

MEMORANDUM ON IRON ORES
IN THE
COUNTY OF PICTOU, NOVA SCOTIA.

BY
J. W. DAWSON, LL.D., F. R. S.

These ores, from their variety, richness, accessibility and proximity to large deposits of coal already extensively worked, are in my opinion the most valuable at present known on the Eastern Coast of North America, though up to this time they have not attracted the attention which they merit.

The areas referred to in this memorandum, amounting to about 30 square miles, are believed to include the whole or nearly the whole of the Pictou County deposits, as follows:

1 *The Sutherland's River Deposit (marked 1 on the map).*

This is a bed or vein of Crystalline Carbonate and Red Oxide of Iron, from eleven to fourteen feet in thickness, and included in the sandstones of the Millstone Grit formation. From an analysis by Dr. T. Sterry Hunt, published in the Report of the Geological Survey of Canada for 1869, it appears that the ore contains 42 to 43 per cent of Iron, and is of a quality likely to prove specially adapted to the manufacture of steel. In connection with this I may state that it contains about 8 per cent of Carbonate of Manganese.* This deposit has been opened up for a short distance on the outcrop, and is no doubt of great extent, though this remains to be proved by further openings. The land, as well as the mining right, has been secured; and the locality is only four miles distant from the rich and valuable coal seams of the "MacBean area," now being opened up and connected with navigation in Pictou Harbor and with the other coal mines on the East River of Pictou by a railway.

2. *The great Iron Ore Bed of the East Branch of the East River of Pictou (No. 2 on the map.)* This is a conformable bed, included in the Upper Silurian slates. It consists of dense oolitic Red Oxide of Iron, probably averaging 40 per cent of metal, and is in some places about 40 feet in thickness. It has been traced for about three miles over the areas marked 2 on the map, and no doubt extends for a much greater distance. The greater part of its extension is included in the mining claims embracing about twenty square miles and shown on the map. This deposit is capable of affording an unlimited supply of ore, and from the nature of the country there are the best facilities for opening it by adits or by open workings.

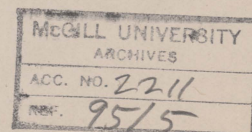
3. *Specular Iron Veins on the west side of the East Branch of the East River (No. 3 on the map.)*

This deposit consists of a network of veins of rich Specular Iron Ore running through quartz rock, and is believed to be of great extent and value, and to afford a quality of ore adapted for making the best kinds of wrought iron and steel. In Mr. Hartley's Report, in the Report of the Geological Survey of Canada, it is stated that an average sample of the mixed ore and veinstone yielded on analysis 45 per cent of metallic iron. Other areas adjoining that marked on the map, have recently been secured, with the view of tracing the extension of this deposit.

4. *Hematite Vein of East Branch of East River, (No. 4 on the map.)*

This is a thick vein of Crystalline Brown Hematite or Limonite, capable of affording 59 per cent of metallic iron and free from all injurious impurities. The extent of this deposit has not yet been explored, but it is stated by Mr. Hartley of the Geological Survey to be eight feet in thickness where exposed; and it extends through the areas covered by the mining rights referred to.

* See note on next page.



The above mining areas 2, 3 and 4 are situated near to each other and to the valley of the East River, and about ten miles distant from the extensive collieries of the General Mining Association, the Intercolonial Mining Company and the Acadian Mining Company, as well as other deposits of coal in the Pictou coal-field, not yet opened on so large a scale. Abundant supplies of fuel could thus be obtained at a moderate price and of a quality well adapted for the manufacture of iron, being remarkably free from sulphur and producing an excellent coke, (I believe present prices are from 7s. to 8s. sterling per ton for the best bituminous coal.) The intervening country already has good common roads, the main provincial railway between Pictou and Halifax is only 8 miles distant, and there are no special engineering difficulties to be encountered in constructing a railway between the coal and iron mines, either by the valley of the East River or by that of McLellan's Brook.

Limestone and building stone abound in the vicinity of these deposits, and there are also beds of clay iron-stone in the coal measures which might become sources of additional supply of ore.

The county of Pictou being one of the most populous in Nova Scotia, and already the seat of considerable mining industries, presents great facilities for obtaining skilled labour, machinery, and supplies of fuel. Wood, for purposes of construction as well as for charcoal-making, is abundant and cheap. The Harbour of Pictou and the Railway to Halifax, afford ample means of shipment.

Additional information as to the above deposits, and also as to the extent and quality of the Pictou coal, may be obtained in the Report of the Geological Survey of Canada for 1869, and in the writer's "Acadian Geology."

Montreal, May 2, 1872.

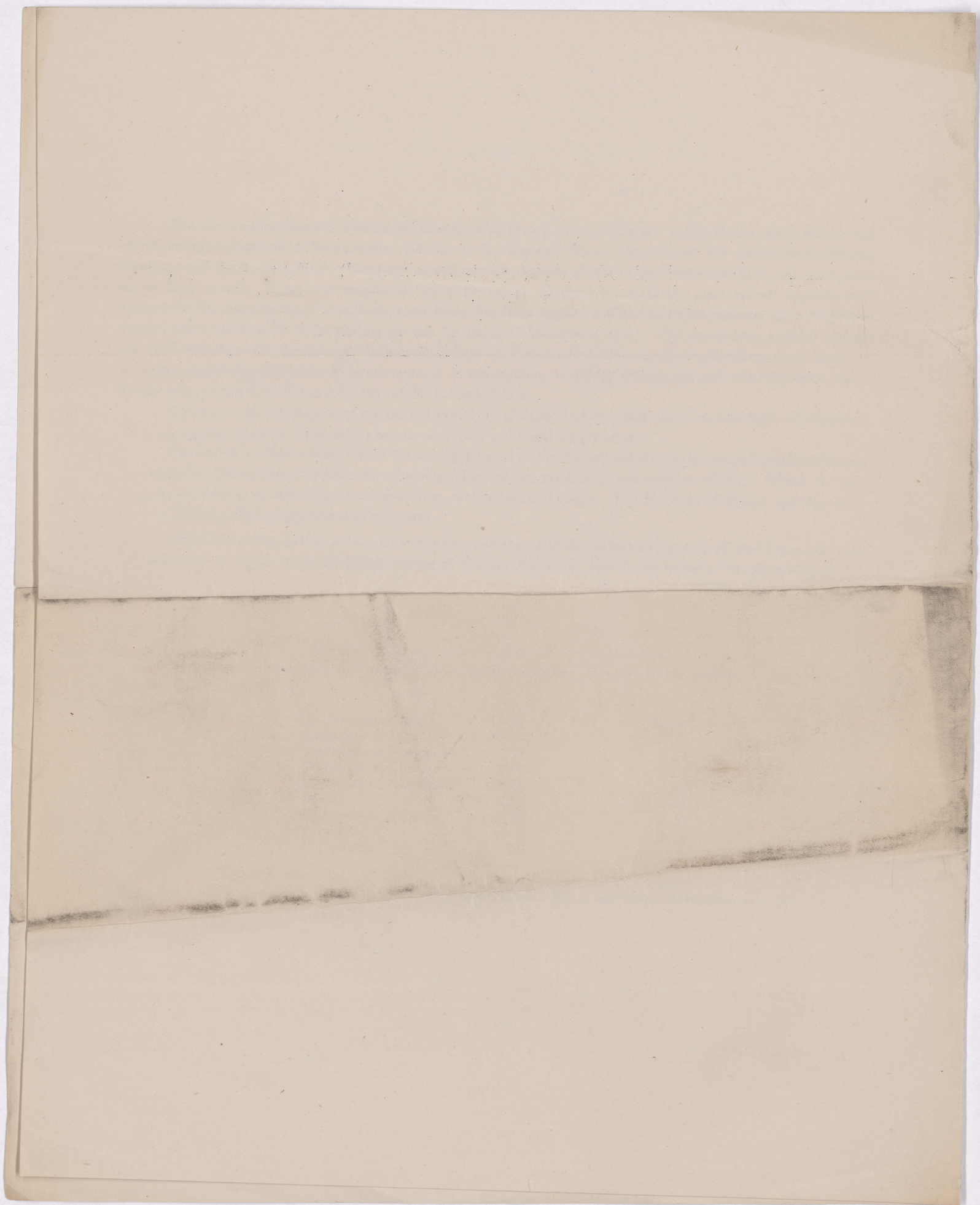
J. W. DAWSON.

Note on Spathic Iron of Sutherland's R.—No. 1 of previous page.

* As it may be important with reference to the question whether this ore would produce a *Spiegel-eisen*, I give Dr. Hunt's analysis:—

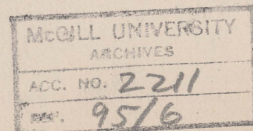
	I.	II.
Sesquioxide of Iron	16.98	20.52
Carbonate of Iron,	65.61	57.40
Carbonate of Manganese,	7.98	8.29
Carbonate of Lime,	2.67	4.02
Carbonate of Magnesia,	3.23	5.66
Silica,	3.76	2.38
Hygroscopic Moisture,	0.76	1.43
Sulphur	none	undet.
Phosphorus	.013	"
	101.003	99.70

No. 1 was a specimen from the Bank of Sutherland's Book. No. 2 was from a costeening pit about 75 feet farther westward.



No. 1st = SCHEDULE REFERRED TO.

- No. on
Government
Plan.
- ✓ *First* - - - No. 5.—A Government License to work one square mile, dated 10th April, 1872, and extended for one year from 10th April, 1874.
- Second* - - - No. 48.—A Government Receipt to work a square mile, dated 14th February, 1874. The above No. 5 was partly selected from this area.
- Third* - - - No. 46.—A Government Receipt to work a square mile, dated 4th June, 1873. The above No. 5 was partly selected from this area.
- Fourth* - - - No. 49.—A Government Receipt to work a square mile, dated 14th February, 1874.
- Fifth* - - - No. 49.—A Government Receipt to select a second square mile, expiring 14th February, 1875.
- Sixth* - - - No. 49.—A Government Receipt to select a third square mile.
- Seventh* - - - No. 45.—A Government Receipt to work one square mile, dated 20th February, 1873.
- Eighth* - - - No. 45.—A Government Receipt to work a second square mile, dated 14th February, 1874.
- Ninth* - - - No. 45.—A Government Receipt to select a third square mile, expiring 14th February, 1875. A portion of this is covered by part of a square mile selected by James Hudson.
- Tenth* - - - No. 102.—A Government Receipt to work one square mile, dated 14th February, 1874.
- Eleventh* - - - No. 102.—A Government Receipt to select a second square mile, expiring 15th February, 1875.
- Twelfth* - - - No. 102.—A Government Receipt to select a third square mile. A portion of this area is covered by part of a square mile selected by James Hudson.
- Thirteenth* - - - No. 101.—A Government License to work one square mile, dated 8th March, 1873.
- Fourteenth* - - - No. 101.—A Government Receipt to work a second square mile, dated 14th February, 1874.
- Fifteenth* - - - No. 100.—A Government License to work one square mile, dated 20th August, 1872.
- Sixteenth* - - - No. 47.—A Government Receipt to work one square mile, dated 14th February, 1874.



Seventeenth - No. 107.—A Government Receipt to select one square mile, dated 1st May, 1873, ~~exclusive of that portion of right of search of Jeffrey McCall and numbered 80.~~ *and since selected*

Eighteenth - No. 105.—
and
Nineteenth - No. 103.— } A Government Receipt to work one square mile, dated April 1873, selected out of both these areas.

✓ *Twentieth* - No. 104.—A Government Receipt to select one square mile, dated 30th April, 1873. *and since selected.*

Twenty-first - No. .—All right and title to six acres of land at Merigomish, where the spathic ore appears, purchased from Neil M'Laurin, by Deed dated 13th November, 1868, and recorded at the Registry of Deeds Office, Pictou, in Book 58, pages 34, 35, and 36. And also all right and title to the ores of iron, and other ores, contained in, under, or upon the farm of the said Neil M'Laurin, consisting of one hundred and fifty acres, as the same is conveyed in the said Deed last above mentioned.

Twenty-second No. .—All right and title to the ores that may be discovered on the lands of John Munro, at Merigomish, embracing one hundred acres, as conveyed by an Agreement dated the 26th November, 1868, and recorded in the Registry of Deeds Office, at Pictou, in Book 60, pages 469 and 470.

Twenty-third No. .—All right and title to the ores that may be discovered on two lots of land at Merigomish, belonging to Archibald Lamont, Alexander Lamont, Catherine Lamont, and Mary Lamont, containing two hundred acres, as conveyed by an Agreement dated 7th December, 1868, and recorded in the Registry of Deeds, Pictou, Book 58, pages 74 and 75.

Twenty-fourth No. .—All right and title to the ores that may be discovered on the land of William Pollock, at Merigomish, embracing two hundred acres, as conveyed by Agreement dated 24th December, 1868, and recorded in Registry of Deeds, Pictou, Book 60, pages 446 and 447.

Twenty-fifth - No. 108.—A Government Receipt to work one square mile, dated 3rd June, 1873.

Portions of the following areas are claimed by the proprietors of the soil, and are excepted, namely, of areas Nos. 48, 46, 102, 101, 47, and 104.

*Proctor
Shaw*

*Copy Letter from DAVID FORBES, Esq., F.R.S., F.G.S., Member of the Council of the
Institute of Civil Engineers.*

8th March, 1873,
11, York Place, Portman Square.

Dear Sir,

In reply to your favour, enclosing a copy of Principal Dawson's Report on the Pictou Iron Mines, and accompanied by samples of the Ores from these Mines, I have much pleasure in stating that the Report impresses me with a very high opinion as to the value of this mineral property, the more so, as I know Dr. Dawson personally as a geologist of the highest standing.

The local circumstances in Nova Scotia, such as the proximity of coal, facility of communication, &c., also appear to me to be so much in favour of making Iron on the large scale in that country, that I have no misgivings as to its success, provided it be entered into with adequate capital and judicious management.

I remain, dear Sir,
Yours truly,
DAVID FORBES.

To EDWARD PRENTICE, Esq.,
Conservative Club.

In another letter, under date the 27th December, 1872, he states that, having read the Reports and examined the Ores, he is of opinion "that Iron of a *superior quality* can be made in Nova Scotia at a *comparatively low rate*;" and adds, "that, if judiciously carried out, with sufficient capital, it cannot fail to prove a commercial success."

Copy Letter from the Director-General of the Geological Survey of Great Britain.

*Geol. Survey of England and Wales,
Jermyn Street,
13th January, 1873.*

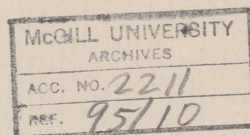
Dear Sir,

I am well acquainted with Mr. George Dawson. He attended all the classes at the Royal School of Mines during three years. In every branch he distinguished himself in the highest degree, and he gained the esteem of every one who knew him.

I have the highest opinion of his ability and integrity, and I know his range of knowledge to be unusually extensive. He also served on the Geological Survey of England for a summer as an amateur, and proved in the field that he easily understood and could take part in all the operations of the Survey in Cumberland.

Believe me,
Yours very truly,
AND. RAMSAY.

To EDWARD PRENTICE, Esq.



Copy taken from David Forman Esq. F.R.S. Editor of the Journal of the
Institute of Civil Engineers.

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Yours truly,

DAVID FORBES

To Howard Parsons Esq.
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for a summer as an assistant, and proved in the field that he could understand and could
take part in all the operations of the Survey in Cornwall.

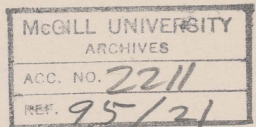
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Yours very truly,

AND. BARBAY

To Howard Parsons Esq.



A



[DRAFT PROSPECTUS.]

The Pictou Iron Company (Limited),

DOMINION OF CANADA.

(Incorporated under the Companies Acts, 1862 & 1867.)

CAPITAL, £250,000, IN 25,000 SHARES OF £10 EACH.

DIRECTORS—

COMMITTEE IN CANADA— { J. W. DAWSON, Esq., F.R.S., F.G.S.
WALTER SHANLY, Esq., C.E.

BANKERS—

BROKERS—

SOLICITORS—

AUDITOR—

CONSULTING ENGINEER—

SECRETARY—

TEMPORARY OFFICES—

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THIS COMPANY is formed for the purpose of acquiring and developing certain deposits of Iron Ores in the County of Pictou, Nova Scotia, held partly in fee simple, and partly under Mining Rights and Leases, from the Government of Nova Scotia, for a term of 21 years, renewable for three further periods of 20 years each, subject to a nominal royalty of 3 cents (1½d.) per ton of Iron, the whole embracing an area exceeding 40 square miles.

These Ores are of great value from their quantity, variety, richness, accessibility, and proximity to large deposits of Coal now being extensively worked by the General Mining Association of London and other large Companies. The coals of the Pictou Mines, as described in the Government Geological Reports, are peculiarly free from sulphur. Several of the richest seams present to the ordinary tests an *absolute freedom from sulphur*.

The Nova Scotia Government Railway from Halifax to Pictou Harbour crosses the property, and connects with the railway system of Canada with that of the United States. The harbour of Pictou, where Atlantic steamers take in coal, is 24 miles distant, and Halifax Harbour, open all the year, is 89 miles distant by rail.

The Iron and Coal Fields of Pictou are described in the Reports to Government by Sir William Logan, F.R.S., F.G.S., late Director of the Geological Survey of Canada.

They have been more recently visited and reported on for this Company, by Dr. J. W. Dawson, F.R.S., F.G.S., Principal of the University, Montreal, and by Mr. G. M. Dawson, Associate of the Royal School of Mines, London.

These Reports have been submitted to David Forbes, Esq., F.R.S., Member of the Council of the Institute of Civil Engineers, who states that this Property possesses all the elements of success.

The Iron Ore deposits, which Dr. Dawson states to be the most valuable at present known on the Eastern coast of North America, consist of—

1. Spathic Iron Ore, containing 42 per cent. of Metallic Iron, in a bed 12 feet thick.
2. Red Hematite, 10 to 30 feet in thickness, containing 50 per cent. of Metallic Iron.
3. Specular Iron Ore, 10 to 20 feet thick, containing 60 to 68 per cent. of Metallic Iron.
4. Brown Hematite, 15 feet thick, giving 62 to 65 per cent. of Metallic Iron.

Careful and complete assays have been made by Dr. Stevenson Macadam, F.R.S.E., Professor of Chemistry, Edinburgh, and by Dr. T. E. Thorpe, F.R.S.E., Professor of Chemistry, and Public Analyst for the City of Glasgow. Other analyses are to be found in the Government of Canada Official Reports.

