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THE GARTSHERRIE IRON INDUSTRY.

The career of Mr. James Baird, principal of the great Gartsherrie iron-making firm, illustrates, perhaps more forcibly and vividly than any other, the immense development of the pig iron trade of Scotland, and the avenues to affluence and power which it was the means of opening up.

Born in 1802, Mr. Baird is the fifth of a family of eight sons and one daughter, whose ancestors for several generations had been farmers in the parish of Old Monkland, and whose father was a tenant on both Drumpellier and Rosehall estates of the farmers of Kirkwood, Newmains, and High Cross. All unconscious of the great destiny that was before them, the elder members of the family aided their father in agricultural operations until they had passed maturity. The father, Alexander Baird, died at the age of 68, after having seen his sons established in the Gartsherrie Works and on the high road to fortune. Seven of the brothers became partners in these works, the eighth brother, John, having preferred to stick to agricultural pursuits. All of them, with the exception of James, have long since met the shadow feared by man and gone over to the great majority.

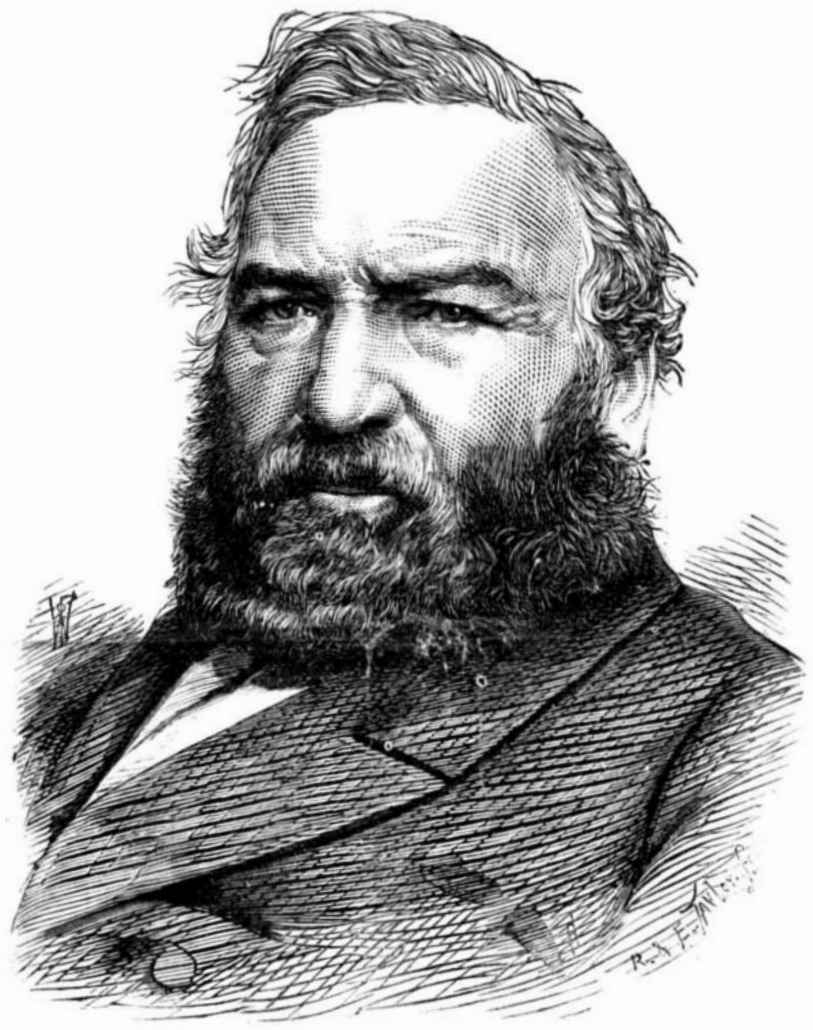
By industry and economy, exercised almost to the verge of parsimony, the Messrs. Baird were enabled to make some little money out of their little colliery, albeit at that time coal owning was not nearly such a profitable occupation as it is in our own day. Other pits were afterwards opened out in Maryston and Gartsherrie, but no works of any consequence had yet been started in this country—now the Black Country of Scotland—for the manufacture of iron. Indeed, the iron trade appeared to concentrate rather on and towards the east coast, where the Carron Works were carried on. As for Coatbridge, which is now environed with a crescent of blast furnaces, it was, to all intents and purposes, a purely pastoral locality.

The Gartsherrie Ironworks were commenced in the year 1829, and the first furnace was put in blast in May, 1830, or simultaneously with the invention of the hot blast.

From time to time the Gartsherrie Works were extended until they reached their present exceptional proportions. They are now, says the *Practical Magazine*, to which we are indebted for the engraving, with perhaps the solitary exception of Dowlais, the largest works of their kind in the world. They comprise sixteen blast furnaces, placed in two parallel rows. The two rows of furnaces are placed face to face, with their pig beds bordering the canal, and the lines of rails for the supply of raw materials placed at a higher level behind each row. A railway bridge connects the two lines of rails crossing the canal and the lower level of the works. The blast is heated to about 800° in hot blast ovens of the pistol pipe form. This is an invention of Mr. James Baird. It was adopted first at these works thirty-five years ago, and led to a higher temperature of blast than had up to that time been reached in the Scotch furnaces. Since then the pistol pipe hot blast oven has come into general use throughout the rest of Scotland. The stoves are fired with slack. They are placed behind the furnaces at the level of the railways supplying the coal. Originally Mr. Baird placed the hot blast stove on the top of his blast furnace, and tried to utilize the flames escaping from the latter for heating the blast; but this mode did not prove a real success in Scotland until Mr. Ferrie's furnace was devised.

