

The Mamora Iron Works in Upper Canada: The first Phase, 1819 to 1826

Arthur D Dunn

It was only with the development of the process of handling molten iron that industry as we know it today became possible. For many centuries man had forged items of iron, first from meteoric materials, and then as he learned to produce crude iron 'blooms' from the ores that he had by that time identified. By about 1450 AD in Europe, earlier in China, man had learned to cast iron into complex forms from which ultimately they were able to produce the machines that made the Industrial Revolution possible.

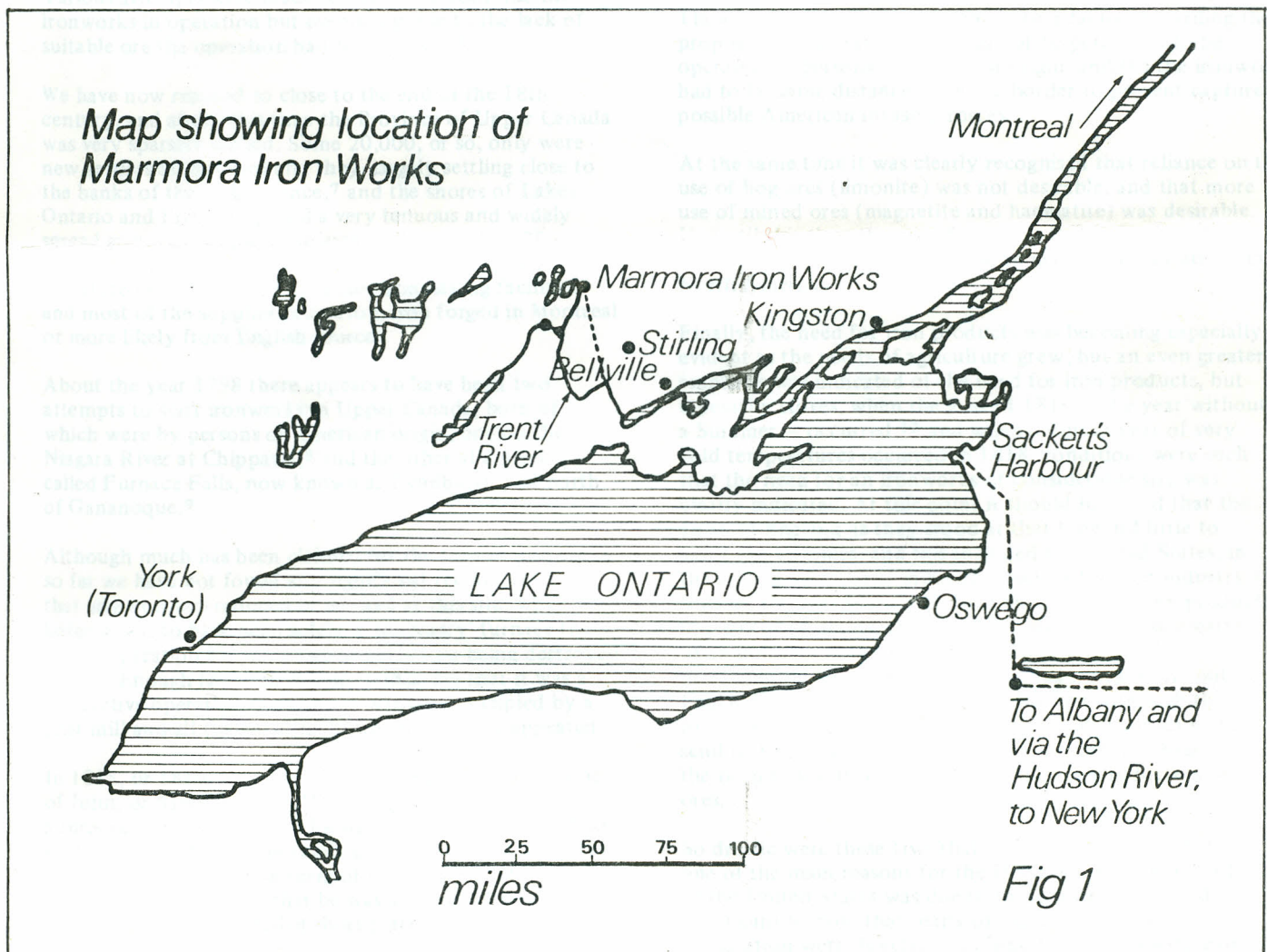
Thus as language and communications is fundamental to the society of man, so also is the working of iron fundamental to man's industrialized society.