The supply of these Ores, which are remarkably *free from Sulphur and Phosphorus* is practically inexhaustible. Dr. Dawson estimates the quantity of Ore to be won at a depth of 200 feet only, which can scarcely be called mining, to be not less than nine millions of tons.

The quantity already *proved*, is estimated at two millions of tons, or sufficient to supply three furnaces for thirty years, reckoning the requirements of each furnace at 700,000 tons of Ore.

The Ores crop out on the surface, and are in most instances from 200 to 400 feet *above drainage level*, thus saving the cost of artificial drainage; and admitting of their being won by open-cast workings. Mr. G. M. Dawson estimates the cost of raising the Ore at 80 cents to 1 dollar, or 4s. per ton.

The price of coal in Pictou is 10s. per ton of 2,240 lbs. Small coal for coking is 4s. to 5s. per ton. Many of the coal seams make an excellent hard coke, which can be supplied in any quantity.

Wood for purposes of construction, and for charcoal-making, is abundant and cheap. Limestone is abundant in the vicinity, and is quarried and sold for 1s. 8d. per ton. Excellent Fire-bricks are manufactured in the neighbourhood.

The County of Pictou, being one of the most populous in Nova Scotia, and already the seat of considerable mining industries, presents great facilities for obtaining skilled labour, machinery, and supplies; labour ranges from 4s. to 6s. per diem.

There is a large and growing market in Canada for Iron of all descriptions, there being many Railways in course of construction, and to be built, including the Pacific Railway through British Territory, for which the Parliament of Canada have voted large land grants, and thirty millions of dollars, including an Imperial guarantee. The total value of the exports of Pig Iron and Manufactured Iron from ports in the United Kingdom to Canada during 1872 amounted to over £2,400,000.

The high character of Nova Scotia Iron is well known in England, and is thus described by Sir Wm. Fairbairn in his "History of Iron:"—"In Nova Scotia some of the richest ores yet discovered, occur in exhaustless abundance. The Iron manufactured from them is of the very best quality, and is equal to the finest Swedish metal. Several specimens have been submitted to direct experiment, and the results prove its high powers of resistance to strain, durability, and the adaptation to all those processes by which the finest description of Iron and Steel are manufactured."

From the richness of the Ores of Nova Scotia, and the abundance and cheapness of fuel, coal, coke, and charcoal, it is confidently asserted that the highest class of Iron can be manufactured for less than the cost of ordinary English Pig Iron.

The cost of producing Bessemer Pig Iron in Nova Scotia will not exceed £3 10s. per ton. In this estimate an allowance of 50 per cent. over actual cost is made for contingencies. The cost of shipping to England is about 25s. per ton.

The present price in England is £8 10s. per ton, and the price of ordinary Pig Iron in Canada is about £9 to £10 per ton; in the United States the price is £12 sterling per ton.

Estimated cost of making a ton of Hematite Pig Iron in Pictou:—

	£	s.	d.
2 Tons of Ore, at 4s. per ton - - - - -	0	8	0
30 Cwts. of Coke - - - - -	0	18	0
10 Cwts. of Limestone - - - - -	0	2	0
Labour - - - - -	0	6	0
Wear and Tear and Interest - - - - -	0	8	6
General Management and other Charges - - - - -	0	4	0
	£2	6	0
To which add 50 per cent. for Contingencies - - - - -	1	3	0
	£3	9	0

Say £3 10s. sterling per ton. Present price in Canada, £9 to £9 10s.
 Present price of No. 1 Hematite Pig Iron in England, £8 10s. to £9.
 " " " " United States, £12.

The cost delivered in New York or Boston would be as follows:—

	£	s.	d.
Pig Iron at Pictou - - - - -	3	10	0
Freight to New York - - - - -	0	12	0
Insurance - - - - -	0	4	0
Duty - - - - -	1	0	0
	<u>£5</u>	<u>6</u>	<u>0</u>
Present price in New York - - - - -	12	0	0
Profit per Ton - - - - -	<u>£6</u>	<u>14</u>	<u>0</u>

The margin of profit in the most distant Canadian markets would be about £5 6s. per ton.

It is intended to erect three Blast Furnaces, fitted for an output of 300 to 400 tons each per week, which, with all appurtenances complete, will cost £75,000; and it will be seen from the costs and prices as detailed above, that a very moderate profit—putting aside the present abnormal price of Iron—will yield a large return on the capital expended.

The output of these Furnaces should not be less, at a moderate estimate, than 40,000 tons per annum. Taking the low average price of Bessemer Pig Iron during the last seven years at £5 per ton, the profits on an output of 40,000 tons of Pig Iron would give a dividend of 40 per cent. on the whole capital.

During the construction of the works it is proposed to raise the Ores, which, from their richness, will admit of shipment to the neighbouring states of America, where there is a large demand for such Ores for admixture.

The Directors will have the benefit of the local knowledge and valuable assistance of J. W. Dawson, Esq., F.R.S., and Walter Shanly, Esq., the eminent Engineer, who have consented to act on the Executive Committee. The high position which these gentlemen occupy in the Colony is a guarantee that the interests of the Company will be well looked after, and its affairs carefully administered.

Copies of the Memorandum and Articles of Association and original Reports, may be seen at the Offices of the Company, where also specimens of the Ores, Coals, Coke, Limestone, and Fire-clays may be inspected.

Proprietors
1873

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Wear and Tear and Interest - - - - -	0	8	6
General Management and other Charges - - - - -	0	4	0
	<hr/>		
	£2	6	0
To which add 50 per cent. for Contingencies - - - - -	1	3	0
	<hr/>		
	£3	9	0

Say £3 10s. sterling per ton. Present price in Canada, £9 to £9 10s.

Present price of No. 1 Hematite Pig Iron in England, £8 10s. to £9.

„ „ „ United States, £12.

The cost delivered in New York or Boston would be as follows:—

	£	s.	d.
Pig Iron at Pictou - - - - -	3	10	0
Freight to New York - - - - -	0	12	0
Insurance - - - - -	0	4	0
Duty - - - - -	1	0	0
	£5	6	0
Present price in New York - - - - -	12	0	0
Profit per Ton - - - - -	£6	14	0

The margin of profit in the most distant Canadian markets would be about £5 6s. per ton.

It is intended to erect three Blast Furnaces, fitted for an output of 300 to 400 tons each per week, which, with all appurtenances complete, will cost £75,000; and it will be seen from the costs and prices as detailed above, that a very moderate profit—putting aside the present abnormal price of Iron—will yield a large return on the capital expended.

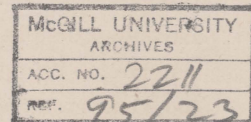
The output of these Furnaces should not be less, at a moderate estimate, than 40,000 tons per annum. Taking the low average price of Bessemer Pig Iron during the last seven years at £5 per ton, the profits on an output of 40,000 tons of Pig Iron would give a dividend of 40 per cent. on the whole capital.

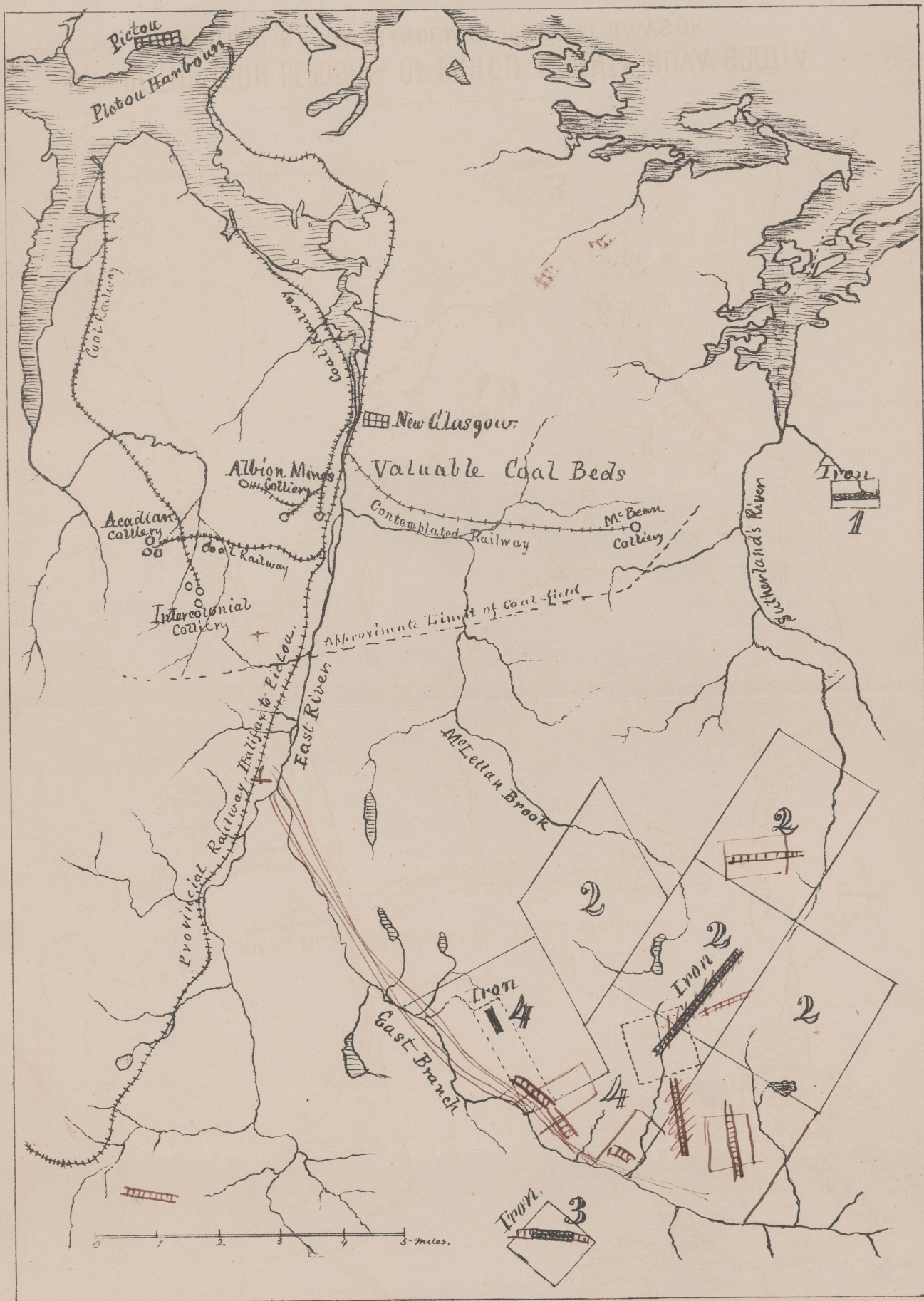
During the construction of the works it is proposed to raise the Ores, which, from their richness, will admit of shipment to the neighbouring states of America, where there is a large demand for such Ores for admixture.

The Directors will have the benefit of the local knowledge and valuable assistance of J. W. Dawson, Esq., F.R.S., and Walter Shanly, Esq., the eminent Engineer, who have consented to act on the Executive Committee. The high position which these gentlemen occupy in the Colony is a guarantee that the interests of the Company will be well looked after, and its affairs carefully administered.

Copies of the Memorandum and Articles of Association and original Reports, may be seen at the Offices of the Company, where also specimens of the Ores, Coals, Coke, Limestone, and Fire-clays may be inspected.

Bessemer



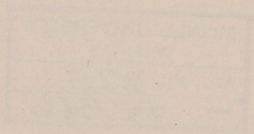


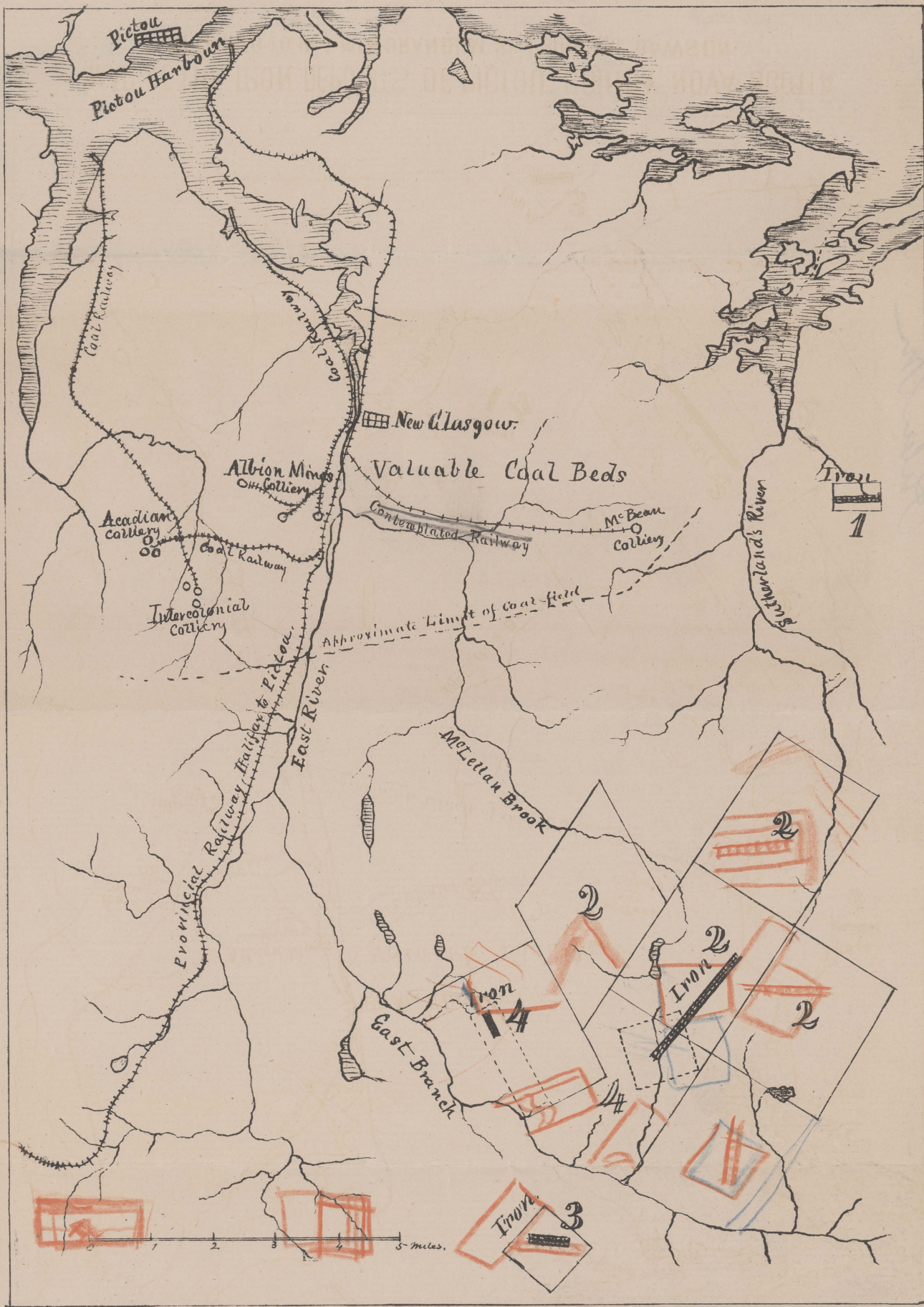
MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA.
 REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.

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MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA.
 REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.

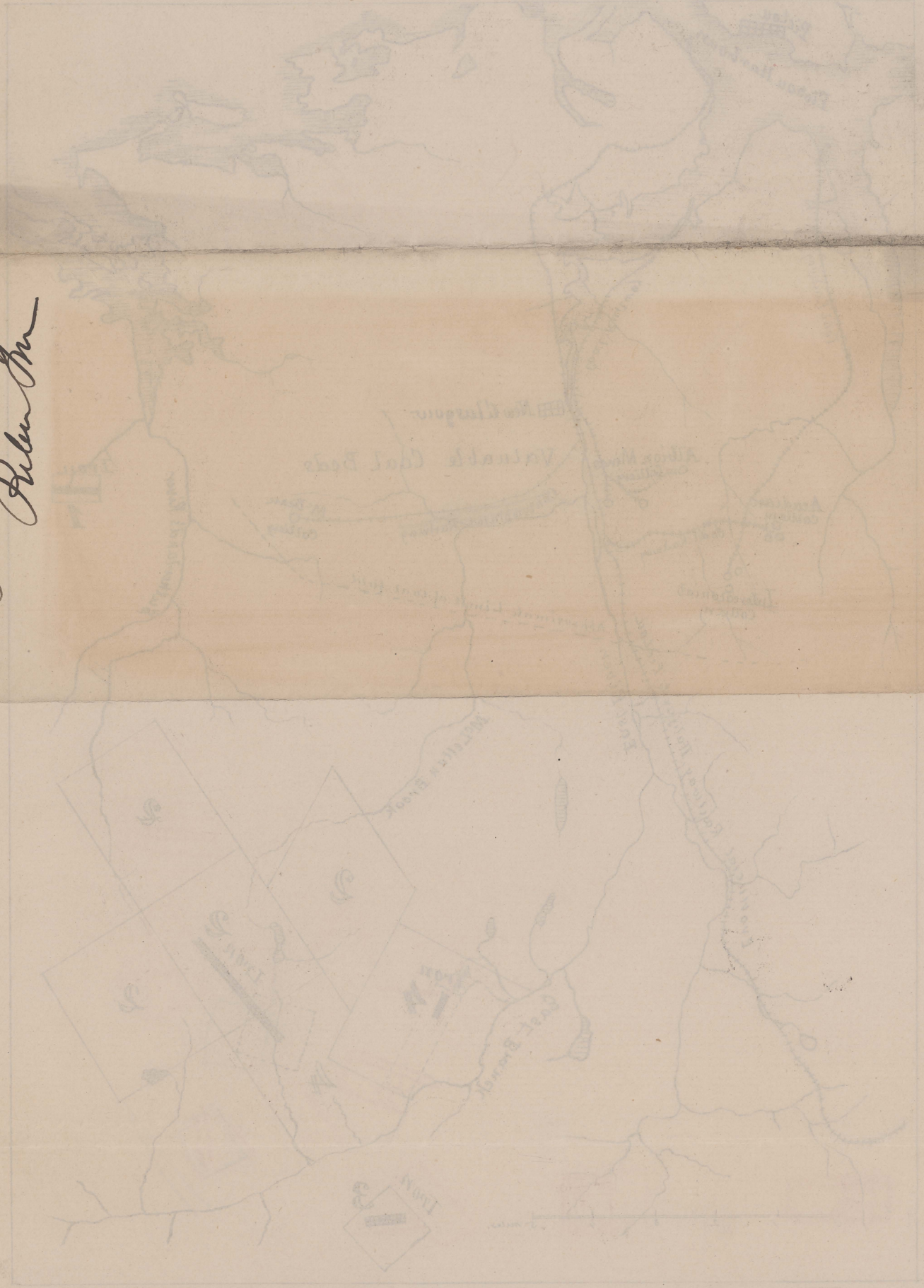




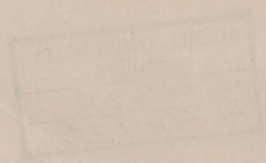
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 REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.

