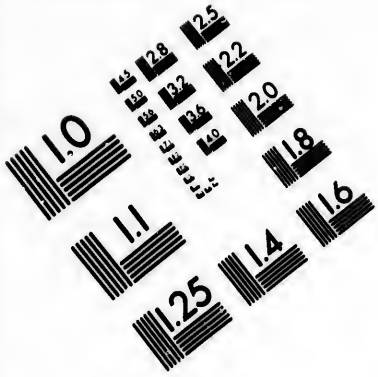

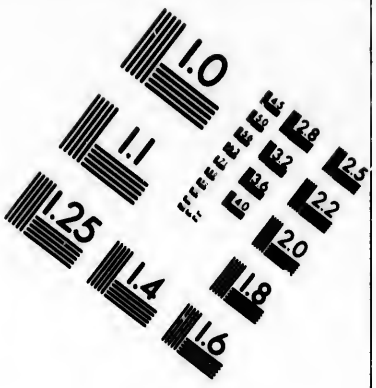

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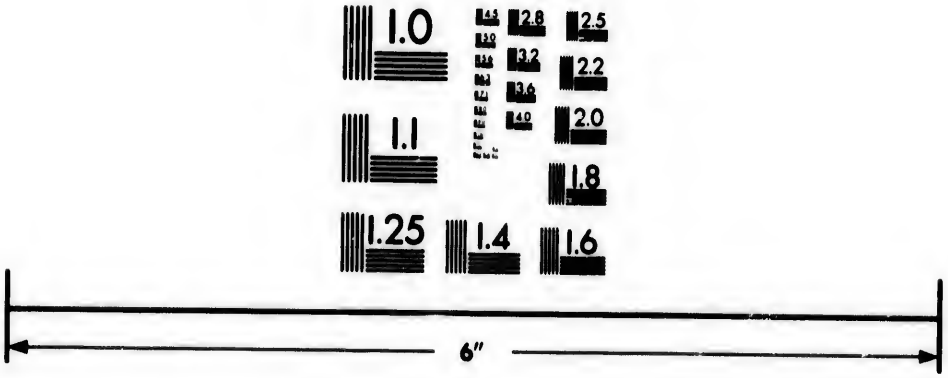

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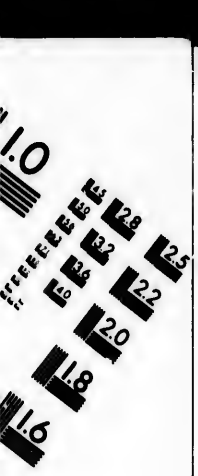

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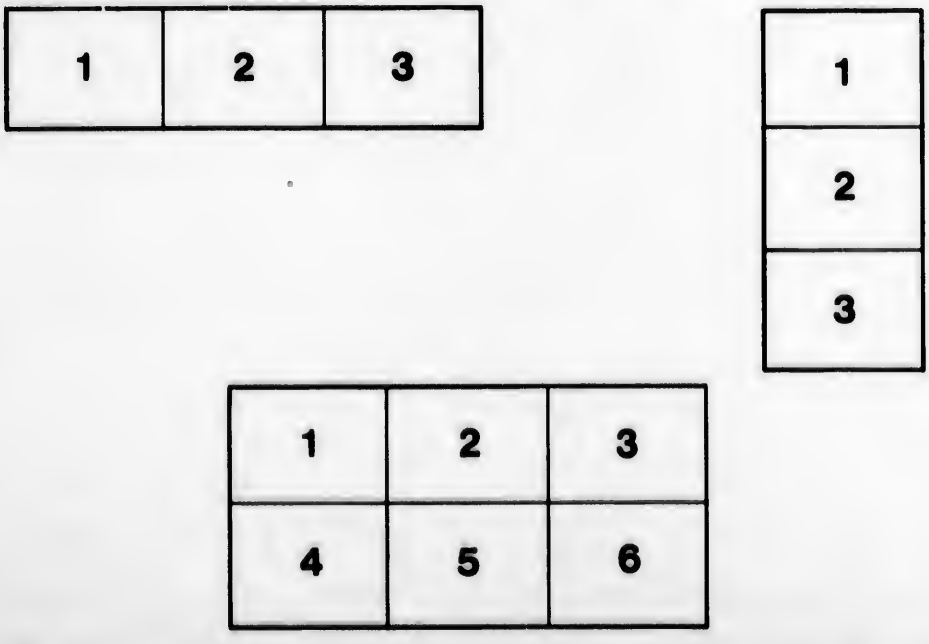

REPORT

ON THE

LONDONDERRY

IRON AND COAL DEPOSITS,

BY DR. GESNER;

AND

A PROSPECTUS,

WITH A VIEW

TO FORM A COMPANY

TO WORK THE SAME,

BY THE PROPRIETOR,

JOHN ROSS.