The history of ironworking in North America might be said to have started around the year 1607 when members of the early settlers of Virginia discovered iron ore there. A shipload was despatched to England and its importance duly determined. Shortly afterward a company of men were sent out of Virginia with the intent of setting up a furnace near to the site where the ore had been found, but the key workmen died shortly afterward of some unrecorded disease.

In an attempt to ensure continuity of the effort John Berkeley, of Beverstone Castle near Tetbury, Gloucester, was sent out with his son, and all seemed to be going well when in 1622 the site of the ironworks was attacked by the Indians, and all of the workers there at the time were massacred.¹ The Indians destroyed all the buildings and no further attempt was made to continue. The actual location of this site at Falling Creek, Virginia, is not accurately known and it is suspected that it was located on a site now occupied by a marina.²

We should say, however, that while this is the first recorded attempt to work iron in North America, there were even earlier attempts known from archaeological investigations notably at the site in Newfoundland known as L'Anse aux Meadows where it is believed that Norse visitors worked iron, but as far as we know did not reduce iron from the ore, about the year 1000 AD³.

The next, and first successful attempt to set up an ironworks in North America, took place at a location now known as being near Boston, Massachusetts (1645). The Company



which was involved in the setting up of the colony on Massachusetts Bay was very much more concerned with a well managed settlement than were those who were involved with the attempts in Virginia which seems largely to have been a very poorly organised expedition.

This attempt at setting up an ironworks⁴ was a limited success although the company of which it was formed was constantly racked with dissension until its dissolution some twenty years later in about 1665.

About this time there was recognition that iron ore (limonite) existed in fairly large quantities in the area just north of Trois Rivieres, and various suggestions were made over the years to the French Government that it should be exploited.

Eventually, about the year 1750 the French Government agreed to financially support an ironworks in this vicinity and the Forges de Ste Maurice came into being. It, however, was never a very serious productive unit until well after the defeat of the French at Quebec when Les Forges were taken over by an Englishman⁵ by the name of Bell who very successfully operated the ironworks until the iron ore began to run out and he lost his licence to operate the works. Various attempts were made thereafter to continue the ironworks in operation but eventually due to the lack of suitable ore the operation had to be closed.⁶

We have now reached to close to the end of the 18th century, and about this time the Province of Upper Canada was very sparsely settled. Some 20,000, or so, only were new settlers in that area and they, largely settling close to the banks of the St Lawrence,⁷ and the shores of Lakes Ontario and Erie, comprised a very tenuous and widely spread group of people at no greater density than 20 to 30 persons per average mile of waterfront. There was therefore little reason, or need for, ironmaking facilities and most of the supplies came from iron forged in Montreal or more likely from English sources.

About the year 1798 there appears to have been two attempts to start ironworks in Upper Canada, both of which were by persons of American origin, one on the Niagara River at Chippawa,⁸ and the other at a place called Furnace Falls, now known as Lyndhurst, just north of Gananoque.⁹

Although much has been claimed for the former ironworks so far we have not found any significant records to show that any iron was reduced or worked at this site, while the latter seems to have been solely a 'bloomery' furnace that was in operation for some two years before being destroyed by fire. Enough has been found to indicate that it was a productive operation but the site was later occupied by a grist mill and all traces of the ironworks have disappeared.

In 1815, or 1816, we learn of an Englishman by the name of John, or Samuel, Mason¹⁰ seeking permission to erect a furnace to make iron at a location known as Turkey Point on Lake Erie. Mason eventually did build a furnace, and so must have received some form of permission, but it is evident from his letters that he was a neurotic type of person and, after his furnace failed shortly after it had been put into blast, he died.

This site and its remains were later sold to a group of Americans sometime about 1823 headed by a man by the name of Hiram Capron,¹¹ who rebuilt the furnace and commenced a period of operation that was to prove to be very productive, although not for Capron. By outlining the early history of ironworking in Canada it will be seen that

during the critical years of the early settlement of Upper Canada the only reliable source of iron products, other than those products brought from England was the Forges de Ste. Maurice, either directly or via subsidiary forges in Montreal. The long journey up the St Lawrence to the few customers who could afford these materials is indicative of one of the problems that the settlers in Upper Canada had to contend with, as well as the possibility that these supplies might well fall into the hands of those Americans who occupied the south bank of the river and who took a delight in denying those loyal to England the means and products with which they might eke out their precarious existence.