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MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA.
REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.



MEMORANDUM ON IRON ORES
IN THE
COUNTY OF PICTOU, NOVA SCOTIA.

BY
J. W. DAWSON, LL.D., F. R. S.

These ores, from their variety, richness, accessibility and proximity to large deposits of coal already extensively worked, are in my opinion the most valuable at present known on the Eastern Coast of North America, though up to this time they have not attracted the attention which they merit.

The areas referred to in this memorandum, amounting to about 30 square miles, are believed to include the whole or nearly the whole of the Pictou County deposits, as follows:

1 *The Sutherland's River Deposit (marked 1 on the map).*

This is a bed or vein of Crystalline Carbonate and Red Oxide of Iron, from eleven to fourteen feet in thickness, and included in the sandstones of the Millstone Grit formation. From an analysis by Dr. T. Sterry Hunt, published in the Report of the Geological Survey of Canada for 1869, it appears that the ore contains 42 to 43 per cent of Iron, and is of a quality likely to prove specially adapted to the manufacture of steel. In connection with this I may state that it contains about 8 per cent of Carbonate of Manganese.* This deposit has been opened up for a short distance on the outcrop, and is no doubt of great extent, though this remains to be proved by further openings. The land, as well as the mining right, has been secured; and the locality is only four miles distant from the rich and valuable coal seams of the "MacBean area," now being opened up and connected with navigation in Pictou Harbor and with the other coal mines on the East River of Pictou by a railway.

2. *The great Iron Ore Bed of the East Branch of the East River of Pictou (No. 2 on the map.)* This is a conformable bed, included in the Upper Silurian slates. It consists of dense oolitic Red Oxide of Iron, probably averaging 40 per cent of metal, and is in some places about 40 feet in thickness. It has been traced for about three miles over the areas marked 2 on the map, and no doubt extends for a much greater distance. The greater part of its extension is included in the mining claims embracing about twenty square miles and shown on the map. This deposit is capable of affording an unlimited supply of ore, and from the nature of the country there are the best facilities for opening it by adits or by open workings.

3. *Specular Iron Veins on the west side of the East Branch of the East River (No. 3 on the map.)* *& slate,*

This deposit consists of a ~~network of~~ ^{large} vein of rich Specular Iron Ore running through quartz rock, and is believed to be of great extent and value, and to afford a quality of ore adapted for making the best kinds of wrought iron and steel. In Mr. Hartley's Report, in the Report of the Geological Survey of Canada, it is stated that an average sample of the mixed ore and veinstone yielded on analysis 45 per cent of metallic iron. Other areas adjoining that marked on the map, have recently been secured, with the view of tracing the extension of this deposit.

4. *Hematite Vein of East Branch of East River, (No. 4 on the map.)*

This is a thick vein of Crystalline Brown Hematite or Limonite, capable of affording 59 per cent of metallic iron and free from all injurious impurities. The extent of this deposit has not yet been explored, but it is stated by Mr. Hartley of the Geological Survey to be eight feet in thickness where exposed; and it extends through the areas covered by the mining rights referred to. *(Greatly extended by recent explorations.)*

* See note on next page.

X Recent openings show that this deposit is larger and its ore richer than I had supposed at the time when the above was written.
J.W.D.

The above mining areas 2, 3 and 4 are situated near to each other and to the valley of the East River, and about ten miles distant from the extensive collieries of the General Mining Association, the Intercolonial Mining Company and the Acadian Mining Company, as well as other deposits of coal in the Pictou coal-field, not yet opened on so large a scale. Abundant supplies of fuel could thus be obtained at a moderate price and of a quality well adapted for the manufacture of iron, being remarkably free from sulphur and producing an excellent coke, (I believe present prices are from 7s. to 8s. sterling per ton for the best bituminous coal.) The intervening country already has good common roads, the main provincial railway between Pictou and Halifax is only 8 miles distant, and there are no special engineering difficulties to be encountered in constructing a railway between the coal and iron mines, either by the valley of the East River or by that of McLellan's Brook.

Limestone and building stone abound in the vicinity of these deposits, and there are also beds of clay iron-stone in the coal measures which might become sources of additional supply of ore.

The county of Pictou being one of the most populous in Nova Scotia, and already the seat of considerable mining industries, presents great facilities for obtaining skilled labour, machinery, and supplies of fuel. Wood, for purposes of construction as well as for charcoal-making, is abundant and cheap. The Harbour of Pictou and the Railway to Halifax, afford ample means of shipment.

Additional information as to the above deposits, and also as to the extent and quality of the Pictou coal, may be obtained in the Report of the Geological Survey of Canada for 1869, and in the writer's "Acadian Geology."

J. W. DAWSON.

Montreal, May 2, 1872.

Note on Spathic Iron of Sutherland's R.—No. 1 of previous page.

* As it may be important with reference to the question whether this ore would produce a Spiegel-eisen, I give Dr. Hunt's analysis:—

	I.	II.
Sesquioxide of Iron	16.98	20.52
Carbonate of Iron,	65.61	57.40
Carbonate of Manganese,	7.98	8.29
Carbonate of Lime,	2.67	4.02
Carbonate of Magnesia,	3.23	5.66
Silica,	3.76	2.38
Hygroscopic Moisture,	0.76	1.43
Sulphur	none	undet.
Phosphorus	.013	"
	101.003	99.70

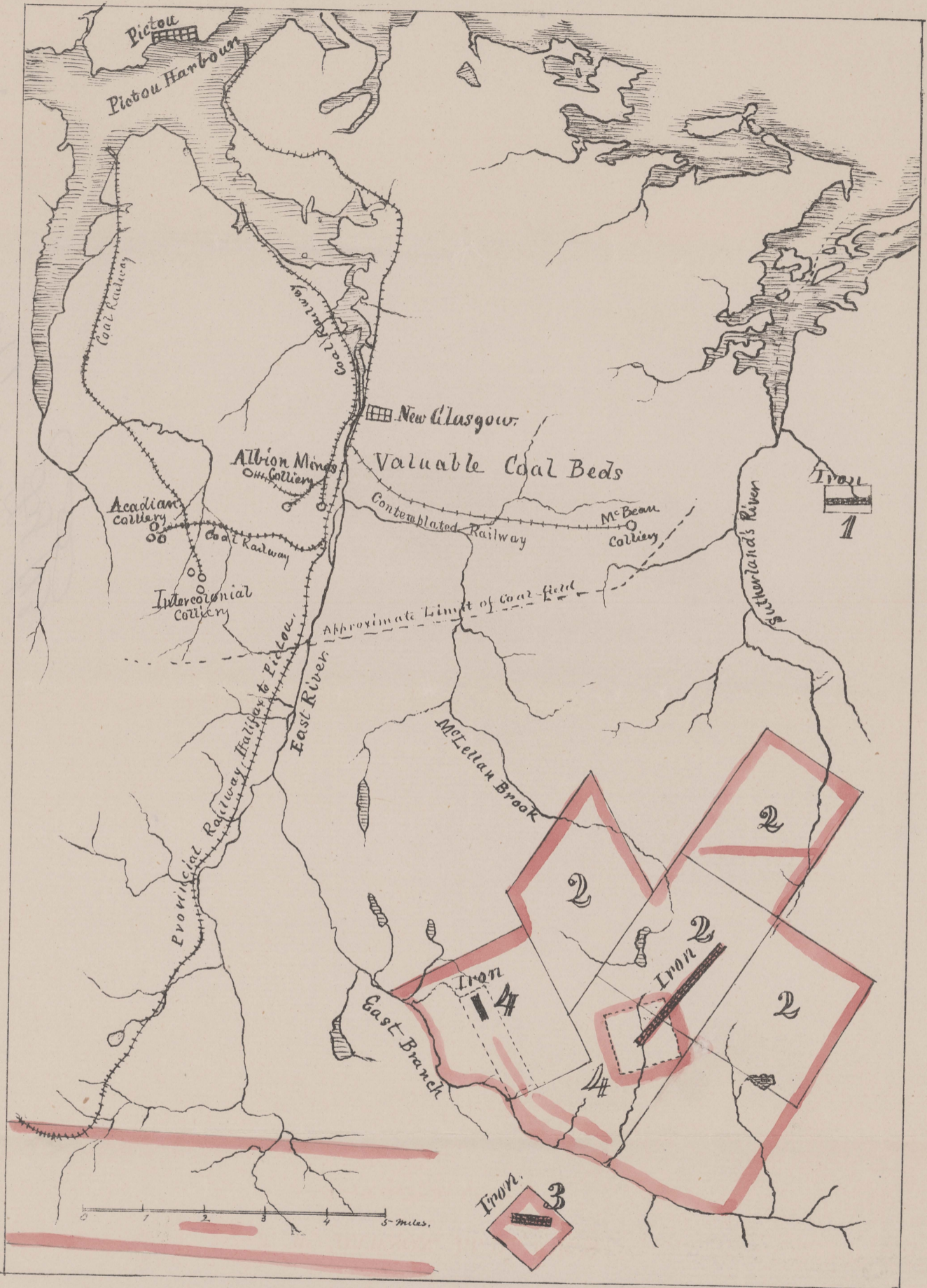
No. 1 was a specimen from the Bank of Sutherland's Book. No. 2 was from a costeening pit about 75 feet farther westward.

The above mentioned reports have been
largely speed up by exploratory works in the summer
of 1872, and additional analyses of the
ores have been made - the reports of all
of which are now in the hands of Mr. Est,
Secretary of Montreal. These reports fully establish
the foregoing statements, both as to the extent and
value of the deposits

W.D.
July 1873

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NOVA SCOTIA
1885



MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA.
REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.



Chas. & Allen
July 1873

MAP OF THE IRON DEPOSITS OF PICTOU COUNTY NOVA SCOTIA
REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.



MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA.
 REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.

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REF. 16

Map of the
Pictou
May 1893



MAP OF THE IRON DEPOSITS OF PICTOU COUNTY NOVA SCOTIA
REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAVISON

Memorandum
& Report

6 copies to 21 Howard Place, Edinburgh
the remainder to Conservative Club
St James

MEMORANDUM ON IRON ORES

London

IN THE

COUNTY OF PICTOU, NOVA SCOTIA.

BY J. W. DAWSON, LL.D., F. R. S.

These ores, from their variety, richness, accessibility and proximity to large deposits of coal already extensively worked, are in my opinion the most valuable at present known on the Eastern Coast of North America, though up to this time they have not attracted the attention which they merit.

The areas referred to in this memorandum and held by parties who have requested this statement, amounting to about 30 square miles, are believed to include the whole or nearly the whole of the Pictou County deposits, as follows:

1. *The Sutherland's River Deposit (marked 1 on the map).*

This is a bed or vein of crystalline Carbonate and Red Oxide of Iron, from eleven to fourteen feet in thickness, and included in the sandstones of the Millstone Grit formation. From an analysis by Dr. T. Sterry Hunt, published in the Report of the Geological Survey of Canada for 1869, it appears that the ore contains 42 to 43 per cent of Iron, and is of a quality likely to prove specially adapted to the manufacture of steel. In connection with this I may state that it contains about 8 per cent of carbonate of Manganese.* This deposit has been opened up for a short distance on the outcrop, and is no doubt of great extent, though this remains to be proved by further openings. The land, as well as the mining right, has been secured; and the locality is only four miles distant from the rich and valuable coal seams of the "MacBain area" now being opened up and connected with navigation in Pictou Harbor and with the other coal mines on the East River of Pictou by a railway.

2. *The great Iron Ore Bed of the East Branch of the East River of Pictou (No. 2 on the map.)* This is a conformable bed, included in the Upper Silurian slates. It consists of dense oolitic Red Oxide of Iron, probably averaging 40 per cent of metal, and is in some places about 40 feet in thickness. It has been traced for about three miles over the areas marked 2 on the map, and no doubt extends for a much greater distance. A part of the outcrop of this bed has been taken up by other parties; but the greater part of its extension is included in the mining claims embracing about twenty square miles and shown on the map. This deposit is capable of affording an unlimited supply of ore, and from the nature of the country there are the best facilities for opening it by adits or by open workings.

3. *Specular Iron Veins on the west side of the East Branch of the East River (No. 3 on the map.)*

This deposit consists of a network of veins of rich Specular Iron Ore running through quartz rock, and is believed to be of great extent and value, and to afford a quality of ore adapted for making the best kinds of wrought iron and steel. In Mr. Hartley's Report, in the Report of the Geological Survey of Canada, it is stated that an average sample of the mixed ore and veinstone yielded on analysis 45 per cent of metallic iron. Other areas adjoining that marked on the map, have recently been secured, with the view of tracing the extension of this deposit.

4. *Hematite Vein of East Branch of East River, (No. 4 on the map.)*

This is a thick vein of Crystalline Brown Hematite or Limonite, capable of affording 59 per cent of metallic iron and free from all injurious impurities. The extent of this deposit has not yet been explored, but it is stated by Mr. Hartley of the Geological Survey to be eight feet in thickness where exposed; and it extends through the areas covered by the mining rights of the parties represented in this memorandum.

(Over.)

MEMORANDUM ON IRON ORES

COUNTY OF PICTOU, NOVA SCOTIA

The above mining areas 2, 3 and 4 are situated near to each other and to the valley of the East River, and about ten miles distant from the extensive collieries of the General Mining Association, the Intercolonial Mining Company and the Acadian Mining Company, as well as other deposits of coal in the Pictou coal-field, not yet opened on so large a scale. Abundant supplies of fuel could thus be obtained at a moderate price and of a quality well adapted for the manufacture of iron, (I believe present prices are from 7s. to 8s. sterling per ton for the best bituminous coal,) while the intervening country already has good common roads, the main provincial railway between Pictou and Halifax is only 8 miles distant, and there are no special engineering difficulties to be encountered in constructing a railway between the coal and iron-mines, either by the valley of the East River or by that of McLellan's Brook.

Limestone and building stone abound in the vicinity of these deposits, and there are also beds of clay ironstone in the coal measures which might become sources of additional supply of ore.

The county of Pictou being one of the most populous in Nova Scotia, and already the seat of considerable mining industries, presents great facilities for obtaining skilled labour, machinery, and supplies of fuel. Wood, for purposes of construction as well as for charcoal-making, is abundant and cheap. The Harbour of Pictou and the Railway to Halifax, afford ample means of shipment.

The undersigned has already personally examined considerable portions of the areas referred to in this memorandum; and proposes to do so more thoroughly in the month of June next, with the view of ascertaining more definitely the limits of the principal deposits. Additional information as to the above deposits, and also as to the extent and quality of the Pictou coal, may be obtained in the Report of the Geological Survey of Canada for 1869, and in the writer's "Acadian Geology."

J. W. DAWSON.

Montreal, May 2, 1872.

* As it may be important with reference to the question whether this ore would produce a Spiegel-eisen I give Dr. Hunt's analysis:—

	I.	II.
Sesquioxide of Iron	16.98	20.52
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Carbonate of Lime,	2.67	4.02
Carbonate of Magnesia,	3.23	5.66
Silica,	3.76	2.38
Hygroscopic Moisture,	0.76	1.43
Sulphur	none	undet.
Phosphorus	.013	"
	101.003	99.70

No. 1 was a specimen from the Bank of Sutherland's Brook. No. 2 was from a costeening pit about 75 feet farther westward.

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THIS COMPANY has been formed for the purpose of ACQUIRING, MINING, and MANUFACTURING the extensive DEPOSITS of most valuable IRON ORES lying in the COUNTY OF PICTOU, NOVA SCOTIA.

These Ores, from their VARIETY, RICHNESS, ACCESSIBILITY, and PROXIMITY to the great and extensively-worked COALFIELD OF PICTOU, and to the PROVINCIAL RAILWAY SYSTEM connecting the field with the PORTS OF PICTOU and HALIFAX, are considered, by the ~~great authority of the Geological Survey of Nova Scotia~~ Dr. J. W. DAWSON, LL.D., F.R.S., F.G.S., the Author of the "ACADIAN GEOLOGY" and PRINCIPAL of MACGILL COLLEGE, MONTREAL, to be "THE MOST VALUABLE AT PRESENT KNOWN ON THE EASTERN COAST OF NORTH AMERICA."

The MINING AREAS over which they extend, and to which the Company will acquire right, amount, in the aggregate, to over 40 SQUARE MILES. The original areas, which amounted to about 30 SQUARE MILES, have, under Principal DAWSON'S guidance, been enlarged and corrected, and lots selected, so as to embrace the greatest possible extent of the deposits and their most productive parts. The lots thus secured are believed now to include THE WHOLE, OR NEARLY THE WHOLE, OF THE IRON ORE DEPOSITS OF PICTOU COUNTY. Dr. DAWSON states that "the acquisition of these properties will give the command of all the available IRON resources of this part of Nova Scotia as at present known or likely to be developed; and if works were established on a large scale, any minor deposits might be rendered tributary on the Iron Masters' own terms."

The IRON FIELD and COAL FIELDS OF PICTOU referred to throughout this Prospectus have been made the subject of elaborately-detailed REPORTS to the GOVERNMENT OF CANADA by Sir W. E. LOGAN, F.R.S., F.G.S., late Director of the GEOLOGICAL SURVEY OF CANADA, and by the late EDWARD HARTLEY, F.G.S., Mining Engineer of the Geological Survey (published by authority, Montreal, 1870, pp. 186, with Geological Maps of the Coal Seams). They have been more recently specially visited, examined, and reported upon for this Company by Principal DAWSON, who had also previously investigated them while preparing his "ACADIAN GEOLOGY" (Second Edition, 1868), and his GEOLOGICAL MAPS OF NOVA SCOTIA.

The Iron Ores consist respectively in the different areas about to be described of deposits, of:—

- (1.) SPATHOSE OR SPARRY IRON ORE, a mixture of about ~~equal parts of Sparry Iron Ore, or the Crystalline Carbonate, (the source of the highly valuable Sparry Iron Ore, and one part of the RED HAEMATITE, with a high per centage of MANGANESE, the Ore containing 42 to 43 per cent. of METALLIC IRON, and being from 15 to 20 FEET IN THICKNESS.~~

- (2.) RED HAEMATITE OR DENSE OOLITIC RED OXIDE, containing from about 40 to 55 per cent. of METALLIC IRON, and varying from 10 to 40 FEET IN THICKNESS.

