

## THE HISTORICAL AVAILABILITY OF STEEL

### COLONIAL IRONMASTERS

About once every year, someone asks about the competing claims of Lithgow and Mittagong to have been the place where steel was first made in Australia. These claims appeared in tourist information over the years, and even turned up on the world-wide-web some months ago. Currently, Lithgow Tourism's web page<sup>i</sup> claims that Blast Furnace Park was where "the first iron and the first steel in Australia were cast", and that "Australia's first steel was successfully puddled at Lithgow in 1900". At first sight that seems technically naive and at best inconsistent with the plaque at Mittagong marking the first blast furnace in Australia some fifty years earlier. The claims prompt a discussion about the patchwork history of iron and steel production in Australia.

There are now two quite authoritative books on colonial iron-makers<sup>ii</sup> and there is no point in my simply repeating the chronology which they present. Let's look at some specific matters:

The first casting of iron in Australia

The first forging of ductile iron in Australia

The first casting of steel in Australia

The first casting of steel in Australia using the Bessemer and Siemens-Martin methods.

The first smelting of local iron ore in Australia

The first forging of ductile iron in Australia from local iron ore

The first casting of iron in Australia from local iron ore

The first casting of steel in Australia from local iron ore

Secondary industry took time to develop in Australia. By 1840 in the Colony of NSW, which encompassed half of Australia, there were "59 manufactories". There were forges and foundries in each of the colonies by the late 1840s. At first their business was in casting iron articles from imported pig iron remelted in a cupola, and in forging imported billets of wrought iron. By the end of the gold rush, the commercial and industrial centre of the colonies was in Victoria. From the mid 1850s, foundries and

blacksmithies appeared in Melbourne and the gold mining towns. Enoch Hughes, finding that local scrap iron was cheaper in Victoria than in England, established the Victorian Iron Rolling Mills in Melbourne in 1860, and they rolled their first bar from scrap in June of that year. However, the first of these iron works seems to have been the Australian Iron and Brass Foundry which was established in Sydney in 1833 or Dawson's foundry and marine blacksmithy established in Sydney in the same year. Dawson's was located in Lower George St near Circular Quay. I can see no reason why one of these two should not be credited with the first casting of iron and the first forging of wrought iron in Australia.

There was an impressive acceleration in the development of colonial foundries, iron-works, wire-works and machinist-engineers in the later 1860s and through the 1870s. The most rapid was in Victoria which, by the end of 1879, had some 90 iron, brass, and copper foundries, 80 iron and tin works, and 11 wire makers. In NSW there were 70 foundries, sixty iron and tin works and four wire makers. There were 30 iron and brass foundries in South Australia. Dawson's by this time employed seventy men and was consuming about forty tons of pig iron a month in castings for the marine and general engineering trades. The City Iron Works at Johnston's Bay, Joseph Mather's and the Chapman Brother's were about the same size. There were Colonial Government works of a similar size.

Peter Nicol Russell & Co were a much bigger firm and had been in business since before 1852. Situated down by Darling Harbour, they had two cupola furnaces, 24 forges, some 14ft plate-rollers, two steam hammers, and employed 250 men. They used some 90tons of pig iron per month. In addition to agricultural machinery and boiler work, their products included girders for the Anthony Horden's building and the Sydney General Post Office, and piers for the Gundagai and Maitland bridges. It is difficult to believe that not one of these enterprises managed to manufacture some blister steel or some crucible steel before say 1860.

Johnston-Liik says "There is considerable evidence that steel was being made in Victorian foundries before 1880 by at least three different processes."<sup>iii</sup> Langland's Foundry was the big operation in Victoria. In 1887, about April, Langland's erected a plant for manufacturing Bessemer steel. It had been built by A. Davey & Co in Sheffield and by November 1888 it was producing castings up to two tons in weight. The Australasian Ironmonger credited them with being the first in Australia to introduce steel making plant into "these colonies". Langland's also advertised that they made crucible steel.

Crucible steel was the principal product of the Victorian Steel Foundry Company Ltd of Victoria St Carlton established in 1886. Casting from 1cwt crucibles, they manufactured drills, cranks, wheels, and hammers. They seem to have done well at first, but there are no records of the company after 1888. In 1891 the Sheffield Steel Works in Brunswick was also making crucible steel.

In August 1889 John Heskett & Co of South Melbourne began to manufacture steel using the Siemens-Martin process at the rate of one ton per day. Their plant was locally manufactured and The Australasian Ironmonger credited them with being the first in Australia to use the Siemens-Martin process. Their raw materials included "scrap files and hematite pig iron". Steel making did not begin at Lithgow until 1900.