It is fairly evident that the provision of local supplies of iron commodities was one of the primary reasons for the consideration by the Lieut. Governor, Sir Peregrine Maitland in establishing an ironworks in Upper Canada when he was appointed.

This was not only a necessity for a growing population, and it was growing at a very rapid rate at that point, but also a military necessity, since at the time of Maitland's appointment, the possibility of war with the Americans still existed and the war of 1812 had just taken place.

These conditions also determined other factors regarding the proposed ironworks; (a) it could not be permitted to be operated by persons of American origin, and (b) the ironworks had to be some distance from the border to prevent capture by possible American invasion forces.

At the same time it was clearly recognised that reliance on the use of bog ores (limonite) was not desirable, and that more use of mined ores (magnetite and haematite) was desirable. Up until this time the use of bog ores had been almost universal in Canada as it was also in many other locations in North America.

Finally, the need for iron products was becoming especially evident as the needs of agriculture grew; but an even greater emphasis was indicated of the need for iron products, but especially stoves, when the year of 1816 – the year without a Summer – occurred;¹² and when a similar year of very cold temperatures occurred in 1818, conditions were such that the need for an ironworks of considerable size was clearly indicated. At this point it should be noted that the Laws of England as they stood at that time did little to assist the Colonies, and this included the United States, in the setting up of basic industries such as the iron industry.¹³ Indeed, the laws bluntly forbade the export of any products, or parts of products, that would contribute to the creation of an industry in the Colonies. Furthermore, it also precluded the emigration of any skilled ironworkers out of England, even to the continent of Europe, although the ironmasters of the time fondly hoped that America would send to England as much pig iron as possible to obviate the need to use British fuel for the primary reduction of the ores.

So drastic were these laws that it has been suggested that one of the main reasons for the Declaration of Independence of the United States was due to these restrictions, and it is significant to note that many of the signees of that Declaration were directly or indirectly involved with ironworking at that time.

There is evidence to suggest, as previously indicated, that Sir Peregrine Maitland, on assuming the Lieut. Governorship of Upper Canada, had had his attention drawn to these particular problems and had made some efforts to have the laws relaxed. They were relaxed, in part, in 1824.¹⁴

With such new freedom it would be possible for Maitland to provide for an easing of the sources of supply of iron products to the settlers, provide a source of munitions should there be further difficulties with the United States, and provide for the expansion of the economy with the introduction of a large scale industry.

Maitland appears to have made it known that offers from those persons that had the means to construct an ironworks would be welcomed, and promised a very large contract for military supplies, as well as general assistance in the provision of appropriate Land Grants to ensure that the practicability of the project was possible.

As far as we are at present aware the only person to respond to this offer was a person by the name of Charles Hayes, of Dublin, in Ireland. He seems to have been a business man and had become quite wealthy as a linen merchant, and in 1819 Hayes visited Upper Canada¹⁵ to discuss the whole project with Sir Peregrine Maitland himself, and it is possible that at this time he first visited the site of the town that was later to be called Marmora.