- (3.) RICH SPECULAR IRON ORE, ~~in a network of veins, so numerous as to approach the character of a bedded deposit, from 3 to 1/2 FEET IN THICKNESS—the mixed ore and veinstone averaging 45 PER CENT. OF METALLIC IRON.~~

- (4.) PURE CRYSTALLINE BROWN HAEMATITE, or LIMONITE—one of the PUREST ORES KNOWN—affording from 58 to 63 PER CENT. OF METALLIC IRON, and being 3 FEET IN THICKNESS.

The supply of these different ores is literally inexhaustible within any period over which the calculations in his Report, after describing the several Deposits, "to go into any calculations as to the quantities of Ore contained in these Deposits. Those acquainted with such matters will know that veins and beds such as those above described will extend downwards to inaccessible depths, and that the quantity of Ore which they contain in the aggregate is practically inexhaustible, while they will afford the largest supplies for many years at the mere cost of quarrying and transport."

The first of these Ores lies in an area called Sutherland's River Area (marked No. 1 on the accompanying Map), apart from the continuous areas (marked Nos. 2, 3, and 4), which respectively contain the remaining Ores.

No. 1. The Deposit of Spathose, or Sparry Iron Ore, at Sutherland's River Area,

lies on the Main Post Road to Pictou, about 1 1/2 miles S.W. of Sutherland's Bridge, on Sutherland's River, which flows into the Harbour of Margotish, and only 3/4 miles eastward of the rich and extensive COAL FIELD commonly called the "MACLEAN AREA," now being opened up and connected by Railway with the Harbour of PICTOU, with the other extensive COAL FIELDS AND COLLIERIES on the EAST RIVER, and with the PROVINCIAL RAILWAY between the PORTS OF HALIFAX and PICTOU. Railway works have been started to connect the ~~Maclean Collieries~~ with the Owners of these Collieries. The ~~Vale Coal Company~~ and a survey and location of the Railway has been continued by the Company state that they will in all probability run their line much beyond these Iron Deposits, and that they will be ready to enter into arrangements to transport the Iron Ore, or Manufactured Iron, and supply Coals so soon as this Company's works are planted. There are no engineering difficulties to encounter, and the Railway will be first class in all respects.

The original area, containing this Deposit of Sparry Iron Ore, and of which the LAND, as well as the MINING RIGHT, has been secured for the Company; is, taken roughly, about ONE AND A HALF SQUARE MILES in extent, and it has been extended under Principal Dawson's directions. The Deposit is included in Sandstones of the Millstone Grit formation. The Deposit has been opened up by ~~a number of Costeening Pits along the outcrop on the South bank of Sutherland's Brook, and within the original mining area of this Company it is found to be a breadth of 600 yards, extending also into adjoining properties, the mining rights of which have been secured.~~ The Deposit appears to be a bed conformable with the stratification; and it is, in Principal Dawson's opinion, "undoubtedly of great extent," though its exact extent remains to be proved by further openings. Its THICKNESS, where exposed, is given by Mr. HARTLEY, in the GEOLOGICAL SURVEY, as varying from ELEVEN to FOURTEEN FEET, and Principal Dawson states that "the actual opening, ~~as shown by excavation, shows a thickness of VEGETY IRON ORE or AT LEAST FOURTEEN FEET in thickness.~~ For a long time to come the Deposit may be worked by ~~the work and by open cuttings or quarries. Wrought in this way, the Ore put on the Railway ready to transport to the furnaces will cost from 40 to 50 cents (18 to 24) per ton.~~"

The following analyses, by Dr. T. STERRY HUNT, LL.D., F.R.S., Chemist and Mineralogist to the Geological Survey, of specimens selected by him from different localities on the Bed, are given in Mr. HARTLEY'S GEOLOGICAL SURVEY REPORT, viz. :—

Analyses of the Spathose Ore.

"No. 1, Specimen from the Outcrop on Sutherland's Brook, and No. 2, from a Costeening Pit about 75 feet further westward:—

" Sesquioxide of Iron,	No. 1.	No. 2.
" Carbonate of Iron,	16.98	20.52
" Carbonate of Lime,	65.61	57.40
" Silica,	5.53	5.83
" Hygroscopic Moisture,	76	1.43
" Sulphur,	None.	Undetermined.
" Phosphorus, .. .. .	.013	None.
" Organic Matter,	Trace.	99.70
	101.003	42.07
	43.58	

Amount of Metallic Iron, 43.58
 Note by Dr. T. STERRY HUNT, appended to Analyses:—"The Iron Ores from Margotish, Nova Scotia, consist of an admixture of RED HAEMATITE and SPARRY CARBONATE OF IRON, with considerable MANGANESE, and but LITTLE LIME, MAGNESIA, or SILICEOUS MATTER; and they appear, moreover, from the results of their analyses, to be REMARKABLY FREE FROM SULPHUR AND PHOSPHORUS. Their composition is such as to make them very readily REDUCIBLE WITH A SMALL AMOUNT OF FUEL IN THE BLAST FURNACE, while the presence of MANGANESE, and their comparative FREEDOM FROM SULPHUR AND PHOSPHORUS, make them REGULARLY WELL FITTED FOR THE PRODUCTION OF STEEL, EITHER BY PUDDLING OR BY CEMENTATION."

The quality of the Ore, as disclosed by these Analyses, ~~is superior to the best proportion of its Crystalline Carbonate to the Sesquioxide or Haematite Ore~~, its high per centage of MANGANESE, and its FREEDOM FROM SULPHUR AND PHOSPHORUS, points it out as suited for the production of Spiegel-Eisen, or of a Natural Sparry Ore like that of Styria and Carinthia, the excellence of which is owing to the quality of the very similar Sparry Ore from which it is produced.

The areas of the three Deposits next to be described—lying together at a distance, at their nearest point, of about five miles to the S.W. of the Sparry Ore Deposit No. 1—extend from the upper valley of Sutherland's River across the upper valley of McLeellan's Brook to the East Branch of the East River of Pictou. These areas are from eight to ten miles distant from the extensive COLLIERIES of the GENERAL MINING ASSOCIATION, the INTERCOLONIAL MINING COMPANY, and the ACADIAN MINING COMPANY, as well as other Deposits of Coal in the PICTOU COALFIELD not yet opened up on so large a scale, with all of which they may easily be connected by RAILWAY, either by way of the East River Valley or that of the Valley of McLeellan's Brook. This Railway would, at the same time, connect these Iron Deposits with the MAIN PROVINCIAL RAILWAY SYSTEM, only six miles distant from them along the existing roads. These three Areas contain the Ores Nos. 2, 3, and 4, above mentioned, and now to be more particularly described.

No. 2. The Red Haematite or Oolitic Red Oxide of Iron,

containing from about 40 to 55 PER CENT. OF METALLIC IRON, occurs in a vast and regular bed, included in and conformable with the Upper Silurian Slates, which is found, so far as opened up, varying from 10 and 14 feet thicknesses of good Ore, with subordinate portions of less value, up to a series of thick beds of Ore, which, associated with others less rich in quality, make up an aggregate of 40 FEET IN THICKNESS. This Deposit has been traced for a distance of about THREE MILES over the areas marked No. 2 on the Map, and no doubt extends for a much greater distance over these areas, which, in their TWENTY SQUARE MILES OF EXTENT, embrace the WHOLE or LARGEST PORTION of this very valuable Deposit. The outcrop of the bed occurs on high ground, 200 to 300 feet above the drainage level. The Deposit is in the vicinity of good common roads, along which it is distant about 7 or 8 miles from the Provincial Railway leading to the Pictou Collieries, which are altogether about ten miles distant from the Iron Deposit. From the configuration of the country and the position of this bed, there are the best facilities for working it by ADIT LEVELS and OPEN-CAST WORKINGS; and, from the great extent and thickness of the Deposit, as already explored, it is obvious that it is, as Principal Dawson states it to be, capable of affording INEXHAUSTIBLE SUPPLIES of the raw material of ordinary foundry Pig-Iron.

The following are two complete Analyses by Dr. T. E. THORPE, Professor of Chemistry, Andersonian University, Glasgow, of the samples selected from this Bed by Dr. Dawson; and also two complete Analyses by Dr. STEVENSON MACADAM, Lecturer on Chemistry, Surgeons' Hall, Edinburgh, of other samples from the Bed also selected by Dr. Dawson:—

" Peroxide of Iron,	56.06	47.36
" Protoxide of Iron,	9.20	5.89
" Manganese Oxide,	Traces	Traces
" Sulphur,	None	None
" Phosphorus	None	None
" Alumina,	5.59	2.09
" Lime,	1.88	0.37
" Magnesia,	1.05	37.43
" Silica,	23.68	1.98
" Loss on Ignition,	2.54	100.00
	100.00	39.73

EQUAL TO METALLIC IRON,

" Peroxide of Iron,	73.13	73.13
" Protoxide of Iron,	0.58	0.58
" Manganese Oxide,	Traces.	Traces.
" Sulphur,	0.02	0.02
" Phosphorus,	—	—
" Alumina,	—	—
" Lime,	—	—
" Magnesia,	—	—
" Silica,	26.18	26.18
" Loss on Ignition,	0.25	0.25
	100.16	100.16
	51.64	51.64

Equal to Metallic Iron.
 Another Analysis of another sample by Dr. STEVENSON MACADAM shows:—

No. 3. The Rich Specular Iron Ore

consists of a network of fissure veins running through quartzites and slates, and is stated by Dr. Dawson to be of great extent and value. Its character and geological relations are precise counterparts of those of the celebrated iron vein of Londonderry, N.S., from which the iron of the Acadian Iron Works, which enjoys so high a reputation, is manufactured. The rocks appear to be much shattered, and the Specular Iron, with granular quartz as a veinstone, appears to fill the fissures, which are sometimes "so numerous," to use the words of Mr. EDWARD HARTLEY, in his GEOLOGICAL SURVEY REPORT, "that the entire bed of rock

about ten

5-20

where exposed 15

(near the Colliery)

is 74

about 10 feet
 in bed
 which may
 be worked

Dr. T. E. Thorpe

the work of Mr. EDWARD HARTNEY, in his GEOLOGICAL SURVEY REPORT, "that the entire bed of rock with granular character as a limestone, appears to fill the fracture, which are sometimes 'so numerous', to use the expression of Mr. HARTNEY, 'as to be almost continuous'. The beds appear to be most abundant and the specimen from the of great extent and value. Its character and geological relations are precise counterparts of those of the consists of a network of veins running through fractures and also as and is cited by Dr. Dawson to

No. 3 The Rich Specimen from Ore

Another analysis of another sample by Dr. STEVENSON MACDONALD shows:—

Loss on ignition	100.00	91.44
Water	0.32	0.32
Iron	52.18	52.18
Manganese	1.00	1.00
Zinc	0.00	0.00
Aluminum	0.00	0.00
Silica	0.00	0.00
Phosphorus	0.00	0.00
Calcium	0.00	0.00
Magnesium	0.00	0.00
Fluorine	0.00	0.00
Chlorine	0.00	0.00
Sulfur	0.00	0.00
Carbon	0.00	0.00
Nitrogen	0.00	0.00
Hydrogen	0.00	0.00
Oxygen	0.00	0.00
Total	100.00	100.00

The following are the samples selected from the Ore by Dr. Dawson, and also two samples from the Bed of the Upper Silurian Shales which is found so far as opened up varying from 10 and 14 feet extent and thickness of the Deposit as already mentioned in the report of Mr. HARTNEY, and from the level about 7 or 8 miles from the Provincial Railway, near to the location of the 3000 feet above the granite level. The Deposit is in the vicinity of Good common veins which is the whole or largest portion of this vein, separate Deposit. The amount of the bed varies on high ground, but extends for a much greater distance over these areas which in their lateral behavior tends to exhibit a certain amount of irregularity in its thickness. The amount of the bed varies on high ground, but extends for a much greater distance over these areas which in their lateral behavior tends to exhibit a certain amount of irregularity in its thickness. The amount of the bed varies on high ground, but extends for a much greater distance over these areas which in their lateral behavior tends to exhibit a certain amount of irregularity in its thickness.

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No. 3 The Red Hematite or Collicite Red Oxide of Iron

No. 3, 3 and 4 above mentioned, and now to be more particularly described.

As the same time, connect these from Deposits with the main PROVINCIAL RAILWAY SYSTEM by way of the Red River Valley or that of the Valley of McMillan's Brook. The Railway would run on to make a scale with all of which they may easily be connected by RAILROAD either MINING COMPANY, as well as other Deposits of Coal in the Province, and the AGENCIES of the GENERAL MINING ASSOCIATION, the INTERNATIONAL MINING COMPANY, and the AGENCIES of the Province. These areas are now open to the view from the extensive Government of Suburbania River across the river valley of McMillan's Brook to the Bed of the main valley about five miles to the S.W. of the Spring Ore Deposit No. 1—extending from the upper valley of the main valley to the described—[link together at a distance of their nearest point of

similar SPARKY Ore from which it is produced. Various sized like that of Sparky and Campbell, the excellence of which is owing to the density of the rock. The following are the samples selected from the Ore by Dr. Dawson, and also two samples from the Bed of the Upper Silurian Shales which is found so far as opened up varying from 10 and 14 feet extent and thickness of the Deposit as already mentioned in the report of Mr. HARTNEY, and from the level about 7 or 8 miles from the Provincial Railway, near to the location of the 3000 feet above the granite level. The Deposit is in the vicinity of Good common veins which is the whole or largest portion of this vein, separate Deposit. The amount of the bed varies on high ground, but extends for a much greater distance over these areas which in their lateral behavior tends to exhibit a certain amount of irregularity in its thickness.

Analysis of the Sparky Ore

Loss on ignition	100.00	91.44
Water	0.32	0.32
Iron	52.18	52.18
Manganese	1.00	1.00
Zinc	0.00	0.00
Aluminum	0.00	0.00
Silica	0.00	0.00
Phosphorus	0.00	0.00
Calcium	0.00	0.00
Magnesium	0.00	0.00
Fluorine	0.00	0.00
Chlorine	0.00	0.00
Sulfur	0.00	0.00
Carbon	0.00	0.00
Nitrogen	0.00	0.00
Hydrogen	0.00	0.00
Oxygen	0.00	0.00
Total	100.00	100.00

No. 1 The Deposit of Sparky or Sparky Iron Ore in Saskatchewan River Area. This deposit is situated in the Province of Saskatchewan, and is one of the most important sources of iron ore in the West. It is situated in the Province of Saskatchewan, and is one of the most important sources of iron ore in the West. It is situated in the Province of Saskatchewan, and is one of the most important sources of iron ore in the West.

The deposit is situated in the Province of Saskatchewan, and is one of the most important sources of iron ore in the West. It is situated in the Province of Saskatchewan, and is one of the most important sources of iron ore in the West. It is situated in the Province of Saskatchewan, and is one of the most important sources of iron ore in the West.

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of America, which there is an unlimited market for such Ore for reduction.

The extraordinary richness of the Ore will permit of their shipment to England or the neighboring States

the system of Railway Communication already in existence on the field.

It is proposed that the three Companies with approximate capitals, will cost \$30,000 each, or \$100,000

It is proposed to erect in the immediate neighborhood of the town of NEW BRUNSWICK, a large coal and

the seat of considerable mining enterprises and business these facilities for obtaining skilled labor and machinery

Iron-ore. The population is chiefly of Scotch descent, industrious, thrifty and honest. The business is chiefly

The County of Essex is one of the most populous in New Jersey, about seven or eight miles, and from

Woods and charcoal works is in New Jersey both abundant and cheap. One of the largest of iron

barren kinds of red, high-class iron.

York with similar Ore and the same variety of situation to some extent by this Company for producing

the use of coal and limestone and the method of treatment proposed in Yorkshire, New Jersey and New

of being extracted in one in the form of a high-class iron, by a process which will produce with

fine iron in all or nearly all the Ore in the state. The high-class iron is capable from the nature of the Ore

Coal field of its own. But arrangements have been made under which the Directors will be able, if they should

to a great and abundant supply of fuel instead of purchasing the same from the numerous Coal Companies

in accordance with the views of persons of business in Canada, it has been determined in the meantime

Ore and supplying the Company will further to aid the production of iron for special purposes.

In accordance with the views of persons of business in Canada, it has been determined in the meantime

sources of additional supply of Ore suitable for producing the highest quality of iron for special purposes.

There are also beds of Gascon Iron-ore in the coal measures which might be necessary, because

quantities of the best quality for furnace iron.

Iron-ore and limestone are found in the vicinity of the iron Ore deposits and limestone and

Sandstone. (See Survey Report, p. 122.) Most of them are high class Ore of most excellent quality.

On the field of this district will be found a large quantity of limestone with those of the same nature of the

quartz and Scotland, the amount is from 143 to 145 per cent. Mr. Harshel states that the greater number of the

ores are considerably below 100 per cent. While numerous analyses show that in the best class of the

numerous different Coals examined by Mr. Harshel and the other officials of the Geological Survey in most

present to the ordinary tests indications of the quality of the coal are from 25 to 30 per cent. The

quality of the geological Survey Reports to be published here from 25 to 30 per cent. The

underlying the 2 feet 6 inches sand.

8 inches, 4 feet, 3 feet 6 inches, 3 feet 8 inches, 3 feet 6 inches, 3 feet 6 inches, 3 feet 6 inches, 3 feet 6 inches,

and also situated in the neighborhood of the Montreal Company, the same of which will furnish for companies in

highest style of situation. The year No. 1 containing the Deposits of Sperry Iron Ore shows mentioned in

present area is connected by Railway with the Provincial Railway System. The beds are all good in the

up in the immediate neighborhood of the workings of these Coal companies. The beds are of this class Coal

and the best quality of coal. The year No. 1 containing the Deposits of Sperry Iron Ore shows mentioned in

and the best quality of coal. The year No. 1 containing the Deposits of Sperry Iron Ore shows mentioned in

of 20 feet of a most excellent coal, all worked. The year No. 1 containing the Deposits of Sperry Iron Ore shows mentioned in

point over 30 feet in thickness of which 22 feet is of excellent marketable coal, while the rest is of a lower

(TOTAL \$238,000) are at present valued so an output of over 300,000 tons a year. The year No. 1 containing the Deposits of Sperry Iron Ore shows mentioned in

Various Companies have been formed for the purpose of producing coal. The year No. 1 containing the Deposits of Sperry Iron Ore shows mentioned in

bearing amount. From the reports of the Geological Survey of Canada, it appears that the

amount for iron-ore. Its extent may be roughly estimated at 20 square miles of unimproved Ore

is inexhaustible in its supplies of a high quality, situated in the neighborhood of these Iron Deposits, and

The Geological Survey of Canada, it appears that the

Another deposit of iron-ore is situated in the neighborhood of these Iron Deposits, and

in the form of a high quality, situated in the neighborhood of these Iron Deposits, and

of a few hundred acres in extent. The year No. 1 containing the Deposits of Sperry Iron Ore shows mentioned in

The whole of these areas is so situated that they may be won either by open cast or by underground

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McGILL UNIVERSITY ARCHIVES ACC. NO. 10 REF. 109

This Company has been formed for the purpose of ACQUIRING, MINING, and MANUFACTURING the extensive DEPOSITS of most valuable IRON ORES lying in the COUNTY OF PICTOU, NOVA SCOTIA.