Iron ore was first smelted in Australia in 1848, by the newly formed Fitz Roy Ironworks company at Mittagong, utilising the deposit discovered there in 1833.<sup>iv</sup> The company must have used a direct reduction bloomery for the job. It is said that towards the end of 1848 a "stove" and some spades made from local ore were sent to Sydney. This would then be the first forging of ductile iron in Australia from local iron ore. The Catalan furnace was still being constructed in 1850, but by 1851 they had smelted and forged 100 blooms with total weight of two tons. They had also installed a cupola furnace to remelt pig iron. The ornamental lions made as presentation pieces for the visit of the Governor in 1850 were cast from imported pig iron using this cupola.

The company's tilt hammer broke in 1852 and this brought smelting to a temporary halt. Mining continued and the ore was sent to P.N. Russell for processing. Capital was found. Rolling machinery was

ordered and shipped from England in January 1856. By 1859 the company's Mittagong works had become a complex iron smelting and manufacturing centre. It had a puddling furnace, a five ton tilt hammer, squeezers, and a complete set of rolls for merchant bar and plate. They had two cupola furnaces which were used to remelt imported pig iron and the "unuseable" overheated iron from their own Catalan furnace. So, although the company did not manage to purchase a blast furnace, to produce pig iron, until 1859, it was casting using some local ore perhaps as early as 1851 and certainly in 1858. This was the first casting of iron in Australia from local iron ore.

There is no evidence that the blast furnace was used until 1864. By 1865 they were producing 60 to 120 tons of pig iron per week. In the nine months to June 1865 they produced 2394 tons of pig iron from local ores. Mittagong pig iron went into the Gundagai bridge piers in 1864, Ebenezer Vickery's office building in Sydney - the first building in the Colony to use iron structurally, and into the Methodist Church at Nattai as the location of the works was known. Fitz Roy products appeared at the various colonial exhibitions and some went as far as Paris and California. Iron smelting did not begin at Lithgow until the end of 1875.

As to who cast the first steel using Australian iron ore, we simply do not know. Certainly William Sanford produced steel from Australian ore at Lithgow in 1907 when he at last had both a blast furnace and a Siemens-Martin regenerative furnace.<sup>v</sup> But, there were iron smelters operating in each of the Australian colonies at the time steel casting became a possibility in Australia between say 1860 and 1880. Moreover, the foundries I have named in connection with steel were not the only steel foundries that might have used local ores. Then there is the Tasmanian Charcoal Iron Company who mined and smelted ore at Leonardsburgh in northern Tasmania in March and April of 1873. They used a special innovative furnace designed by a Melbourne physician Dr William Harrison. They produced a substantial quantity of iron which was "of excellent quality - like steel". A cutler in Melbourne is said to have made high tensile tools using this iron. An attempt to make Bessemer steel from this ore four years later revealed that it had a very high chromium content, and the product was too hard to be used. Did this company in fact make steel? It is interesting to note that the Iron and Steel Manufacturing Coy used the Moore-Heskett direct reduction process for smelting in 1905. I do not know whether their product had sufficient carbon content to be called steel but I suspect that it did. That would give them precedence over Sanford at Lithgow.

In short, I do not know where and when local ore first found its way into locally made steel.

---

<sup>i</sup> <http://www.lisp.com.au/~lithtour/blast.htm>

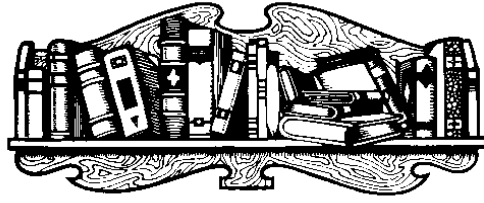
<sup>ii</sup> **Johnston-Liik E.M. Liik G. Ward R.G. A Measure of Greatness, The Origins of the Australian Iron and Steel Industry**, Melbourne University press, South Carlton, 1998 This book has a most extensive bibliography, and photographs of the Mittagong iron works.

**Hughes H. The Australian iron and Steel Industry 1848- 1962**, Melbourne 1964

<sup>iii</sup> **Johnston-Liik E.M. Liik G. Ward R.G.** op cit

<sup>iv</sup> Sydney Morning Herald 12 December 1848

<sup>v</sup> Not, incidentally an open hearth furnace but a closed hearth furnace of the type patented by Luhrmann in 1867.



**Fin**