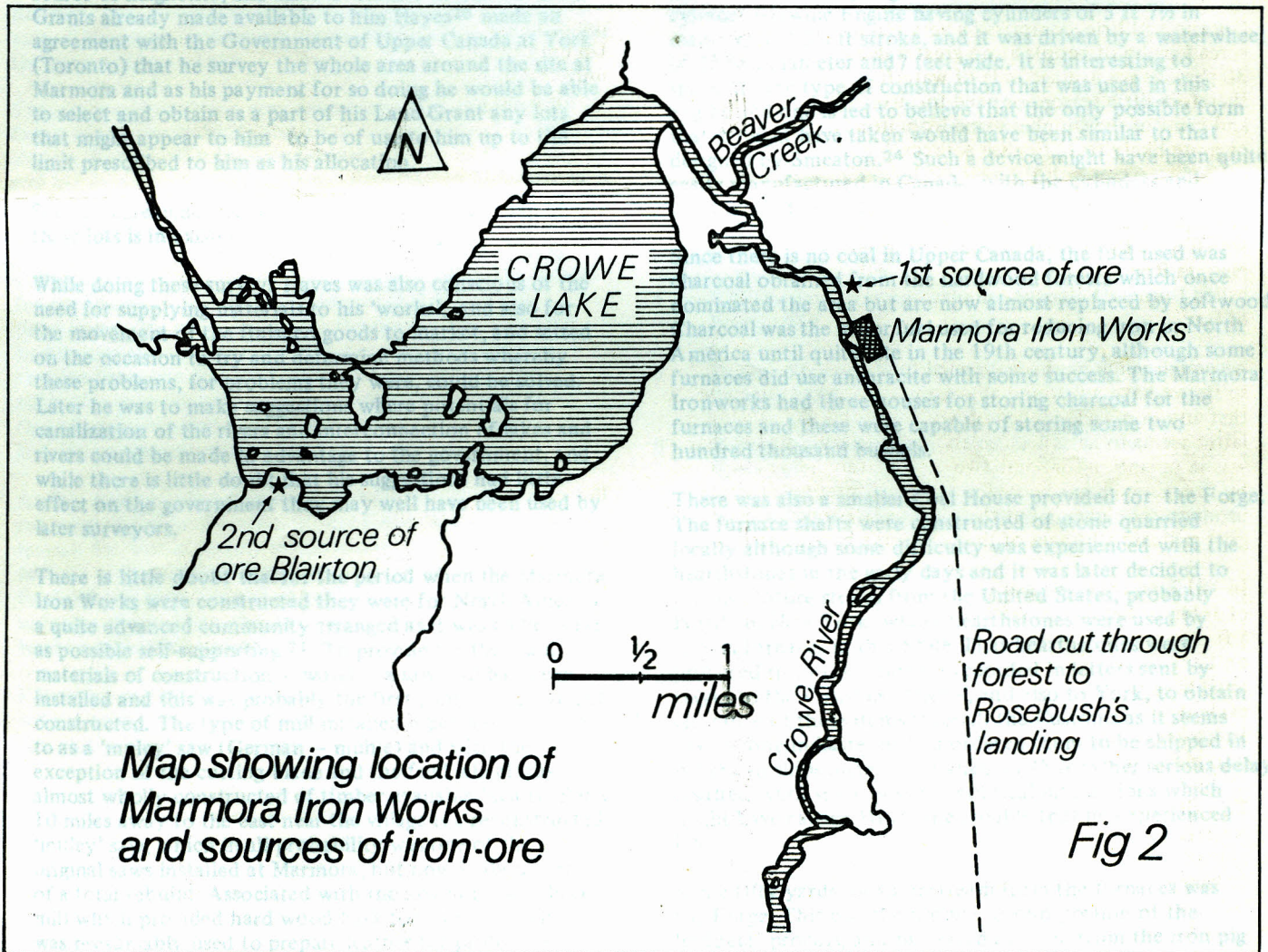
Upon Hayes' return to England he appears to have satisfied himself as to his legal situation, and to have received government sanction to proceed. At the same time he sought advice from someone whom he refers to as a 'miner' and in another context as a 'man of science'. Whom this person could have been we do not have any information at the present, but suspect that it could well have been Richard

Smith, later to make a name for himself in a somewhat similar way in Nova Scotia, and still later to become the impressive manager of the Earl of Dudley's properties in the Midlands.

By the middle of 1820 Hayes, accompanied by his wife, had made his way once again to North America, travelling via New York, the Hudson River, the Mohawk valley and Sackett's Harbour to Kingston in Upper Canada. From this point he made a detour to Montreal, leaving his wife in Kingston, possibly to requisition materials for the project or to make arrangements for the forwarding of equipment and materials that had been shipped from England,¹⁶ returning to Kingston and then proceeding to locate himself in Sydney Township, on the River Trent, possibly at Louis Rosebush's Landing a few miles west of the present day Stirling from where he commenced the construction of a road (Fig. 1).

From here the line of the road ran almost in a straight line to the site on the Crowe, or Marmora, River where the ironworks were to be constructed.¹⁷ (Fig. 2). Work continued throughout the ensuing Winter to achieve this end since Hayes wanted to get his 'works' completed as quickly as possible so that his Land Grants could be confirmed and the military contracts issued.

After some difficulties with the Indians the road was completed and work commenced on the buildings necessary for a community situated so far from any major civilized centre as it was, being then some 100 miles from Kingston



Map showing location of Marmora Iron Works and sources of iron-ore

Fig 2

the nearest source of supplies.¹⁸ The main buildings shown in Fig. 3 appear to have been completed quite rapidly, which indicates that he had in some manner acquired the services of a number of good competent workers, as well as the necessary materials to construct the specialised buildings and equipment that we know were in production by the middle of 1822.¹⁹

At the time some one hundred tons of cast iron products had been produced at the new ironworks, and they had even attempted to cast, and bore a couple of guns one of which being bored was found to have 'imbibed too much air'. Despite this fault Hayes was very confident that should the Government of Upper Canada have demands for munitions they, at Marmora, would have no difficulties in supplying their needs.