These Ores, from their VARIETY, RICHNESS, ACCESSIBILITY, and PROXIMITY to the great and extensively-worked COALFIELD OF PICTOU, and to the PROVINCIAL RAILWAY SYSTEM connecting the field with the PORTS of PICTOU and HALIFAX, are considered, by the great authority upon the Geology of Nova Scotia, Dr. J. W. DAWSON, LL.D., F.R.S., F.G.S., the Author of the "ACADIAN GEOLOGY," and PRINCIPAL of MACGILL COLLEGE, MONTREAL, to be "THE MOST VALUABLE AT PRESENT KNOWN ON THE EASTERN COAST OF NORTH AMERICA."

The MINING AREAS over which they extend, and to which the Company will acquire right, amount, in the aggregate, to about 40 SQUARE MILES, the Titles of which are direct from the Crown. The original areas, which amounted to about 30 SQUARE MILES, have, under Principal Dawson's guidance, been enlarged and corrected, so as to embrace the greatest possible extent of the deposits and their most productive parts. The areas thus secured are believed now to include THE WHOLE, OR NEARLY THE WHOLE, OF THE IRON ORE DEPOSITS OF PICTOU COUNTY. Dr. DAWSON states that "the acquisition of these properties will give the command of all the available Iron resources of this part of Nova Scotia as at present known or likely to be developed; and if works were established on a large scale, any minor deposits might be rendered tributary on the Iron Masters' own terms."

The IRON FIELD and COAL FIELDS of PICTOU referred to throughout this Prospectus have been made the subject of elaborately-detailed REPORTS to the GOVERNMENT OF CANADA by Sir W. E. LOGAN, F.R.S., F.G.S., late Director of the GEOLOGICAL SURVEY OF CANADA, and by the late EDWARD HARTLEY, F.G.S., Mining Engineer of the Geological Survey (published by authority, Montreal, 1870, pp. 186, with Geological Maps of the Coal Seams). They have been more recently specially visited, examined, and reported upon for this Company by Principal DAWSON, who had also previously investigated them while preparing his "ACADIAN GEOLOGY" (Second Edition, 1868), and his GEOLOGICAL MAPS OF NOVA SCOTIA.

The Iron Ores consist respectively in the different areas about to be described of deposits, of:—
(1.) SPATHOSE OR SPARRY IRON ORE, a mixture of about FOUR parts of SPATHIC IRON ORE, or the CRYSTALLINE CARBONATE (the source of the highly valuable SPIEGEL-EISEN), and one part of the RED HAEMATITE or ANHYDROUS PEROXIDE, with a HIGH per centage of MANGANESE, the Ore containing 43 to 43 per cent. of METALLIC IRON, and being from ELEVEN to FOURTEEN FEET IN THICKNESS.

(2.) RED HAEMATITE OR DENSE OOLITIC RED OXIDE, containing 40 per cent. of METALLIC IRON, and in some parts 40 FEET IN THICKNESS.

(3.) RICH SPECULAR IRON ORE, in a network of veins, so numerous as to approach the character of a single bed or deposit, from 8 to 12 FEET IN THICKNESS—the mixed ore and veinstone averaging 45 PER CENT. OF METALLIC IRON.

(4.) PURE CRYSTALLINE BROWN HAEMATITE, or LIMONITE—one of the PUREST ORES KNOWN—affording 59 PER CENT. OF METALLIC IRON, and being 8 FEET IN THICKNESS.

The first of these Ores lies in an area called Sutherland's River Area (marked No. 1 on the accompanying Map), apart from the continuous areas (marked Nos. 2, 3, and 4), which respectively contain the remaining Ores.

No. 1. The Deposit of Spathose, or Sparry Iron Ore, at Sutherland's River Area.

lies about 1½ miles S.W. of Sutherland's Bridge, on Sutherland's River, which flows into the Harbour of Merigomish, and only 3½ miles eastward of the rich and extensive COAL FIELD commonly called the "MACBEAN AREA," now being opened up and connected by Railway with the Harbour of PICTOU, with the other extensive COAL FIELDS and COLLIERIES on the EAST RIVER, and with the PROVINCIAL RAILWAY between the PORTS of HALIFAX and PICTOU. Railway works have been started to connect the Macbean Collieries with the Provincial Railway at New Glasgow, and a survey and location of the Railway has been continued by the Owners of these Collieries, "The Vale Coal Iron Manufacturing Company," to the Iron Deposits at Sutherland River. That Company state that they will in all probability run their line much beyond these Iron Deposits, and that they will be ready to enter into arrangements to transport the Iron Ore or Manufactured Iron, and supply Coals so soon as this Company's works are planted. There are no engineering difficulties to encounter, and the Railway will be first class in all respects.

The original area containing this Deposit of Sparry Iron Ore, and of which the LAND, as well as the MINING RIGHT, has been secured for the Company, is, taken roughly, about ONE-AND-A-HALF SQUARE MILES in extent, and it has been extended under Principal Dawson's directions. The Deposit is included in Sandstones of the Millstone Grit formation. The Deposit has been opened up in the original area by a number of Costeening Pits along the outcrop on the South bank of Sutherland's Brook, and within that area it is found to have a breadth of 600 yards, extending into adjoining properties, the mining rights of which are being secured. The Deposit appears to be a bed conformable with the stratification; and it is, in Principal Dawson's opinion, undoubtedly of great extent," though its exact extent remains to be proved by further openings. Its THICKNESS, where exposed, is given by Mr. HARTLEY, in the GEOLOGICAL SURVEY, as varying from ELEVEN to FOURTEEN FEET, and Principal Dawson states that "the actual exposure, ascertained by excavation, shows A MASS OF NEARLY PURE ORE OF AT LEAST FOURTEEN FEET in thickness." The Deposit is situated well above the Drainage Level, and can be worked with great facility and little cost. For a long time to come the Deposit may be worked by open cuttings or quarrying. Wrought in this way, the Ore put on the Railway ready to transport to the furnaces will cost from 40 to 45 cents (1/8 to 1/10) per cubic yard.

The following analyses, by Dr. T. STERRY HUNT, L.L.D., F.R.S., Chemist, and Mineralogist to the Geological Survey, of specimens selected by him from different localities on the Bed, are given in Mr. HARTLEY'S GEOLOGICAL SURVEY REPORT, viz.:

Analyses of the Spathose Ore.	
No. 1, Specimen from the Outcrop on Sutherland's Brook, and No. 2, from a Costeening Pit about 75 feet further westward:—	No. 3, No. 4
" Sesquioxide of Iron,	16.98
" Carbonate of Iron,	65.61
" Carbonate of MANGANESE,	7.98
" Carbonate of Lime,	2.67
" Carbonate of Magnesia,	3.23
" Silica,	3.76
" Hydroscopic Moisture, ... ..	.76
" Sulphur,	None.
" Phosphorus, ... ..	.013
" Organic Matter,	Trace.
	101.003
	43.36
	42.07

Note by Dr. T. STERRY HUNT, appended to Analyses:—"The Iron Ores from Merigomish, Nova Scotia, consist of an admixture of RED HAEMATITE and SPARRY CARBONATE OF IRON, with considerable MANGANESE, and but LITTLE LIME, MAGNESIA, or SILICIOUS MATTER; and they appear, moreover, from the results of their analyses, to be REMARKABLY FERRUGINOUS, SULPHUR, AND PHOSPHORUS." Their composition is such as to make them very readily REDUCIBLE WITH A SMALL AMOUNT OF FUEL "IN THE BLAST FURNACE, while the presence of MANGANESE, and their comparative FREEDOM FROM SULPHUR AND PHOSPHORUS, make them ESPECIALLY WELL FITTED FOR THE PRODUCTION OF STEEL, EITHER BY PUDDLING OR BY "CEMENTATION."

The quality of the Ore, as disclosed by these Analyses, particularly in respect to the large proportion of its Crystalline Carbonate to the Sesquioxide or Haematite Ore, its high per centage of MANGANESE, and its FREEDOM FROM SULPHUR AND PHOSPHORUS, points it out as suited for the production of Spiegel-Eisen or of a Natural Steel, like that of Styria and Carinthia, the excellence of which is owing to the quality of the very similar SPARRY ORE from which it is produced.

The areas of the three Deposits next to be described—lying together at a distance, at their nearest point, of about five miles to the S.W. of the Sparry Ore Deposit No. 1—extend from the upper valley of Sutherland's River across the upper valley of McLellan's Brook to the East Branch of the East River of Pictou. These areas are from eight to ten miles distant from the extensive COLLIERIES of the GENERAL MINING ASSOCIATION, the INTERCOLONIAL MINING COMPANY, and the ACADIAN MINING COMPANY, as well as other Deposits of Coal in the PICTOU COALFIELD not yet opened up on so large a scale, with all of which they may easily be connected by RAILWAY, either by way of the East River Valley or that of the Valley of McLellan's Brook. This Railway would, at the same time, connect these Iron Deposits with the MAIN PROVINCIAL RAILWAY SYSTEM, only six miles distant from them along the existing roads. These three Areas contain the Ores Nos. 2, 3, and 4, above mentioned, and now to be more particularly described.

No. 2. The Red Haematite or Oolitic Red Oxide of Iron.

averaging 40 PER CENT. OF METALLIC IRON, occurs in a VAST BED, included in and conformable with the Upper Silurian Slates, which is in some places 40 FEET IN THICKNESS, and has been traced for a distance of about THREE MILES over the areas marked No. 2 on the Map, and no doubt extends for a much greater distance over these areas, which, in their TWENTY SQUARE MILES OF EXTENT, embrace the WHOLE OR LARGEST PORTION of this very valuable Deposit. From the configuration of the country and the position of this great bed, there are the best facilities for working it by ADIT LEVELS and OPEN-CAST WORKINGS; and, from the great extent and thickness of the Deposit, as already explored, it is obvious that it is, as Principal Dawson states it to be, capable of affording INEXHAUSTIBLE SUPPLIES of the raw material of ordinary foundry Pig-Iron.

The following are two Analyses by Dr. STEVENSON MACADAM, F.R.S.E., Lecturer on Chemistry, Surgeons' Hall, Edinburgh, of samples of this Ore selected by Principal Dawson:

" Oxide of Iron,	75.67	" Oxides of Iron,	63.66
" Oxide of Manganese,	0.52	" Oxide of Magnesia,	0.53
" Alumina,	0.45	" Alumina,	1.82
" Carbonate of Lime,	2.44	" Carbonate of Lime,	0.89
" Carbonate of Magnesia,	0.98	" Carbonate of Magnesia,	0.23
" Phosphoric Acid,	0.22	" Sulphuric Acid,	0.31
" Sulphur,	0.29	" Silica,	Trace.
" Titanic Acid,	Trace.	" Silica,	32.14
" Silica,	19.43		100.00
	100.00	" EQUAL TO METALLIC IRON,	45.96

" EQUAL TO METALLIC IRON, 45.96
" This is an excellent Red Iron Ore, containing fully 75 per cent. of the Oxide of Iron, principally the Red Oxide, and is capable of yielding 54½ per cent. of Metallic Iron."

No. 3. The Rich Specular Iron Ore

consists of a network of fissure veins running through quartzites and slates, and is stated by Dr. Dawson to be of great extent and value. The rocks appear to be much shattered, and the Specular Iron, with granular quartz as a veinstone, appears to fill the fissures, which are sometimes "so numerous," to use the words of Mr. EDWARD HARTLEY, in his GEOLOGICAL SURVEY REPORT, "that the entire bed of rock contains a large

contains a large per centage of the Ore, and may be considered as a **SINGLE DEPOSIT.**" Dr. Dawson describes it as "a vein traversing a slaty Rock, and showing a thickness of AT LEAST TWELVE FEET of dense Specular Ores intermixed with fragments of the enclosing Rock, but the Ore LARGELY PREDOMINATING, AND, IN A CONSIDERABLE PORTION OF THE VEIN, ALTOGETHER PURE. At another place, 300 yards distant on the line of strike, a thickness of EIGHT FEET of VERY PURE Ore was seen *without exposing the walls.*" A sample of *the mixed Ore and Veinstone*, selected by Mr. HARTLEY as appearing to represent the average of what might be mined, gave on analysis:—

"Sesquioxide of Iron,	...	...	...	...	65.14
"Silica,	...	...	...	...	32.50
"Hygroscope Moisture,	...	...	...	...	.91
...	...	...	...	...	98.50
...	...	...	...	...	45.60 per cent.
...	...	...	...	...	4.007
"ANOTHER OF METALLIC IRON,	...	...	...	...	...
"Specular Gravity,	...	...	...	...	...
"Oxide of Iron,	...	...	...	...	69.08
"Oxide of Manganese,	...	...	...	...	1.22
"Equal to Metallic Iron,	...	...	...	...	48.35

"A rich specular Iron Ore, capable of yielding 48½ per cent. of Metallic Iron."

The following is an analysis by Dr. THORPE of samples selected from this deposit by Dr. DAWSON:—

Dr. DAWSON states, from his recent examination of the locality, that this deposit has been traced on property of the Company for 500 yards, and that surface indications show that the vein extends quite across THE AREA OF ONE SQUARE MILE, APPARENTLY WITHOUT DISTURBANCE, and indications of its continuation have also been observed in the country to the westward for about TEN MILES. Under Dr. DAWSON'S advice, rights of search over this additional territory have been secured, with the view of acquiring the entire extension of the Deposit of this Ore, which is well known to be of high value and of increasing importance, as especially adapted for the manufacture of the best kinds of Wrought Iron and Steel.

No. 4. The Deposit of Crystalline Brown Haematite Ore or Limonite

Hes in the areas marked No. 4, which have an aggregate extent of OVER 10 SQUARE MILES, and will be the source of AN UNLIMITED SUPPLY OF BESSEMER PIG, of which the limits of supply have apparently been reached in England. The Deposits of this Ore are stated by Mr. HARTLEY to be MOST VALUABLE, as "THE ORE IS ONE OF THE PUREST KNOWN." The Ore contains 59 PER CENT. OF METALLIC IRON, and, according to Principal Dawson, is "FREE FROM ALL INJURIOUS IMPURITIES." The full extent of the Deposit downwards has not yet been explored, but Mr. HARTLEY states that, in the only exploration which he was able to make, "a shallow pit sunk in a few hours by one man was sufficient to expose a MASS EIGHT FEET IN THICKNESS, of a PURE LIMONITE of the mammillary, stalactitic, and fibrous varieties, and conformable to the stratification. The bottom of the bed was not exposed. No substance save THE PURE MINERAL was discovered in the bed, the roof appearing well defined." Dr. Dawson confirms Mr. HARTLEY'S statement of the thickness of the Deposit, and states farther that "the deposit extends THROUGHOUT THE AREAS COVERED BY THE MINING RIGHTS REFERRED TO," &c. the two areas marked No. 4. Dr. Dawson has also advised the acquisition of ANOTHER AREA OF ONE SQUARE MILE, so as to include as much as possible of the extent of this very valuable vein, and of its most productive portions. The following analysis is of an average specimen taken by Mr. HARTLEY, who adds that "it will be observed that the silicious residue does not equal half of one per cent.":—

"Sesquioxide of Iron,	...	...	...	...	84.94
"Combined Water,	...	...	...	...	15.43
"Hygroscope Moisture,	...	...	...	...	.92
"Silica (Insoluble residue),	...	...	...	...	.41
...	...	...	...	...	101.70

ANOTHER OF METALLIC IRON, ... 5.9.46 percent."

The following is Dr. THORPE'S analysis of samples of this Ore selected by Dr. DAWSON, viz:—

"Protoxide of Iron,	...	...	...	...	83.59
"Manganese Oxide,	...	...	...	...	1.04
"Sulphur,	...	...	...	...	0.04
"Phosphorus,	...	...	...	...	0.81
"Alumina,	...	...	...	...	4.32
"Lime,	...	...	...	...	11.05
"Magnesia,	...	...	...	...	100.85
"Silica,	...	...	...	...	58.51
"Loss on Ignition,	...	...	...	...	...

Equal to Metallic Iron, ... "higher than those given in the Analysis. AND, THESE ORES ARE OF A HIGH CLASS."

Another Analysis by Dr. STEVENSON MACADAM SHOWS:—

Dr. THORPE adds to his Analysis the following note:—"These Ores are of exceedingly good quality; that marked No. 4 is especially fine. All the samples were PERFECTLY FREE FROM PHOSPHORUS, and two only contained Sulphur, but in VERY MINUTE QUANTITY. SUCH ORES ARE ADAPTED TO THE PRODUCTION OF THE FINEST QUALITY OF IRON." Signed, T. E. THORPE.

From the analyses of the Ores it is obvious that they can be reduced with the greatest facility and cheapness, and that every one of them will yield a manufactured product of the very best quality. While the deposits of Limonite, Specular, and Spathic Ores furnish a material unsurpassed for Steel and the finest qualities of Iron, the great bed of Red Haematite may be looked upon as the source of an illimitable supply of the best foundry pig.

The whole of these ores lie so near the surface that they may be won either by open cast or adit levels, or by shafts of a few fathoms in depth. The drainage is perfect in areas No. 2, 3, and 4, and will require no machinery. In 100 l some draining apparatus will be required.

Another speciality—unique in Canada, and giving peculiar value to this great Iron-field, is that there exists, almost alongside of these deposits of iron, an abundant supply of coal. It is well known that owing to the want of coal nearly the whole of the iron made in Canada, and throughout a large portion of the United States, is reduced by the use of Wood or Peat Charcoal in Bloomary and Calabar forges. But so great is the superiority of Coal as a fuel that the Archæa Iron Works, of which the situation is given on the accompanying Map, find it to their advantage to bring Coal from the Picton Coal-field to their furnaces over 60 miles of Railway.