HALIFAX, NOVA SCOTIA.
PRINTED BY GOSSIP & COADE, TIMES OFFICE.
1846.

REPORT

ON THE IRON ORE AND COAL OF LONDONDERRY, NOVA SCOTIA.

SIR,—

I have just completed a cursory and limited examination of the deposits of Iron and Coal at the Folly Mountain, in the Township of Londonderry, in accordance with your request; and beg leave to submit the following remarks, as the result of my explorations in that quarter.

It appears from statements made by the inhabitants, that for some time past pieces of ore have been found on the surface of the earth at the above place. During the present year, two persons by the name of Qingley, by making small excavations beneath the soil, obtained an ore which they supposed to be manganese, and shipped several tons of it to the United States. Small quantities of brown and yellow ochrey matter have also been found and employed as pigments.

Upon my arrival at the Folly Mountain, I immediately caused a deep trench to be dug at right angles to the supposed deposit of iron, and to a depth sufficient to reach the compact and undecomposed masses of the ore. The section thus made across the bed, or vein, with a small opening previously made, was twenty feet in length; but the trench did not reach either of the sides of the ore, and therefore its thickness still remains unknown. I am of the opinion,

that the depth is far too great ever to be ascertained. From the quantities of hematite, the *hydrate* of iron, or ochrey, brown and yellow, oxides of the metal contained in the soil, the main deposit may be traced on the surface. With these indications, and two small openings made at a limestone quarry, I followed the ore to the distance of three quarters of a mile; but the length of the ore bed, like its depth, is unknown. The course of the stratum, or vein, which affects the magnetic needle in a slight degree, is nearly east and west, and appears to be direct. From those facts it may be observed, that the ore itself is perfectly inexhaustible, and its situation most favourable for mining. The site most advantageous for removing the ore, is apparently on the farm of —— Slack, senr., and the adjoining lot westward, occupied by —— Forsyth. On the farm of the former, the trench was opened, where the ore is abundant and excellent in quality. It is specular iron, of the richest variety. From a specimen taken from a mass at the bottom of the cutting, I have obtained of 100 parts,

Oxygen, - - 30
Iron, - - - 70—100

It will smelt readily, and evidently yield soft malleable iron.

Along the surface of the bed, or vein, there are several varieties of ore. Besides the hydrate and common brown, red and yellow oxides, there are hematitic and micaceous iron ores; the latter is abundant. These varieties have no doubt resulted from the decomposition of the compact masses of specular iron by being exposed to meteoric agents. The specular ore is similar to that smelted and manufactured at Rossie, St. Lawrence County, State of New York.

Limestone for a flux, occurs in thick strata, and a sparry stratum of that rock probably forms the southern wall of the great ore bed. It frequently con-

tains thin seams of micaceous iron, and is deeply colored by the oxides. From the best judgment I could form, the northern wall of the ore is trap rock, a ridge of which running parallel to the ore, crosses the Folly River, and forms high projecting masses on the sides of the stream, affording thereby an excellent site for constructing a dam.

The immense deposit of iron ore under consideration, is situated about a furlong from the river, which will supply sufficient water power to propel all kinds of manufacturing machinery, and almost the whole country is covered with wood, suitable for fuel and other purposes.

Having completed a rapid survey of the iron ore adjacent to the river, with the aid of the inhabitants of the new settlement, I proceeded to examine that part of the coal field which touches the Cobequid Mountains at their southern base, and upon the lots of land occupied by Messrs. Slack and Forsyth.— It was found that the coal field crossed the Folly River, and reached within a quarter of a mile of the iron, which is deposited in older rocks. It appears that only one stratum of coal has been discovered.— That stratum occurs on the north side of a deep ravine on the lands before mentioned; it is about one foot in thickness, and in my opinion is one of the uppermost strata in the coal basin; but I am confident that workable beds of coal might be found probably within the distance of a mile from the base of the hill that contains the ore, if the borings were conducted with judgment and skill.

By reference to the ancient grant of these lands, it will be seen that the minerals contained in them were not reserved, but were given up by the Crown with the soil. To them, therefore, the General Mining Association of London have no claim; on that account they are of vast importance to the country,

as they may be worked by any person or persons who will purchase, or lease them from the land-holders, and without the payment of any Royalty whatever.