By this time Hayes had also found that the originally indicated source of ore had not proven to be of a significant size, and from existing records it would seem to have been largely in the form of an 'ochre'. Some of this ore was used, and some of it shipped out for the manufacture of paint, and Hayes set off in search of a better source of supply of ore which he found some three miles away at a site now known as Blairton. (Fig. 2). This site contained an excellent source of magnetite, and since it was not within the Land Grants already made available to him Hayes²⁰ made an agreement with the Government of Upper Canada at York (Toronto) that he survey the whole area around the site at Marmora and as his payment for so doing he would be able to select and obtain as a part of his Land Grant any lots that might appear to him to be of use to him up to the limit prescribed to him as his allocation.

Such an agreement was concluded, and a sketch map of these lots is in existence.

While doing these surveys Hayes was also conscious of the need for supplying materials to his 'works', and also for the movement of the finished goods to market, and seized on the occasion to try and determine methods whereby these problems, for problems they were, could be solved. Later he was to make suggestions where potentials for canalization of the rivers and interconnection of lakes and rivers could be made to advantage to the government, and while there is little doubt that his suggestions had little effect on the government they may well have been used by later surveyors.

There is little doubt that for the period when the Marmora Iron Works were constructed they were for North America a quite advanced community arranged as it was to be as far as possible self-supporting.²¹ To provide for the main materials of construction – wood – a saw mill had been installed and this was probably the first piece of equipment constructed. The type of mill installed is generally referred to as a 'muley' saw (German – *muhle*) and with the exception of the cutting blade and the feed wheel was almost wholly constructed of timber available locally. Some 10 miles away to the east near the village is a reconstructed 'muley' saw, which in all probability was one of the original saws installed at Marmora, but now sadly in need of a total rebuild. Associated with the saw mill was a bark mill which provided hard wood bark for a tannery which was presumably used to prepare leather for protective clothing for the workers at the furnaces and at the forges.

For the community at large there was also a grist mill,²² a bake house, a general store, a dry goods store, a potashery (for the manufacture of crude soap), and a blacksmith's shop. For the younger members of the community there was

a schoolhouse, as well as some twenty six or more dwelling houses for the workers and their families, and for Charles Hayes, himself, a very carefully constructed log house which still exists as one of the better houses in the community.

The main buildings of the Ironworks proper consisted of two furnaces facing on to a common Casting House which appears also to have been provided with some accommodation for the furnacemen. Both furnaces were of an overall height of 36 feet and the No 1 Furnace had a bosh diameter of 8½ feet and was blown by what is referred to as a pair of German Bellows. This we would presume to mean were bellows constructed entirely out of wood and in a similar fashion to the Steffen Bellows used in Sweden. Plot, in his *Natural History of Staffordshire*,²³ shows a diagram of similar units. In the case of the No 1 Furnace the bellows were each 28 feet long and 15 feet wide and worked into a receiver, the whole being driven by a waterwheel 27 feet diameter and 6 feet wide. From the water levels at the site it is presumed that the water wheel was most probably a breast wheel.

The No 2 Furnace was as noted earlier of the same height as No 1 but this one had a bosh diameter of 9 feet and was blown by a blowing engine that is described as a Three cylinder Blowing Engine having cylinders of 5 ft 7½ in diameter and 3¼ ft stroke, and it was driven by a waterwheel of 25 feet diameter and 7 feet wide. It is interesting to speculate the type of construction that was used in this engine and one is led to believe that the only possible form that it might have taken would have been similar to that designed by Smeaton.²⁴ Such a device might have been quite easily manufactured in Canada, with the cylinders and pistons in Montreal.

Since there is no coal in Upper Canada, the fuel used was charcoal obtained from the hardwood forests which once dominated the area but are now almost replaced by softwoods. Charcoal was the major fuel used for reducing iron in North America until quite late in the 19th century, although some furnaces did use anthracite with some success. The Marmora Ironworks had three houses for storing charcoal for the furnaces and these were capable of storing some two hundred thousand bushels.

There was also a smaller Coal House provided for the Forge. The furnace shafts were constructed of stone quarried locally although some difficulty was experienced with the hearthstones in the early days and it was later decided to procure future stones from the United States, probably Potsdam, New York, whose hearthstones were used by several furnaces in that State. That hearthstones were procured from this source is recorded in letters sent by Hayes to the Customs officers, and also to York, to obtain clearance of these items through the Customs as it seems that, acting in haste, he had ordered them to be shipped in American ships instead of Canadian.²⁵ A rather serious delay resulted, with some possible political interactions which might have caused Hayes the trouble that he experienced later.