The GREAT COAL-FIELD OF PICTON, already mentioned, lies in the neighbourhood of these Iron Deposits, and is inexhaustible in its supplies of a fuel remarkably suited, in heating and colking qualities, and in freedom from sulphur, for Iron-smelting. Its extent may be roughly estimated at 20 square miles of uninterrupted Coal-bearing ground. From the copious REPORTS OF THE GEOLOGICAL SURVEY OF CANADA, it appears that the ALBION COLLIERIES alone, belonging to the GENERAL MINING ASSOCIATION OF LONDON AND NOVA SCOTIA (CAPITAL, £535,000), are at present equal to an output of over 3000 tons a day—their DAHOUSTE Main Seam being over 36 feet in thickness, of which 28 feet is "excellent marketable coal," while their Deep Seam consists of 20 feet of "most excellent coal," all worked. The ACADEIA COAL COMPANY'S Seams present respectively 7, 8, and 14 feet thicknesses of good coal; the INTERCOLONIAL COAL COMPANY'S Drummond Seam, over 16 feet thickness of good coal; the NOVA SCOTIA COAL COMPANY'S Seams, 9 and 14 feet thickness; and the MONTREAL AND PICTON COAL COMPANY'S Seams, a thickness of from 17 to 19 feet. There are other collieries being opened up in the immediate neighbourhood of the workings of these great companies. The whole of this great Coal-bearing area is connected by Railways with the Provincial Railway System. The pits are all fitted in the highest style of efficiency. The Area No. 1., containing the Deposits of Sparry Iron Ore, above mentioned, is also situated in the neighbourhood of the MACLEAN COLLIERY, the seams of which will furnish, for centuries, a supply of good and cheap fuel. The MACLEAN Seams are respectively of the thickness of 8 feet 6 inches; 6 feet 6 inches; 4 feet; 3 feet 6 inches; 3 feet 8 inches; 1 foot 8 inches; 13 feet; and there are three other seams underlying the 8 feet 6 inches seam.

The Coals of the Picton field have been ascertained by numerous analyses and experiments, all elaborately detailed in the Geological Survey Reports, to be REGULARLY FREE FROM SULPHUR. Several of the richest seams present to the ordinary tests indications of ABSOLUTE FREEDOM FROM SULPHUR. The Sulphur-content of the numerous different Coals examined by Mr. HARTLEY, and the other officials of the GEOLOGICAL SURVEY is in most cases very considerably below 1.00 per cent., while numerous analyses show that in the best coals of Wales, Lanca-shire, and Scotland, the sulphur is from 1.42 to 1.45 per cent. Mr. HARTLEY states that "the greater number of the coals of this district will, I believe, COMPARE FAVOURABLY WITH THOSE OF ANY DISTRICT OF THE WORLD IN REGARD TO SULPHUR." (Geol. Survey Report, p. 177.) Most of them also yield COKE of most excellent quality.

LIMESTONE and BUILDING STONE abound in the vicinity of the Iron Ore deposits, and MILSTONE Grit Sandstones of the best quality for furnace hearths.

There are also beds of Clayband Ironstone: in the coal measures, which might, if necessary, become sources of additional supply of Ore, suitable for tempering the richness and strength of the Company's own Ores, and enabling the Company still further to vary the production of Iron for special purposes.

In accordance with the advice of persons of experience in Canada, it has been determined, in the meantime at least, to rely, as may be confidently and safely done, on the competition of these numerous Coal Companies for a cheap and abundant supply of fuel, instead of burdening the Company with the purchase and working of a Coal Field of its own. But arrangements have been made under which the Directors will be able, if they should think it advisable, to acquire an adequate Coal Field on reasonable terms.

The Iron, in all, or nearly all, the Ores in the areas above described, is capable, from the purity of the Ores, of being extracted at once in the form of Malleable Iron, by calcination and heating with wood charcoal without the use of coal and limestone, and this method of treatment, followed in Vermont, New Jersey, and New York with similar Ores, may be found worthy of adoption, to some extent by this Company, for producing particular kinds of very high-class iron.

WOOD FOR CHARCOAL MAKING is in Nova Scotia both abundant and cheap.

The County of Picton is one of the most populous in Nova Scotia, about seven or eight days' sail from Liverpool. The population is chiefly of Scotch descent, laborious, thrifty, and peaceful. The province is already the seat of considerable mining industries, and presents great facilities for obtaining skilled labour and machinery. It is proposed to erect in the immediate neighbourhood of the town of NEW GLASGOW, where coal and labour are cheaper than in this country, and of the great ALBION COLLIERIES, the sites of which are indicated on the Map, *Five Blast Furnaces*, to which the Iron Ore will be brought from the Shafts by extensions of the system of Railway Communication already in existence on the field.

It is estimated that the Blast Furnaces, with appurtenants complete, will cost £20,000 each, or £100,000. The extraordinary richness of the Ores will admit of their shipment to England or the neighbouring States of America, where there is an unlimited Market for such Ores for admixture.

[DRAFT PROSPECTUS.]

The Pictou Iron Company (Limited),

DOMINION OF CANADA.

PROSPECTUS.

THIS COMPANY is formed for the purpose of acquiring and developing certain deposits of Iron Ores in the County of Pictou, Nova Scotia, held under Mining Rights and Leases, from the Government of Nova Scotia, for a term of 21 years, renewable for *two* three further periods of 20 years each, subject to a nominal royalty of 3 cents ($1\frac{1}{2}$ d.) per ton of Iron, the whole embracing an area exceeding 30 square miles.

These Ores are of great value from their quantity, variety, richness, accessibility, and proximity to large deposits of Coal now being extensively worked. The coals of the Pictou Mines, as described in the Government Geological Reports, are peculiarly free from sulphur. Several of the richest seams are practically free from sulphur.

The Nova Scotia Government Railway from Halifax to Pictou Harbour crosses the property, and connects with the railway system of Canada, *and* with that of the United States. The harbour of Pictou, where Atlantic steamers take in coal, is 24 miles distant, and Halifax Harbour, open all the year, is 89 miles distant by rail.

The Iron and Coal Fields of Pictou are described in the Reports to Government by Sir William Logan, F.R.S., F.G.S., late Director of the Geological Survey of Canada.

They have been more recently visited and reported on for this Company, by Dr. J. W. Dawson, F.R.S., F.G.S., Principal of the University, Montreal, and by Mr. G. M. Dawson, Associate of the Royal School of Mines, London.*

These Reports have been submitted to David Forbes, Esq., F.R.S., Member of the Council of the Institute of Civil Engineers, who states that this Property possesses all the elements of success.

The Iron Ore deposits, which Dr. Dawson states to be the most valuable at present known on the Eastern coast of North America, consist of—

1. Red Hematite, 10 to 30 feet in thickness, containing 50 per cent. of Metallic Iron.
2. Specular Iron Ore, 10 to 20 feet thick, containing 60 to 68 per cent. of Metallic Iron.
3. Brown Hematite, 15 feet thick, giving 62 to 65 per cent. of Metallic Iron.

* The statements contained in these Reports have been more than verified during the past summer, by an independent examination of the property made by two competent authorities, (whose Reports are annexed), at the instance of Mr. Richard Potter, Mr. E. W. Barnett, M.P., and other gentlemen, who propose to join this undertaking.

Careful and complete assays have been made by Dr. Stevenson Macadam, F.R.S.E., Professor of Chemistry, Edinburgh, and by Dr. T. E. Thorpe, F.R.S.E., Professor of Chemistry, and Public Analyst for the City of Glasgow. Other analyses are to be found in the Government of Canada Official Reports.

The supply of these Ores, which are remarkably *free from Sulphur and Phosphorus* is practically inexhaustible. Dr. Dawson estimates the quantity of Ore to be won at a depth of 200 feet only, which can scarcely be called mining, to be not less than nine millions of tons.

The quantity already *proved*, is estimated at two millions of tons, or sufficient to supply three furnaces for thirty years, reckoning the requirements of each furnace at 700,000 tons of Ore.

The Ores crop out on the surface, and are in most instances from 200 to 400 feet *above drainage level*, thus saving the cost of artificial drainage; and admitting of their being won by open-cast workings. Mr. G. M. Dawson estimates the cost of raising the Ore at 80 cents to 1 dollar, or 4s. per ton.

The price of coal in Pictou is 10s. per ton of 2,240 lbs. Small coal for coking is 4s. to 5s. per ton. Many of the coal seams make an excellent hard coke, which can be supplied in any quantity.

Wood for purposes of construction, and for charcoal-making, is abundant and cheap. Limestone is abundant in the vicinity, and is quarried and sold for 1s. 8d. per ton. Excellent Fire-bricks are manufactured in the neighbourhood.

The County of Pictou, being one of the most populous in Nova Scotia, and already the seat of considerable mining industries, presents great facilities for obtaining skilled labour, machinery, and supplies; labour ranges from 4s. to 6s. per diem.

There is a large and growing market in Canada for Iron of all descriptions, there being many Railways in course of construction, and to be built, including the Pacific Railway through British Territory, for which the Parliament of Canada have voted large land grants, and thirty millions of dollars, including an Imperial guarantee. The total value of the exports of Pig Iron and Manufactured Iron from ports in the United Kingdom to Canada during 1872 amounted to over £2,400,000. There is also a large importation of Iron and Rails from the United States.

The high character of Nova Scotia Iron is well known in England, and is thus described by Sir Wm. Fairbairn in his "History of Iron:"—"In Nova Scotia some of the richest ores yet discovered, occur in exhaustless abundance. The Iron manufactured from them is of the very best quality, and is equal to the finest Swedish metal. Several specimens have been submitted to direct experiment, and the results prove its high powers of resistance to strain, durability, and the adaptation to all those processes by which the finest description of Iron and Steel are manufactured."

From the richness of the Ores of Nova Scotia, and the abundance and cheapness of fuel, coal, coke, and charcoal, it is confidently asserted that the highest class of Iron can be manufactured for less than the cost of ordinary English Pig Iron.

The cost of producing Bessemer Pig Iron in Nova Scotia will not exceed £3 10s. per ton. In this estimate an allowance of 50 per cent. over actual cost is made for contingencies. The cost of shipping to England is about 25s. per ton. The Canadian Market, however, will absorb more than this Company can make for many years to come.

The present price in England is £8 10s. per ton, and the price of ordinary Pig Iron in Canada is about £9 to £10 per ton; in the United States the price is £12 sterling per ton.

Estimated cost of making a ton of Hematite Pig Iron in Pictou :—

	£	s.	d.
2 Tons of Ore, at 4s. per ton	0	8	0
30 Cwts. of Coke	0	18	0
10 Cwts. of Limestone	0	2	0
Labour	0	6	0
Wear and Tear and Interest	0	8	6
General Management and other Charges	0	4	0
	£2	6	0
To which add 50 per cent. for Contingencies	1	3	0
	£3	9	0

Say £3 10s. sterling per ton. Present price in Canada, £9 to £9 10s.

Present price of No. 1 Hematite Pig Iron in England, £8 10s. to £9.

“ “ “ United States, £12.

The cost delivered in New York or Boston would be as follows :—

	£	s.	d.
Pig Iron at Pictou	3	10	0
Freight to New York	0	12	0
Insurance	0	4	0
Duty	1	0	0
	£5	6	0
Present price in New York	12	0	0
Profit per Ton	£6	14	0

The margin of profit in the most distant Canadian markets would be about £5 6s. per ton.

It is intended to erect three Blast Furnaces, fitted for an output of 300 to 400 tons each per week, which, with all appurtenances complete, may be estimated to cost £75,000; and it will be seen from the costs and prices as detailed above, that a very moderate profit

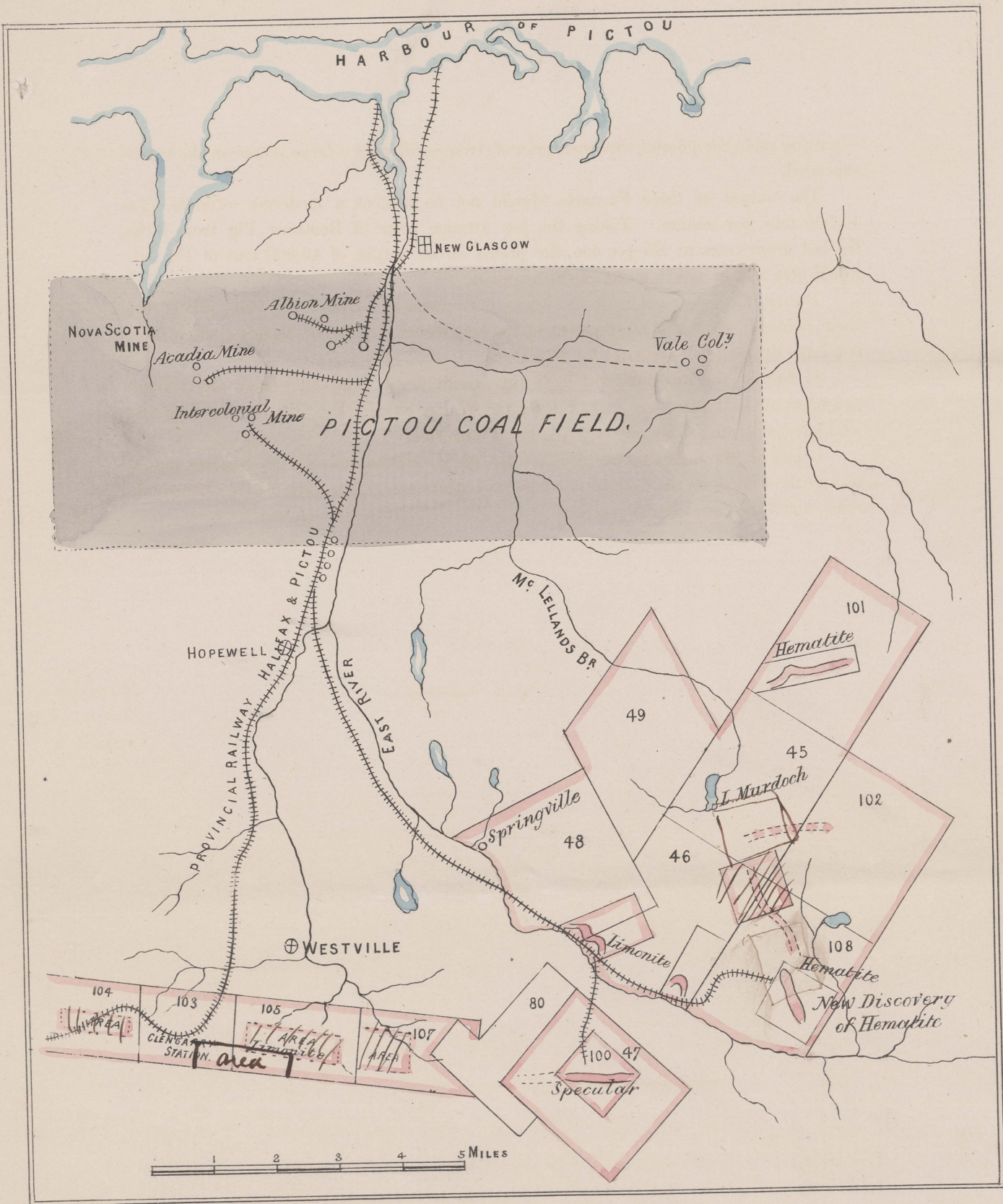
—putting aside the present abnormal price of Iron—will yield a large return on the capital expended.

The output of three Furnaces should not be less, at a moderate estimate, than 40,000 tons per annum. Taking the low average price of Bessemer Pig Iron during the last seven years at £5 per ton, the profits on an output of 40,000 tons of Pig Iron would give a large return on its capital required.

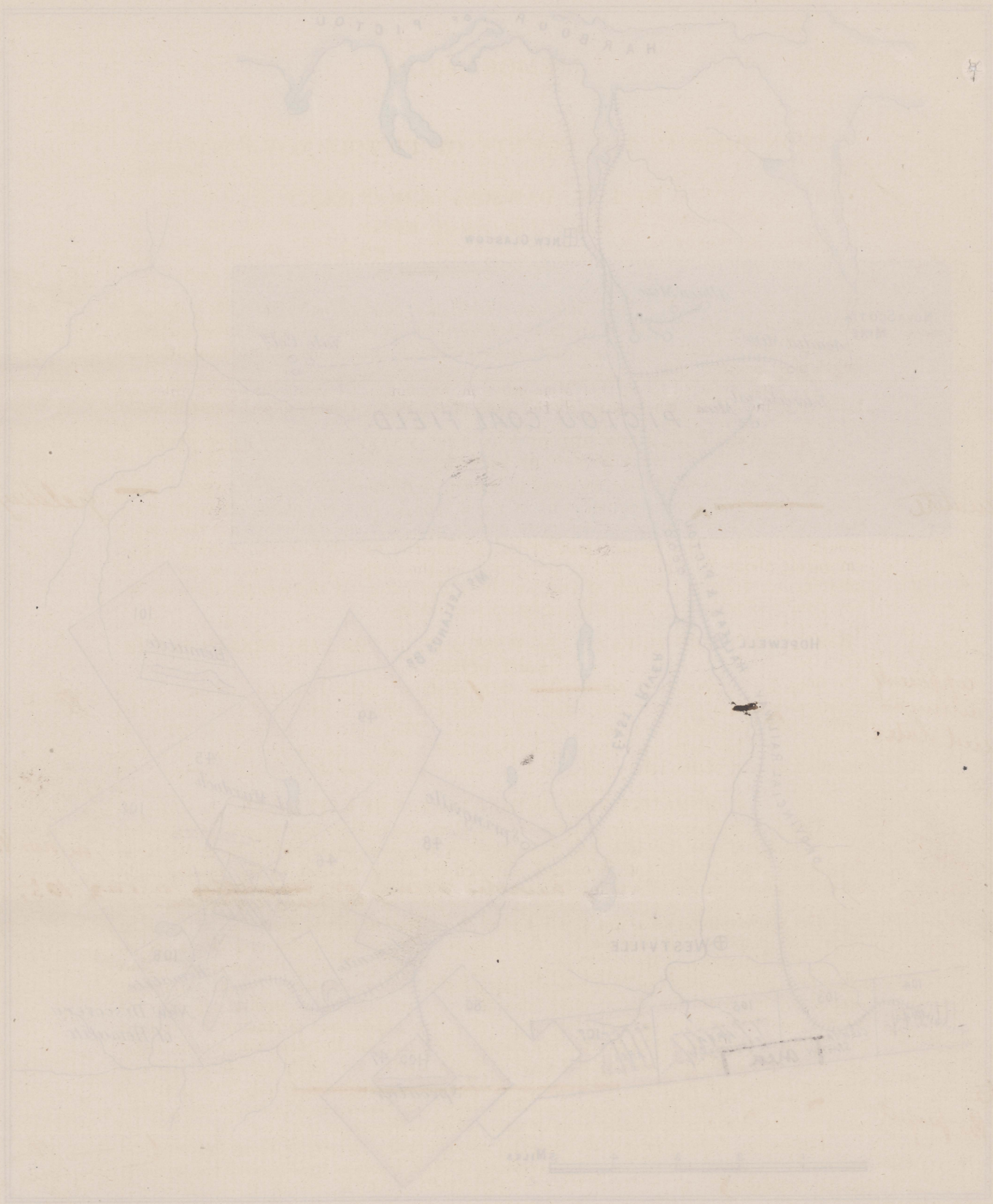
During the construction of the works it is proposed to raise the Ores, which, from their richness, will admit of shipment to the neighbouring states of America, where there is a large demand for such Ores for admixture.