From the character of the district where the iron is situated, I am of the opinion that the rocks are highly metalliferous, and it is probable that other ores besides those already noticed, will yet be discovered.

Wood, coal, and iron ore, are seldom seen situated near each other in great quantities. To such an advantage at the Folly Mountain is added that of a rapid river, with water to perform all the necessary operations of the manufacture of iron. From those, and other favorable circumstances that might be noticed—the fact that the contemplated Railway between Halifax and Quebec is marked upon the map of the Province to run in the direction of the river, compels me to add that I have never known a situation more favorable for the smelting and manufacture of iron than that now offered at the site before mentioned.

The inhabitants afforded me every assistance, for which, and their kindness, it is but meet that I should make this acknowledgment; and I trust that the brief examination thus made at an unfavorable season of the year, will prove satisfactory, and that every allowance will be made for a survey necessarily limited in its extent and operations.

I am, Sir,

Your obedient servant,

A. GESNER.

JOHN Ross, Esq., M. P. P., &c.

Cornwallis, 27th November, 1845.

THE SUBSCRIBER, having completed his purchases on the Londonderry Mountain, consisting of 3000 acres, besides 300 acres held by lease for 60 years, comprising, as appears by thefore going Report, the richest and most extensive deposit of iron ore ever discovered in any portion of her Majesty's Dominions, has now the satisfaction of offering to the Inhabitants of Nova-Scotia and New-Brunswick, elements upon which their labour and capital may be employed with a degree of certainty *never* before attained under such favourable circumstances.

The process of manufacturing Iron from the ore, is, with very few exceptions, totally unknown in these Colonies; and for the information of such as are not familiar with the great saving of labour, time and fuel, introduced into the manufacture of Iron since 1830, the following extracts are taken from "Grier's Mechanic's Dictionary," published by Blackie & Sons, Glasgow, in 1839. To the scientific world, Mr. Grier is favourably known as a Civil Engineer, and Lecturer on Natural Philosophy:—

"In England, and every where else, until very recently, it was supposed that the colder the air that was injected into the furnace, the better. Mr. J. B. Neilson, Civil Engineer, and manager of the Gas works of Glasgow, directed his attention to blast furnaces in 1824, in consequence of some enquiries having been made, if he could devise any means of purifying the air propelled by the blowing engine before it reached the furnace, in any way similar to that in which Gas is purified. The enquirer suspected that it was the presence of sulphurous vapour that injured the air of the blast. But experience led Mr. Neilson to attribute the evil to another cause. From some simple experiments, he concluded that by heating the air before it went into the furnace, he could effectually remove the evil under consideration. It is known that air will not support combustion until

heated to a temperature of 1000 ° Fahrenheit, and therefore until it acquires that temperature, by coming in contact with the heated mass of the fire, it must act prejudicially: from which it is manifest, that the nearer it can be brought to that point before entering the fire, the better. The temperature originally employed by the Patentee was, we believe, about 300 °, and this was the heat of the blast at Clyde iron works in 1830, when coke was employed. The advantage obtained by the employment of hot blast of this temperature, will at once appear from the fact, that, during the first six months of 1829, when all the furnaces at Clyde iron works were wrought with the cold blast, 8 tons 1¼ cwt. of coal, converted into coke, were required for the smelting of one ton of cast iron; but during the first six months of 1830, when the blast was heated to about 300 °, the same quantity of iron required only 5 tons 3¼ cwt. of coals, converted into coke—which, after deducting 8 cwt. of coal employed in heating the air, gives a saving of 2 tons 10 cwt. The success of the hot blast at 300 °, induced the manufacturers to try it at a still higher temperature, and the results proved proportionably beneficial. In the course of 1831, the temperature of the blast was doubled, so that it was not less than 600 °, and the success was such, that they *were induced to employ coal instead of coke in the smelting furnace*, which induced a saving to a very considerable amount. In 1829, 8 tons 1¼ cwt. of coal were required for coke to smelt one ton of iron; whereas in 1833, only 2 tons 13¼ cwt. of coal, *not converted into coke*, were required for the same purpose. The increase of combustion with the blast at 600 °, precluded the necessity of coking before smelting, for the intense heat is sufficient to compensate for the great quantity of latent heat that must arise with the vapours expelled from the coals during combustion."