The ore used at Gartsherrie is pure black band, which is delivered from the mines in a calcined state. A very large stock of iron ore, varying from 80,000 to 120,000 tuns, is always kept in stock at Gartsherrie. Besides the native black band there is generally a considerable quantity of hematite used, and the firm work hematite mines of their own near Whitehaven. The black band is calcined in open heaps of about 2,000 tuns, covered over with a small material, so as to exclude an excessive supply of air. Before being charged into the blast furnace, the calcined black band is carefully sorted, and all foreign and impure matter is extracted by hand.

It is probably due to the care bestowed upon the purification of the ingredients used in the blast furnace that the Gartsherrie brand is so much esteemed. It is more like the assaying of precious metals than the rough-and ready mode of treating the materials used in the furnaces of Cleveland and other districts. When thus carefully picked and purified, the Gartsherrie ironstone contains a very large percentage of metallic iron; and it only requires 32 cwt. of ore to the tun of iron, or even less.



JAMES BAIRD, OF GARTSHERRIE, SCOTLAND.

The weekly production of the Gartsherrie furnaces is about 160 tuns each; they are tapped every twelve hours, and produce each about twelve tuns of iron at each cast. The production of the works for 1872 was over 120,000 tuns, about 80 per cent of this being "No. 1 Gartsherrie," which is the highest quality of foundery iron made, and at the present market value realizes from $40 to $50 in gold per tun.

Besides the establishment at Gartsherrie, the Messrs. Baird acquired the Lugar, Eglinton, Portland, and Blair Ironworks, all in Ayrshire, and in 1856 they acquired the Muirkirk Ironworks, also in Ayrshire, which, after the Clyde and Carron, are the oldest ironworks in Scotland. In 1864 the firm acquired the Portland Ironworks, with five blast furnaces, to which one has since been added. In 1852 the Blair Ironworks came into the market. These works were started by the Ayrshire Iron Company, which became bankrupt through the mismanagement of its affairs. The works of the company were increased at a rate out of all proportion to the capital. Iron was bought on credit and sold for cash at a ruinous sacrifice, and when insolvency followed it was found that there were $1,250,000 of liabilities, without any assets except the works at Dalry. These works, which originally cost $450,000 or $500,000, were ultimately sold to the Messrs. Baird for $100,000, or $350,000 less than it cost to build them. At the present time, therefore, the Gartsherrie firm own forty-two blast furnaces, capable of producing, when in full going order, from 1,200 to 1,500 tuns of iron per day. At the present time the output of pig does not exceed 800 tuns daily. Altogether, the firm employ upwards of 9,000 men and boys. And here it may be remarked that the Gartsherrie iron is more valuable than any other brand in Scotland, that of Coltness alone excepted. As a well known engineer has put it, "a tun of pig iron marked Gartsherrie will command a price in the market which is above the average of the general quotations, but which is also entirely unaffected by the smaller fluctuations in the prices of pigs, the general variations between supply and demand having no influence upon that select brand. The same pig iron, taken to any distant port, will find itself in a similar position by virtue of its brand: and the act of effacing this brand, although it could not possibly alter the intrinsic value of the material, would reduce its market price by 10 or 12 per cent."

From these premises we may almost draw a conclusion which will be tolerably certain and safe as to the probable profits of the Gartsherrie firm. Assuming that their total annual production were only 200,000 tuns—and it has often been much above this—its value, at the present quotations for pig, would be $7,500,000. It is no secret that something like one half of this enormous amount finds its way, in the shape of profits, into the pockets of the Gartsherrie firm.

From first to last Mr. James Baird has been the most active, practical, and plodding member of this great firm, and he is now the only one of his name that is associated with its management. With a constructive and inventive genius that was eminently sound and correct, if not very brilliant, he devised many improvements in blast furnace practice. We have already alluded to the assistance he rendered in the perfecting of Neilson's invention of hot blast. But that was only one of his many achievements. It was he who led the way in Scotland to the adoption of the modern shape of the blast furnace, which is very much less in bulk and cost than those used in the early history of the trade, when square bases and other cumbersome and unnecessary features, now obsolete, or nearly so, were in vogue. It has been said that Mr. Baird excelled in suggesting and applying different modes of saving labor in every department; and so skilled was he in all the various processes of manufacture, that the workmen all regarded him as a master of his handicraft.

Protection from Yellow Fever.

In a report on yellow fever, recently published in the United States, it is shown that this disease has never appeared in any climate at the hight of 2,500 feet. In the island of Dominica, a hill top not more than 1,500 feet high is always healthy, even when the fever is epidemic at its base. In San Domingo, similar observations have been made. The highest elevation at which yellow fever has occurred in the United States is 460 feet, in Arkansas; and the medical men of this country now hold that the stratum of air infected by the poison is heavier than pure air, and therefore sinks, and they recommend that in unhealthy districts houses and hospitals should be built on tall piles, so as to be above the fever stratum. But where hills are near, the best remedy will be to carry the patients up to a hight of 500 feet.

FROM the experiments of W. F. Donkin, it appears that the Sprengel pump may be made to give an exhaustion down to $\frac{1}{1000000}$ in its simplest and most convenient form, namely, without an air trap and with an india rubber joint immersed in glycerin; but that if a very complete exhaustion is required, the air trap must be used, and the vessel to be exhausted must be sealed hermetically on to the pump.