If desired, the Directors will have the benefit of the local knowledge and valuable assistance of J. W. Dawson, Esq., F.R.S., and Walter Shanly, Esq., the eminent Engineer, who have consented to act on the Executive Committee.

Copies of the Memorandum and Articles of Association and original Reports, may be seen at the Offices of the Company, where also specimens of the Ores, Coals, Coke, Limestone, and Fire-clays may be inspected.



PLAN
 SHEWING THE RELATIVE POSITIONS OF THE
 PICTOU COAL & IRON FIELDS.



PLAN
 SHOWING THE RELATIVE POSITIONS OF THE
 PICTOU COAL & IRON FIELDS

MEMORANDUM

ON

IRON ORES IN THE COUNTY OF PICTOU, NOVA SCOTIA,

By J. W. DAWSON, LL.D., F.R.S.,

Principal of the University, Montreal.

THESE Ores, from their variety, richness, accessibility, and proximity to large deposits of coal already extensively worked, are in my opinion the most valuable at present known on the Eastern Coast of North America, though up to this time they have not attracted the attention which they merit.

The areas referred to in this Memorandum, amounting to about 30 square miles, are believed to include the whole or nearly the whole of the Pictou County deposits, as follows:—

1.—THE GREAT IRON ORE BED OF THE EAST BRANCH OF THE EAST RIVER OF PICTOU.

This is a conformable bed, included in the Upper Silurian slates. It consists of ~~Iron~~ *Wematite* Red Oxide of Iron, 40 to 54 per cent. of metal, and is in some places about 30 ft. in thickness. It has been *proved* for more than a mile, and no doubt extends for a much greater distance. The greater part of its extension is included in the mining claims, embracing about 20 square miles, and shown on the map. This deposit is capable of affording an unlimited supply of Ore, and from the nature of the country there are the best facilities for opening it by adits or by open workings. *yielding*

2.—SPECULAR IRON VEINS ON THE WEST SIDE OF THE EAST BRANCH OF THE EAST RIVER.

This deposit consists of a ~~network~~ *an apparently continuous and slate* of veins of rich Specular Iron Ore running through quartz rock, and is of great extent and value, and will afford a quality of Ore adapted for making the best kinds of wrought iron and steel. The deposit is from 10 to 20 ft. in thickness, and has been proved for more than half a mile. Average samples taken from the thickest part of the vein yielded on an analysis 64 to 68 per cent. of metallic iron. *It*

3.—HEMATITE VEIN OF EAST BRANCH OF EAST RIVER.

This is a thick vein of Crystalline Brown Hematite or Limonite capable of affording 59 per cent. of metallic iron and free from all injurious impurities. It is 15 ft. in thickness where exposed, and it extends through the area covered by the mining right for about three-quarters of a mile, *border occurs on the other area 105,*

The above mining areas are situated near to each other and to the valley of the East River, and about 10 miles distant from the extensive collieries of the General Mining Association, the Intercolonial Mining Company, and the Acadian Mining Company, as well as other deposits of coal in the Pictou Coal-field, not yet opened on so large a scale. Abundant supplies of fuel could thus be obtained at a moderate price and of a quality well adapted for the manufacture of iron, being remarkably *free from sulphur* and producing an excellent coke (present prices are from 9s. to 10s. sterling per ton for the best bituminous coal). The intervening country already has good common roads; the main provincial Railway between Pictou and Halifax, *which crosses the property at one point,* is only 8 miles distant from its centre; there are no engineering difficulties to be encountered in constructing tramways to connect the more remote parts of this extensive Property. *the of the property*

Limestone, building stone, and fire-clay abound in the vicinity of these deposits (and fire-bricks manufactured in the neighbourhood of New Glasgow were considered to be of excellent quality.) *on two hills*

This is an extract from G. M. D.'s Report & has no bearing here

The County of Pictou being one of the most populous in Nova Scotia, and already the seat of considerable mining industries, presents great facilities for obtaining skilled labour, machinery, and supplies of fuel. Wood for purposes of construction, as well as for charcoal-making, is abundant and cheap. The Harbour of Pictou and the Railway to Halifax, afford ample means of shipment.

Additional information as to the above deposits, and also as to the extent and quality of the Pictou coal, may be obtained in the Report of the Geological Survey of Canada for 1869, and in the writer's "Acadian Geology."

J. W. DAWSON.

Montreal, November 1872.

The foregoing Memorandum has been supplemented by a Report of subsequent examinations, and explorations of an extensive character, corroborative of Dr. Dawson's views, and *proving* the same by actual work done during the past summer. This Report, made up to 8th November last, is by George M. Dawson, of the Royal School of Mines, London.

From the great extent of outcrop already proved, Dr. Dawson estimates the quantity, at a depth of 200 ft. only, to be not less than ten millions of tons.

The quantity *proved* is not less than 2,000,000 tons, or sufficient for the supply of three blast furnaces for 30 years.

The principal Iron deposits are situated 200 to 450 ft. above drainage level.

The Mining Rights have been extended for many miles under Dr. Dawson's guidance, so as to embrace the greatest extent of outcrop, and it is confidently asserted by this gentleman that "the whole, or nearly the whole, of the Pictou County deposits" are included in this Property.

The various mining properties to which the proposed Company will obtain right, includes rights of search and licenses for mining, acquired from the Government of Nova Scotia under the Mining Law of that Province, the whole extending to over 40 square miles. A nominal Royalty of 3 cents. ($1\frac{1}{2}$) on the ton of *Iron* is payable to the Government. But even this small charge is likely to be abolished by the Government, who are anxious to encourage the development of this the most important mining industry in Canada.

There is a large and growing market in the Dominion of Canada, independent of tariffs; the high quality of the Iron, however, will permit of its export to Europe, America, and, at current prices, even to England; but the Canadian market will quickly absorb a much greater quantity than it is proposed to make at present.

The requirements of Canada for Railway Iron, already large, must be much increased, there being many new Railways in course of construction, and others contracted for and to be commenced next summer, including the Pacific Railway, for which the necessary money has been voted.

The price of ordinary Pig Iron in Canada has ranged from 30 to 40 dollars for some time past. The cost of producing Iron in Pictou of a high class, or say Bessemer Pig, will not exceed 15 dollars or £3 10s. sterling. In making this estimate a very large margin has been allowed for contingencies. The detailed cost is appended,—also analyses, in detail, by Dr. Stevenson Macadam, F.R.S.E., Professor of Chemistry, Edinburgh, and by Dr. Thorpe of the Andersonian University, Public Analyst for the City of Glasgow.

David Forbes, Esq., F.R.S., 11, York Place, Portman Square, London, has examined the various reports and estimates in connection with these iron fields, which possess, as he states, all the elements of success, and cannot fail, under judicious management, to prove very profitable.

Sir William Fairbairn, in his History of Iron, says, "In Nova Scotia some of the richest Ores yet discovered occur in ~~exhaustible~~ abundance. The Iron manufactured from them

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The areas referred to in this Memorandum, amounting to about 30 square miles, are believed to include the whole or nearly the whole of the Pictou County deposits, as follows:—

1.—THE SUTHERLAND'S RIVER DEPOSIT.

This is a bed or vein of Crystalline Carbonate and Red Oxide of Iron, from 11 to 14 ft. in thickness, and included in the sandstones of the Millstone Grit formation. From analysis by Dr. T. Sterry Hunt, published in the Report of the Geological Survey of Canada for 1869, it appears that the Ore contains 42 to 43 per cent. of Iron, and is of a quality likely to prove specially adapted to the manufacture of steel. In connection with this I may state that it contains about 8 per cent. of Carbonate of Manganese. The locality is only four miles distant from the rich and valuable coal seams of the "MacBean area," now being opened up and connected with navigation in Pictou Harbour, and with the other coal mines on the East River of Pictou by a Railway.

2.—THE GREAT IRON ORE BED OF THE EAST BRANCH OF THE EAST RIVER OF PICTOU.

This is a conformable bed, included in the Upper Silurian slates. It consists of dense Red Oxide of Iron, 40 to 54 per cent. of metal, and is in some places about 30 ft. in thickness. It has been *proved* for more than a mile, and no doubt extends for a much greater distance. The greater part of its extension is included in the mining claims, embracing about 20 square miles, and shown on the map. This deposit is capable of affording an unlimited supply of Ore, and from the nature of the country there are the best facilities for opening it by adits or by open workings.

3.—SPECULAR IRON VEINS ON THE WEST SIDE OF THE EAST BRANCH OF THE EAST RIVER.

This deposit consists of a network of veins of rich Specular Iron Ore running through quartz rock, and is of great extent and value, and will afford a quality of Ore adapted for making the best kinds of wrought iron and steel. The deposit is from 10 to 20 ft. in thickness, and has been proved for more than half a mile. Average samples taken from the thickest part of the vein yielded on an analysis 64 to 68 per cent. of metallic iron.

4.—HEMATITE VEIN OF EAST BRANCH OF EAST RIVER.

This is a thick vein of Crystalline Brown Hematite or Limonite, capable of affording 59 per cent. of metallic iron and free from all injurious impurities. It is 15 ft. in thickness where exposed, and it extends through the areas covered by the mining right for about three-quarters of a mile.

The above mining areas are situated near to each other and to the valley of the East River, and about 10 miles distant from the extensive collieries of the General Mining Association, the Intercolonial Mining Company, and the Acadian Mining Company, as well as other deposits of coal in the Pictou Coal-field, not yet opened on so large a scale. Abundant supplies of fuel could thus be obtained at a moderate price and of a quality well adapted for the manufacture of iron, being remarkably *free from sulphur* and producing an excellent coke (present prices are from 9s. to 10s. sterling per ton for the best bituminous coal). The intervening country already has good common roads; the main provincial Railway between Pictou and Halifax, which crosses the property at one point, is only 8 miles distant from its centre; there are no engineering difficulties to be encountered in constructing tramways to connect the more remote parts of this extensive Property.

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From the great extent of outcrop already proved, Dr. Dawson estimates the quantity, at a depth of 200 ft. only, to be not less than ten millions of tons.

The quantity *proved* is not less than 2,000,000 tons, or sufficient for the supply of three blast furnaces for 30 years.

The principal Iron deposits are situated 200 to 450 ft. above drainage level.

The Mining Rights have been extended for many miles under Dr. Dawson's guidance, so as to embrace the greatest extent of outcrop, and as these deposits lie at a high angle, it is confidently asserted by this gentleman that "the whole, or nearly the whole, of the Pictou County deposits" are included in this Property.

The various mining properties to which the proposed Company will obtain right, includes rights of search and licenses for mining, acquired from the Government of Nova Scotia under the Mining Law of that Province; and, in cases where mineral rights had not been reserved by the Crown, deeds of sale have been obtained from the proprietors, the whole extending to over 40 square miles. In the latter case there is no Royalty, and in the former, a nominal Royalty of 3 cent. ($1\frac{1}{2}$) on the ton of *Iron*. But even this small charge is likely to be abolished by the Government, who are anxious to encourage the development of this the most important mining industry in Canada.

There is a large and growing market in the Dominion of Canada, independent of tariffs; the high quality of the Iron, however, will permit of its export to Europe, America, and, at current prices, even to England; but the Canadian market will quickly absorb a much greater quantity than it is proposed to make at present.

The requirements of Canada for Railway Iron, already large, must be much increased,

there being many new Railways in course of construction, and others contracted for and to be commenced next summer, including the Pacific Railway, for which the necessary money has been voted.

The price of ordinary Pig Iron in Canada has ranged from 30 to 40 dollars for some time past. The cost of producing Iron in Pictou of a high class, or say Bessemer Pig, will not exceed 15 dollars or £3 10s. sterling. In making this estimate a very large margin has been allowed for contingencies. The detailed cost is appended,—also analyses, in detail, by Dr. Stevenson Macadam, F.R.S.E., Professor of Chemistry, Edinburgh, and by Dr. Thorpe of the Andersonian University, Public Analyst for the City of Glasgow.

David Forbes, Esq., F.R.S., 11, York Place, Portman Square, London, has examined the various reports and estimates in connection with these iron fields, which possess, as he states, all the elements of success, and cannot fail, under judicious management, to prove very profitable.

Sir William Fairbairn, in his History of Iron, says, "In Nova Scotia some of the richest Ores yet discovered occur in exhaustible abundance. The Iron manufactured from them is of the very best quality, and is equal to the finest Swedish metal. Several specimens have been submitted to direct experiment, and the results prove its *high* powers of resistance to strain, durability, and the adaptation to all these processes by which the finest description of Iron and Steel are manufactured."

Should it be desired to have an Executive Committee in Canada, Principal Dawson and Walter Shanly, Esq., the eminent Engineer, have consented to give their services. The large interests retained by the proprietors is a guarantee for the careful and economical management of the Company's affairs in Pictou, where, subject to arrangement, they will reside and devote their time exclusively to the interests of the Company.

The whole Reports, with maps and plans, together with specimens of the ores, coals, coke, limestone and fire clay, can be seen on application to

LONDON, 19th March. 1873.

APPENDIX 1.

The cost of coal, as stated above, is 10s. per ton. Small coal for coking can be purchased for say 4s. per ton. Limestone is *retailed* in Pictou to the farmers at 40 cents (say 1s. 8d. sterling) per ton. Fire clays are abundant and suitable for making bricks. Labour ranges from 4s. to 5s. sterling per day.

Estimated cost of making a ton of Hematite Pig Iron in Pictou:—

	£	s.	d.
2 Tons of Ore, at 4s. per ton - - - - -	0	8	0
30 Cwts. of Coke - - - - -	0	18	0
10 Cwts. of Limestone - - - - -	0	2	0
Labour - - - - -	0	6	0
Wear and Tear and Interest - - - - -	0	8	6
General Management and other charges - - - - -	0	4	0
	£2	6	0
To which add 50 per cent. for Contingencies - - - - -	1	3	0
	£3	9	0

Say £3 10s. sterling per ton. Present price in Canada, £9 to £9 10s.

Present price of No. 1 Hematite Pig Iron in England, £8 10s. to £9.

United States, £12.

The cost delivered in New York or Boston would be as follows :—

	£	s.	d.
Pig Iron at Pictou - - - - -	3	10	0
Freight to New York - - - - -	0	12	0
Insurance - - - - -	0	4	0
Duty - - - - -	1	0	0
	<hr/>		
	5	6	0
Present price in New York—say - - - - -	12	0	0
	<hr/>		
Profit per ton - - - - -	£6	14	0

The margin of profit in the most distant Canadian markets would be about £5 6s. per ton.

The output of three furnaces, considering the richness of the ores, should not be less than 40,000 tons per annum of the highest class of Pig Iron, and it will be seen that a very moderate profit thereon would yield a large dividend on the capital employed.

In accordance with the advice of persons of experience in Nova Scotia, it has been determined in the meantime to rely on the competition of the numerous Coal Companies for a cheap and abundant supply of fuel, instead of burdening the Company with the purchase and working of a coal-field of its own; but if it is thought advisable to do so, arrangements have been made to acquire an adequate coal-field on reasonable terms.

APPENDIX 2.

ANALYSES OF PICTOU IRON ORES,

By DR. STEVENSON MACADAM.

*Analytical Laboratory,
Surgeons' Hall,
Edinburgh, 14th December, 1872.*

ANALYSIS OF HEMATITE ORE,

Received in enclosed box, signed on the lid "J. W. Dawson."

*Oxides of Iron - - - - -	75.67
Oxide of Manganese - - - - -	0.52
Alumina - - - - -	0.45
Carbonate of Lime - - - - -	2.44
Carbonate of Magnesia - - - - -	0.98
Phosphoric Acid - - - - -	0.22
Sulphur - - - - -	0.29
Titanic Acid - - - - -	trace.
Silica - - - - -	19.43
	<hr/>
	100.00

* Equal to Metallic Iron, 54.36.

An excellent Red Iron Ore, containing fully 75 per cent. of the Oxides of Iron, prin-

cipally the Red Oxide, and capable of yielding $54\frac{1}{2}$ per cent. of Metallic Iron. High Class Ore.

ANALYSIS OF SPATHIC ORE.

*Iron, Carbonate	-	-	-	-	-	-	88.48
Manganese, Carbonate	-	-	-	-	-	-	1.85
Lime, Carbonate	-	-	-	-	-	-	2.34
Magnesia, Carbonate	-	-	-	-	-	-	5.82
Silica	-	-	-	-	-	-	1.51
							<hr/>
							100.00
							<hr/>

* Capable of yielding Metallic Iron, 42.71.

This is a first-class Spathic Carbonate or Sparry Iron Ore, being very rich in Carbonate of Iron, with a good Proportion of Carbonate of Manganese, and practically free from impurities. It is of the best quality of the class.

ANALYSIS OF SPECULAR ORE.

*Oxide of Iron	-	-	-	-	-	-	92.01
Oxide of Manganese	-	-	-	-	-	-	2.16
Alumina	-	-	-	-	-	-	0.21
Carbonate of Lime	-	-	-	-	-	-	1.27
Carbonate of Magnesia	-	-	-	-	-	-	0.43
Phosphoric Acid	-	-	-	-	-	-	0.08
Sulphur	-	-	-	-	-	-	0.16
Titanic Acid	-	-	-	-	-	-	trace.
Silica	-	-	-	-	-	-	3.68
							<hr/>
							100.00
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* Equal to Metallic Iron, 64.41.

This is a very fine and rich Specular Iron Ore. It is of the best quality and will undoubtedly yield the finest iron.