After giving a description of the construction of Furnaces, and the mode of introducing the heated air by means of the furnace itself, and consequently doing away, altogether, with the expense of the fuel used in 1833, for the air-heating apparatus used by Mr. Neilson, where a separate fire was used,—he goes on to show, by experiments actually made in the Clyde iron works, during the years 1829 and 1833 respectively, from the 1st of January to the 19th of August in each year, the amazing saving arising from the introduction of hot air—the blowing engine being the same. The results as exhibited by the following table, show that the quantity of iron produced in the same time, by the employment of hot air, is equally astonishing with the saving in coal, so that the saving is of a two-fold description. The quantity of Iron produced is more than two-fold, while the quantity of fuel employed is only a little over one-fourth required by the old process of employing cold air.

*" *Table shewing the Weight of Cast Iron produced, and the average weight of Coal made use of in producing a Ton of Cast Iron at Clyde Iron Works, during the years* 1829 *and* 1833, *the Blowing Engine being the same.*

Coke & Cold Air.	Coke & Hot Air.
1829–The aggregate product of Cast Iron from the 1st Jan'y. to the 19th of August :	1833–The aggregate produce of Cast Iron from the 1st. Jan'y. to the 19th of August.
tons. *cwt.*	*tons.* *cwt.*
2878 18	6370 3
averaging 8 tons 1¼ cwt. of Coals to 1 ton of Cast Iron.	averaging 2 tons 5¼ cwt. of Coals to 1 ton of Cast Iron."

* The Table here referred to, is of so complicated a nature, that it would be attended with much inconvenience and expense to republish it in detail, only the result is therefore given.—*Editor.*

It appears from these experiments, that the quantity of coal or fuel required in 1829 to produce 2,878 tons 18 cwt. of cast iron, will now produce 10,236 tons, and simply by the application of hot air instead of cold air, as was the practice in 1829.

The Subscriber has been more particular in bringing these facts now before the Colonial public, with a view to shew that the failure of the Annapolis Mining or Iron Company, (whose operations were brought to a close before the use of hot air was introduced), ought not, and it is hoped will not, deter those able and favourable to the manufacture of this, the most important article of home consumption, from coming forward to aid the endeavour now made to establish in the Colonies a means of employing its population, while individual profit and public policy are strong inducements to encourage the undertaking. But great as the saving of fuel and labour certainly has been, by the introduction of hot air in this branch of the manufacture of iron, since the operations at Annapolis have ceased, it is not the only particular in which the undertaking now offered is far superior to that at Annapolis. By a Report drawn up by Dr. Gesner, in 1844, it appears that the ore at Annapolis yields from 35 to 40 per cent. of cast metal, and as it holds in combination other bodies besides oxygen, it requires the expensive process of *Roasting*, and from the compact nature of the stratum, is very hard to quarry, costing, as the subscriber has been informed, about 15s. 6d. per ton. Now, the deposit of Iron ore on the Londonderry Mountain, and now offered, yields 70 per cent. of cast metal, and having nothing in combination but oxygen, requires no roasting; while it is an extraordinary fact, that crystallized carbonate of lime, containing 11 per cent. of iron, is in great abundance in its immediate proximity, for flux, if any be required. It is the opinion of an

eminent chemist, who has been consulted, that no flux will be needed. This vein of Iron ore is of unknown thickness, easily quarried, being of a friable texture, and is easily fractured, and being situated on the top of a hill of easy ascent, carts can be driven into the Mine, while an ordinary level will be sufficient to drain it for many years. These facts, together with the facilities offered by the water power of the Folly River, for propelling machinery, at all seasons of the year, and the height of the bank for serving the furnaces, comprise a combination of natural advantages that must be seen to convey an idea of the extraordinary inducements which nature offers in this region, to supply man's wants in the most important commodity manufactured for his use, and the comparative small portion of labour and capital that is necessary to develope resources which are the certain means of individual wealth, and tend directly to public prosperity. Vessels of 200 Tons may load within 7 miles of this invaluable deposit, and one hundred pounds a mile would make it the best road in this Province ; but if the Halifax and Quebec Railway should ever be made, it is the prevailing opinion that it will pass within a few rods of the Furnace, and intersect the lands of the Establishment for upwards of 2½ miles—Halifax Harbour would, in that case, be as accessible as the Bay of Fundy is now.

Here, then, is incontrovertible data, by which it is obvious, that when the quality of the ore in Londonderry, and the quantity of fuel now required to manufacture one ton of cast iron, is taken into account, 7 tons can be produced with the quantity of raw materials, that yielded only one ton when the Annapolis works were in operation, while the price of Iron now far exceeds that of former years.

The undertaking now offered to Colonial capital-

ists, possesses peculiar advantages as compared even with British manufactures—particularly in Scotland. The rich quality of the ore—the facility by which it is obtained, and the low price of charcoal, are inducements which no similar establishment offer to the British manufacturer; and altho' the *price* of labour is low in England, yet the *quantity* required to procure the raw materials of a poor description, almost exceeds belief.