Some fifty yards, or so upstream from the furnaces was the Forge. This was the normal second portion of the 'indirect' process, and produced bar iron from the iron pig produced in the Casting House.²⁶ The Forge had two complete sets of 'finery' hearths, 'chauffery' hearths, and hammers. So far there is little known of the construction of the Forge or its equipment, but should we be correct in suggesting that the three cylinder blowing engine be attributed to the design of John Smeaton, then it is very

possible that the various hearths and hammers could well have been constructed to his designs also. At least for the time being we are making that assumption.

The several blowing engines (4), and the two hammers in the Forge were each driven separately by a waterwheel, and a power take-off from one such unit was used to power machinery, which included a lathe, in the Carpenter's shop. Probably in the first instance this shop was used for general carpentering work but later seems to have become the Pattern Shop, and the accounts available had made quite a number of patterns which were stored in the second floor of one of the buildings.

To complete the community there was a farm of some 150 acres, but where this was located we have little idea at this juncture. We know that Hayes drove roads east and west from the village of Marmora, as well as a short one north to the Beaver Creek Settlement about a mile away, and although locally the site of the village is very rocky and unfit for cultivation good cultivatable land is available within the radius of ten miles.

The subsequent history has shown that the selection of the site at Marmora was an ideal one for that period. Vast quantities of hardwood abounded on the surrounding lands, the falls of the Marmora, now the Crowe, River could supply abundant power, the head being about nine feet at that time, and the river about 100 feet wide just above the falls, with a constant supply provided by the Marmora, now Crowe, Lake about half a mile away. Vast amounts of magnetite have already been mined, not only from the originally used mine at Blairton, but also at the Marmoraton mining site just south-east of Marmora, and enormous deposits remain, much under the present Crowe Lake.

The site was therefore a very sound selection, but why did it fail as did Hayes in 1826, and all of his successors? Hayes was the first to offer to manufacture castings of all types, and bar iron for sale, but he was continually in difficulty in maintaining the roads to get his products to market, which was basically a government responsibility to organise and pay for. But for Hayes no such support was forthcoming and this transportation problem is often cited as the reason for his failure.²⁷ But there is evidence that Hayes was promised vastly larger orders for the naval dockyards than he actually received, and it seems possible, in retrospect, that Sir Peregrine Maitland, or his officers had not the authority to make such large contractual arrangements so that the support that had been promised did not arrive and Hayes was left to bear the consequences.

At this point Hayes and his wife left Upper Canada and returned to England hoping to find financial support there, leaving his 'works' largely in the hands of the Hon Peter McGill, of Montreal.²⁸ Unfortunately, Hayes arrived in England just after the end of the Napoleonic wars, when industry was at a low ebb in England, and many of the banks had been forced to close.

For many years he tried to raise money on his, and his wife's, other holdings, and applied many times to the British Government for assistance without any success.

During this time he lived for some years in London, and later in Bristol, and the repeated frustrations together with the loss of his wife caused him to return to Dublin, where he eventually remarried³⁷ and was able to regain much of his former position although he had apparently always had a wish to return to 'his' works in Upper Canada.

From the little information that is available to us at present it appears that he moved from his home in Dublin, (he had still retained possession evidently) to another on the outskirts of Dublin and there he died in 1844.

We have no knowledge of his age at death so that we cannot determine his age when he came to Upper Canada, but he seems to have been a remarkably able person, an excellent organiser, a good employer and a strong supporter of the Irish immigrants whom he appears to have helped to emigrate. From being a linen draper to becoming an owner of ironworks Hayes shows himself in his letters to have been a dedicated person albeit a retiring person, not quite the type that would have used his political powers to the best advantage if indeed he had any appreciation of his political power that was so necessary during that frontier time.

After Hayes had left for England McGill, later to be the founder of the Bank of Montreal, and of the well known McGill University, continued to operate the iron works but finding difficulties with his manager put the works up for sale.

For the next fifty years or so Marmora Iron Works continued to operate in a sporadic way then, with the rising demand for timber in the United States, the site was cleared and replaced by saw milling operations, the mine at Blairton supplying ore to furnaces in the United States.

Aeromagnetic surveys³⁰ have shown that there still is vast amounts of iron ore deposits still in the area, as well as lead, gold, silver, copper and many other valuable minerals.

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