. If necessary the ore could be mined elsewhere and transported.

In 1709 Abraham Derby succeeded in using coke instead of charcoal in the blast furnaces at Coalbrookdale in Shropshire, and the Wealden Iron industry started to decline. Local trade continued for a time but then gradually faded with the last furnace, at Ashburnham, closing in 1827. There was widespread bankruptcy and unemployment.

The need for water has left in places a series of 'ponded back' pools (pond bay, i.e. dam, on the Ordnance Survey sheets) and in many places there are 'hammer ponds', some of them large enough for water skiing. Nature has returned and the pools, plus the beautiful houses once owned by the ironmasters, enhance the landscape. Now the sites are silent, or you hear only the birds, the water and the wind. It is difficult to imagine that the Weald was an

industrial area. East Grinstead was ringed by fire at night, from the light of the furnaces which never went out. The noise, heat, odour and activity must have been overwhelming. The beauty which remains is tainted, too. Prosperity depended on wars. Gun founders were the arms dealers of the times. Without death and destruction they would have been reduced to producing domestic items only.

Despite the prosperity iron brought to the district there was a considerable amount of dissension even before the use of coke. The Forest was becoming denuded, for example, with the demands on it for wood for houses and ships, and charcoal for glass, lime and gunpowder as well as iron, and in Elizabeth's reign an Act of Parliament was passed restricting the use of wood. It was also a sore point that the ironmasters did nothing to maintain the roads which their heavy cannons ruined.

Place names give clues to the industry - hammer, cinder, burnt pit, collier or collyer (charcoal burner), mine, beeches - all appear as part of place names or names of farms, woods, etc. 'Beech' means cinder not trees.

The origins of the iron ore and its distribution are the result of forces dating back over a hundred million years and the majority of sites are in the areas of Tunbridge Wells Sand, Wadhurst Clay and Ashdown Sand, situated mainly in Sussex and Kent, with Surrey very much on the periphery, but we did have a few of the early bloomery sites in our area.

South Park, Bletchingley - Cinderhill Wood and adjacent Poundhill, the latter being where perhaps the unworked 'blooms' were hammered to produce malleable iron. Dryhill, and also to the south of it at Beeches Farm. There is another site, out of our area, at Thunderfield, Horley, possibly another to the west of Chartham Park Golf Course, and several small sites just over the border in Kent in the Cowden area.

The only local connection with the blast furnace stage is Wiremill at Felbridge, which was at one time the forge for Warren Furnace at Crawley Down. Cast iron was made at Warren Furnace and quantities were taken to Wiremill Forge to be turned into wrought iron. The only two major furnace sites are also just over the border in Kent at Scarletts and Furnace Mill, in Smithers Lane, Cowden.

Scarletts (or Scarlets) was called Scalehurst in the 15th century and at the close of the 16th century was worked by 'Quintyn'. It was then acquired by John Knight a yeoman from Lingfield. He enlarged the existing house at Basings, about 500 yards from the Scarletts' dam, and lived there with his wife. The business prospered and between 1571 and 1611 he had the present house built. By 1768 the Knight family were still there but probably they were making domestic items or, more likely, the site had become a corn mill.

Furnace Mill, further along Smithers Lane, nearer Cowden, was known as the Lower Furnace. In 1574 it was worked by Michael West of Lyme and owned by the wealthy and powerful Titchbourne family who had Crippenham Manor built in 1607. This branch of the family was Parliamentarian and it is believed they built ordnance for them in the

Civil War. Robert Titchbourne was appointed a colonel by Fairfax in 1647 and also appointed Lieutenant of the Tower. He was one of the 59 men who signed the death warrant of Charles I. The family went 'underground' at the time of the Restoration and the furnace was reported as destroyed by 1664. The site became a cornmill.

Scarletts also supported the Parliamentarians but seemingly not so ardently and continued to make guns. There was bad flooding in 1703 and Scarletts had ceased gun casting by 1717.

It was the flooding in 1968 which resulted in the discovery of the lay out of the site, which was later excavated. A report on the gun casting pit was written up in 1979.

THE PEOPLE - The Furnace - The ironmaster owned or rented the site. Skilled workers would include the founder, responsible for the maintenance of the furnace. He would have had a deputy because it was a 24 hour job. Next came the filler, in charge of the furnace, and he too would have had a deputy. Then there was the moulder. Each of these would have had perhaps a couple of labourers, working at the furnace.

The next group would be those driving the horse or ox-drawn wagons, bringing in supplies or taking out finished products. Then there were those who dug the ore. Perhaps there would be 50/60 men on a site.

The Forge - There would be the finer, who refined the iron (i.e. smelting again to change the coarser cast iron into the malleable wrought iron). Then the hammerman - a 'blacksmith' but on a larger scale. There would be about 10 labourers.

The labourers and wagon drivers at both sites would probably be agricultural workers, who would work in the iron industry during those times in the year when farm work was slack, remembering that the Weald was mainly livestock farming with very little arable.

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Sources:

Wealden Iron - Ernest Straker
The Iron Industry of the Weald - Henry Cleere & David Crossley
A Gun-casting Furnace at Scarletts, Cowden, Kent - D W Crossley

And with thanks for information supplied by:
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