By reference to Brewster's Edinburgh Journal for 1828, it will be seen that "at Cross-basket," 7 miles south-east from Glasgow, there are nine strata of iron ore worked, varying from 2½ inches to 14 inches thick, yielding only 33 per cent. of cast iron. The *quantity* of labour expended in procuring this raw material may be conceived from the following extract :—

"When the iron stone lies in a stratum, or vein, between two strata of clay, not more than thirty feet below the surface of the earth, it is obtained by sinking a pit, at first, of a diameter of eight feet, and deepened until the ore is reached where the pit is undermined, until the diameter at the bottom becomes twice that at the top. When all the ore is taken out of this pit, another is dug similar to the first, and near it, so that when the second pit is excavated, the bottom of the two meet. In digging the second pit, the earth is thrown into the first, and thus one pit is made and another filled, until the whole vein is exhausted."

Thus it does appear that the amount of labour expended in obtaining raw materials of a poor description, comprise the principal expense, perhaps constitute one half the value of Pig Iron in Great Britain, but particularly in Scotland—whereas the ore now offered may be procured for less than one-tenth the value of Pig iron in this country, while the iron it yields

is of a very superior description. This particular ore is found in great abundance on the Island of Elba—the mines there have been worked for 1600 years, and notwithstanding the innumerable discoveries of iron deposits made all over Europe since that period, yet at the present time, 32,000,000 quintals of ore are annually exported to various Ports on the Continent, for the manufacture of steel, &c.

Now, it is proposed to raise a capital of £40,000 Sterling, to work the Londonderry Mines, in One thousand Shares of £40 each, payable by five equal instalments, as follows, viz :—

A deposit of £8 or	20 per cent.
On the 1st of May, 1847—	20 per cent.
" Nov. 1847—	20 per cent.
" May, 1848—	20 per cent.
" Nov. 1848—	20 per cent.

In a young country like Nova Scotia, the exact sum required to erect Furnaces and keep them in constant operation, cannot be estimated with the same degree of accuracy as in older countries, where such erections are of daily occurrence ; yet such information has been obtained, as may justify the opinion, that less than one half the sum now proposed to be raised as above, will be sufficient to complete two Furnaces for the manufacture of Pig Iron, with the necessary accommodations for Casting on the spot all the Machinery requisite to extend the operations of the Company, in a very short time, to the making of Bar Iron and Steel, as well as the innumerable variety of implements into which iron is capable of being manufactured.

Two Gentlemen, who have superintended the manufacture of Iron in Wales and America, have been consulted, separately, as to the number of men required to attend and keep continually in blast a

furnace for making Pig Iron,—the following information has been thus obtained, viz :—

2 Managers for the top of the Furnace, who thoroughly understand their business, would probably require a Salary of £150 ea.	£300	0 0
4 Fillers, alternately working day and night, at 40s. per week,	408	0 0
4 below do. at 40s.	408	0 0
1 Manager below at £150,	150	0 0
1 Superintendant, 400,	400	0 0
1 Clerk, 150,	150	0 0
	£1,816	0 0
Each Furnace will make 4500 tons of Pig Iron annually, and each ton of Pig Iron will require 13-4 tons of ore, at 10s. per ton—say 7,875 tons at 10s.	3,937	10 0
Every Ton of Pig Iron will require 2¼ Tons of Coal at 12s. 6d per Ton, or 150 Bushels of Charcoal, at 20s. per 100 Bushels—say 30s. for fuel,	6,750	0 0
	£12,503	10 0
Thus the yearly expense of keeping in constant employment Two Furnaces would be	£25,000	0 0
Two Furnaces would yield 9000 Tons of Pig Iron, which would be worth at the Furnace £7 per ton, £63,000		
But 100 Tons of which, if *cast* into the various implements, machinery and materials required in the Country, might be considered worth at least £20 per Ton more, say £2,000 =	£65,000	0 0
Carried up	£40,000	0 0

Brought up		£40,000 0 0
Deduct 10 per cent. for contingencies,	£4,000	
Interest on Capital at 6 per ct.	3,000	
		7,000 0 0
Clear profit of 66⅔ per cent., or £33 to each Share of £50,		£33,000 0 0

When one-half the Shares are taken up, and the deposits paid, all the lands, or such parts thereof as may be required, will be conveyed as soon as the Company is properly organized, at a very reasonable consideration, the Subscriber reserving for himself such an interest in the undertaking as may be agreed upon.

JOHN ROSS.

TRURO, 26th Sept., 1846.