ANALYSIS OF LIMONITE ORE.

*Oxide of Iron	-	-	-	-	-	-	88.92
Oxide of Manganese	-	-	-	-	-	-	0.78
Alumina	-	-	-	-	-	-	0.71
Carbonate of Lime	-	-	-	-	-	-	1.44
Carbonate of Magnesia	-	-	-	-	-	-	0.82
Phosphoric Acid	-	-	-	-	-	-	0.34
Sulphur	-	-	-	-	-	-	0.24
Titanic Acid	-	-	-	-	-	-	trace.
Silica	-	-	-	-	-	-	2.14
Moisture	-	-	-	-	-	-	4.61
							<hr/>
							100.00
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* Equal to Metallic Iron, 62.24.

A Crystalline Hematite, containing (88.92) 89 per cent. of Red Oxide of Iron, which is equal to $62\frac{1}{4}$ per cent. of Metallic Iron. There is nearly five per cent. of combined water in this sample, so that the actual proportions of Oxide of Iron and Metallic Iron in the dry Ore are $\frac{1}{20}$ th higher than those given in the analysis. A High Class Ore.

(Signed) STEVENSON MACADAM, Ph. D., F.R.S.E., F.C.S.,
Lecturer in Chemistry.

ANALYSES BY DR. T. E. THORPE.

*Andersonian University, Glasgow,
December 20th, 1872.*

ANALYSIS OF THE RED HEMATITE ORE.

Metallic Iron	-	-	-	-	-	-	43.4
Oxides of Iron	-	-	-	-	-	-	65.26*
Oxide of Manganese	-	-	-	-	-	-	traces.
Sulphur	-	-	-	-	-	-	none.
Phosphorus	-	-	-	-	-	-	none.
Alumina	-	-	-	-	-	-	5.59
Lime	-	-	-	-	-	-	1.88
Magnesia	-	-	-	-	-	-	1.05
Silica	-	-	-	-	-	-	23.68
Loss on ignition	-	-	-	-	-	-	2.54
							<hr/> 100.00

* Containing 9.20 per cent. Protoxide.

ANALYSIS OF SPATHIC IRON ORE.

Carbonate of Iron	-	-	-	-	-	88.59
Carbonate of Manganese	-	-	-	-	-	2.85
Carbonate of Lime	-	-	-	-	-	1.53
Sulphate of Lime	-	-	-	-	-	0.55
Carbonate of Magnesium	-	-	-	-	-	3.48
Insoluble matter	-	-	-	-	-	2.70
						<hr/> 99.70

Metallic Iron=42.76 per cent.

This Ore bears great similarity to the Durham Spathic Carbonate; it contains no Phosphorus, and but a small quantity of Sulphur, as Sulphate of Lime.

ANALYSIS OF THE SPECULAR ORE.

Protoxide of Iron	-	-	-	-	-	-	0.89
Peroxide of Iron	-	-	-	-	-	-	96.63
Sulphide of Iron	-	-	-	-	-	-	0.06
Phosphorus	-	-	-	-	-	-	none.
Silica and Insoluble Matter	-	-	-	-	-	-	3.20
							<hr/>
							100.78
							<hr/>

Per-centage of Metallic Iron=68.33.

This is an exceedingly rich ore, consisting almost entirely of pure Oxide of Iron. It is capable of yielding Iron of the finest quality.

ANALYSIS OF THE LIMONITE ORE.

Peroxide of Iron	-	-	-	-	-	-	93.09
Manganese Oxide	-	-	-	-	-	-	1.10
Ferrous Sulphide	-	-	-	-	-	-	0.04
Phosphorus	-	-	-	-	-	-	none.
Lime	-	-	-	-	-	-	0.91
Insoluble Matter	-	-	-	-	-	-	4.80
							<hr/>
							99.94
							<hr/>

This is one of the finest iron ores. It yields 65.2 per cent. of metal. It should afford iron of great purity.

(Signed) T. E. THORPE, F.R.S.E.,
Professor of Chemistry.

ANALYSIS OF THE SPICULAR ORE

0.88	Protoxide of Iron
98.83	Protoxide of Iron
0.00	Sulphide of Iron
none.	Phosphorus
3.30	Silica and Insoluble Matter
100.78	

Percentage of Metallic Iron = 68.83

This is an exceedingly rich ore, consisting almost entirely of pure Oxide of Iron. It is capable of yielding iron of the finest quality.

*Chas
McMahon
Mre/13*

ANALYSIS OF THE LIMONITE ORE

98.03	Protoxide of Iron
1.10	Manganese Oxide
0.04	Ferrous Sulphide
none.	Phosphorus
0.31	Lime
1.80	Insoluble Matter
99.91	

This is one of the finest iron ores. It yields 65.2 per cent. of metal. It should afford iron of great purity.

T. E. THORPE, F.R.S.E.
Professor of Chemistry

THE PICTOU IRON COMPANY, NOVA SCOTIA.

REPORT OF WALTER SHANLY, ESQ.

NEW GLASGOW, N.S.,

12th May, 1873.

MY DEAR SIR,

I have made a full and careful examination of the several veins or deposits of iron ore specified in the reports of Messrs. Dawson, sent me with your letter of 10th last month.

The exposition and calculable quantity of the several beds described in the reports, are in no respect over-stated.

RED HÆMATITE.—The Red Hæmatite ore, as exposed by natural and artificial openings on the "Webster Farm," situated on the height of land between McLellan's Brook and Sutherland's River, makes a very fine exhibit. The quantity of this ore, even within the secured area (about one square mile), is almost illimitable. Dr. MacAdam, of Edinburgh, calls it a "high class ore," a character fully borne out by external indications. It is a great ore bed, with excellent facilities for being worked to a depth, if necessary, of 300 feet with adit drainage.

LIMONITE.—The Brown Hæmatite, or "Limonite" Ore-bed has been proved on the "Fraser Saddler Farm," in the valley of the East River, six miles in a direct line S. 45° W. from the Red Hæmatite at Webster's. The principal opening made here by Mr. G. M. Dawson uncovers a vein of 17 ft. in width, "of the very best quality of the class" (Dr. MacAdam). It makes a most promising "show," and requires only to be carefully followed, it is my belief, to establish the existence of a vast and continuous deposit of this most valuable ore. The bed is on the east side of East River, and for facilities of access, drainage, and shipment is the most favourably circumstanced of all the several deposits which are the subject of this letter.

SPECULAR ORE.—The area (one mile square) on which openings to prove the Specular ore vein have been made lies on the west side of East River, some 450 ft. above the level of the valley. Three openings, at distances of 900 ft. and 1,086 ft. apart respectively, have been sunk upon the bed, showing a vein of 10·12 and 20 ft. in width. It is beautiful ore, "a very fine, rich, specular ore," as pronounced by Dr. MacAdam. The existence of a continuous vein, angling across the area, is undoubted; the quantity of ore practically inexhaustible.

ACCESSIBILITY.—All the ore beds here treated of lie in the water-shed of the East River. The Red Hæmatite and Specular outcrops at high elevations above the valley, but to be reached by rail or tramways without extraordinary difficulty or expense. The length

of main line to be constructed to bring the Red Hæmatite (the furthest off deposit) to the Pictou and Halifax Railway will be from twelve to fifteen miles,—the other “East River deposits” being served by short spurs or branches from the main track.*

SURVEYS.—I would recommend that a surveying party be organized and put into the field early in the summer, as well to ascertain the most feasible line for the railways to the several ore beds as for determining the salient topographical features of each of the already selected areas. Some skill and experience will be needed in the selection of the most fitting route for what may be termed the “main line” from the point of junction with the Halifax and Pictou line to the Red Hæmatite beds.

EXPLORATION.—The four already chosen “locations”—aggregating about four square miles—are but isolated spots in the wide extent of territory over which Mr. Prentice has taken out right of search. The developments made on those areas are certainly of most promising character; but there can be no good reason for concluding that equally rich deposits or veins have not still to be discovered *somewhere* within the forty square miles of territory still to be explored. Ten thousand dollars might be judiciously expended in further explorations. Strong indications of a vein of Limonite exist on area 105, near by where the junction of the Iron Mines Railway with the Halifax and Pictou line is likely to be.

FURNACES.—I would not yet venture an opinion on the selection of a site for the Smelting Furnaces. It is a matter to be very carefully considered, and should be submitted to the judgment of some one of large experience in the bringing together of coal and ores.

LIMESTONE.—Limestone of fine quality is abundant in the valley of the East River; it is easily worked, and lies conveniently near to where the main line of railway will have to run.

In conclusion: It would be hard to find in any part of the world so rich and varied an assortment of iron ore in such convenient association with one another and with coal. Other conditions—such as facilities for getting out the ore, and advantages of shipment by sea and rail—are also highly favourable. “The whole, or nearly the whole, of the Pictou deposits,” says Dr. Dawson, “are included in this property;” and I cannot see any reason to doubt but that New Glasgow is destined to become the centre of a vast iron-making district, as it already is of the coal-mining industry of Nova Scotia.

Mr. Kennet Blackwell accompanied me in my examination of the property, and has rendered efficient assistance. His knowledge of the Londonderry Mines (which I have not seen) enables him to make a comparison between the ore beds there and those in the Pictou areas, and generally as to the other features of the two properties. I enclose his notes on the result of our joint exploration, and which have been drawn up wholly independently of my own remarks.

I am,

My dear Sir,

Yours faithfully,

W. SHANLY.

RICHARD POTTER, Esq.,
London.

* In consequence of more recent discoveries of this deposit, four miles nearer the other veins or deposits, the tramway required will be thus much reduced in length, as it will not be necessary to open up this more remote bed or deposit for some years. (See Dr. Dawson's later Report of 13th June, 1873.)

NOTES AND MEMORANDA ON PICTOU IRON DEPOSITS made by Mr. Kennet Blackwell while assisting Mr. Walter Shanly in his examination of the above property, the examination being made with the chief object in view of confirming and verifying the information contained in the reports of the Messrs. Dawson on the same.

The question of the quantity of the ore need only be briefly alluded to. The openings on the several deposits show the ores to be of a very uniform character and composition, and the samples taken therefrom have given the most satisfactory results in the analysis made, entitling them to the highest rank in the class of ore to which they belong.

As regards the quantity of ore on the property, it would be impossible even to approximate a limit to the probable yield of the various deposits until further and more extensive explorations have been made, although the natural exposures and indications, as well as the openings already made, do now most certainly warrant the expectation of a yield to a certain amount, the extent of which may readily be assumed from the following:—

HÆMATITE, RED.—This is the next deposit referred to by Mr. Dawson after having made a thorough examination along the entire line of the "out-crop" of this vein, and visited all the openings made on the same; the general character and dimensions as described in the report were found to be perfectly correct. This "selected" area embraced the Eastern slope as well as the flat ground on the summit; the vein is here so well defined and proved in its general character and size that an approximate estimate may readily be arrived at of the probable amount of ore contained in that portion of the vein that lies above the level of the bottom of the valleys on either side of McLellan's mountain. After taking the fact into consideration that this vein re-appears both East and West of this area at elevations considerably lower than the summit on area "101," and that the vein at these points is of a far greater width than it is on the summit, it will then be quite reasonable to take the average width of the vein on the higher ground as a basis for a calculation; such a calculation would show as much ore as would yield one million and a-half tons of metallic iron. The most advantageous way of working this vein would be to drive a "level" in along the course of the vein from a point as low down as possible on the Eastern slope of the mountain, while at the same time a very large quantity of ore might be quarried from along the entire line of the out-crop of the vein on the higher ground.

SPECULAR ORE.—The evidence revealed by the openings made by Mr. Dawson, and marked "A," "B," "C," "D," on his supplementary plan of this vein, reveals a well-defined and regular vein for a distance of about 2,100 feet, varying from 6 to 20 feet in width, having a southerly dip at an angle of about 65°. The first opening, marked "A" on plan, has been made at the extreme East of the selected area, and the surface indications exist between the last opening made, marked "C" on plan, and the extreme Western boundary of the area, thus proving beyond a doubt that the vein traverses the entire length of the selected area. The direction of the line of this vein extends along an oval-shaped hill nearly parallel to its major axis, the highest point of the vein being about 440 feet above the level of the bed of the East River; these facts would, therefore, probably render it necessary in opening out the vein, to do so by sinking a shaft on the summit directly on the vein; the ores might then be conveyed from the summit to the valley of the East River by means of a shoot.

LIMONITE.—The openings made by Mr. Dawson to show the existence of this deposit, as well as the natural indications spoken of by him in his report, were visited and carefully examined. The only point where Mr. Dawson has actually exposed a vein of this ore was in the bed of a brook on the "Fraser Saddler" lot in the area "No. 5;" here the vein was found to be 17 ft. in width, and of unusual compactness and uniformity. It would appear that Mr. Dawson was of opinion that a vein of this exists in a line crossing the base of the selected area running nearly parallel to the East River; but the more

recent finding of some ore gravel on the same area to the North-west of this first opening, together with the general position of the drift in this vicinity, would indicate that there were several "finger" like veins running at right angles to the course of the East River. The fact of this theory being proved would, of course, considerably increase the value of area "No. 5;" this, however, is a question that can only be proved by more extensive explorations. The samples of limonite that I have seen from this locality compare very favourably with the best ores from the great Londonderry Brown Hæmatite vein, while at the same time the circumstances and peculiarities under which they both occur are very similar; this leads me to a comparison between the relative important features of the two properties, and I am of opinion that the subject might be perused to the advantage of the Pictou district. In the first place it must be admitted that in the aggregate amount of ore already proven on the two properties, Londonderry has the advantage; but Londonderry, on the other hand, does not possess any other class of ore in sufficient quantities than the Brown Hæmatite; there is there most certainly a great superabundance of this class of ore, while Pictou will undoubtedly have abundance of this class of ore, and at the same time a great abundance of Red Hæmatite and Specular. As regards the proximity of the two properties to the coal, and the facilities for shipment of the manufactured article, Pictou has again immense advantages over the other. Until the Spring Hill coal areas are more fully developed, and a communication established between that and Londonderry, coal would have to be taken from Pictou to the works at Londonderry (a distance of 62 miles), while, on the other hand, the Pictou ores would simply have to be hauled about 10 miles, on an average, to the smelting furnaces, which would, of course, be situated as near as possible to the coal pits.

With Pictou, the shipping point by sea would be Pictou Harbour, available to the largest ship afloat, while Londonderry would have to look to Great Village as a shipping point; this place is situated at the entrance of a small tidal river to the Cobequid Branch of the Bay of Fundy; the navigation up to the entrance of this river is bad, and the river can only be entered at high tide by vessels drawing not more than 12 ft. of water.

KENNET BLACKWELL.

NEW GLASGOW,
May 11th, 1873.

REPORT
ON
EXPLORATIONS OF THE IRON ORE DEPOSITS OF PICTOU COUNTY,
NOVA SCOTIA,

By Mr. G. M. DAWSON, *Associate of the Royal School of Mines, Jermyn Street, London.*

The following Statements relate to exploratory works conducted in October last on the iron deposits of Pictou County. The object of these explorations was more fully to open up the deposits and to ascertain their precise extent and value. I shall confine myself in the main to results of these examinations, referring for other facts to previous reports on the properties.

RED HEMATITE.—This deposit is situated on area 101, and has, by its outcrop and surface masses of ore, been traced completely across the area in a general direction nearly East and West. The ore occurs as a bed in greyish and black slates, and on the whole dips Northward, generally at a high angle. The Western end of the outcrop, being on high ground and easy of access, was chosen as the part of the bed where information concerning its general character and thickness could be most easily obtained. In the course of the operations, about a mile of the outcrop has been well defined by trenching, and openings in the substance of the ore itself, from which a considerable quantity of ore has been blasted out, and now lies in heaps at the surface.

In the furthest East trench made on the outcrop of the ore bed (marked A in Plan), it is nearly vertical, and shows 22 ft. of ore, the greater part of which is of excellent quality, and almost free from intercalated layers of slate. At a distance of 594 ft. Westward from this trench, an opening of some size, and going down about 10 ft. on the ore, has been made (section I). The dip of the bed is here N. 29° E. at an angle of 58°. The upper layer of ore is 4 ft. 4 in. thick, and rests upon a second layer 3 ft. in thickness. Below this is a parting of slate 2 ft. 11 in., and underlying this a third bench of very good ore 3 ft. 3 in. thick. There is thus altogether, and deducting the slate parting, 10 ft. 7 in. of ore. At 198 ft. West of this opening is a trench completely crossing the outcrop, and showing a section of the bed, measuring on the surface and including some small slate partings, 27 ft. across. The dip is here N. 15° E. at an angle of 62°. Near this trench the outcrop changes its course, and bends sharply off to the North, passes round the nose of an anticlinal, returns nearly South, and then resumes its old East-West course. Both sides of this anticlinal have been explored, and the appearance of the ore is specially good, both as regards its quality and thickness. In the opening on the East side (section II., and marked in Plan), in which the ore-bed was followed down about 15 ft. on the dip, the lowest bench of ore is of very excellent quality and 6 ft. in thickness. Above this lies 3 ft. 10 in. of slate and slaty ore. Then 3 ft. of ore. Next a bench of 2 ft. 6 in. of ore, and above this three layers of ore, each about a foot thick. The slate roof was not actually reached, as the rock fell away rapidly under the drift material. The total thickness proven amounted to 14 ft. 6 in.

conty works

here

On the West side of the anticlinal a considerable length of outcrop has been bared of trees and soil, and shows ore of good quality and great surface breadth (about 30 ft.), though the dip, not being distinctly shown, the precise thickness remained undetermined.

At the exposure (marked D in Plan) the ore has resumed its old course, and runs nearly East and West. It is nearly vertical, and about 15 ft. in width.

In the woods to the West of this last opening numerous fragments of ore occur in the line of the outcrop of the bed, as indicated by the general strike of the slates. At the Western end of these indications a trench has been made and the ore exposed, though in the place chosen the bed is considerably fractured by small faults.

The ore itself is a very compact, somewhat silicious, red Hematite. As the ground slopes rapidly away to the South, drainage of any workings upon it will be easy. The ore might first be extracted by open cast, on the outcrop, and a vast quantity would in this way be easily obtainable. The ore, though hard under the drill, yields easily to powder, and might, I believe, at the present value of labour, be extracted at from 80c. to \$1 per ton.

It will be observed that the ore has a general tendency to improve in proceeding Eastward, and in this direction is shown to exist quite across area 101 by exposures of outcrop and surface masses, as indicated in the General Plan attached to previous reports.

SPECULAR IRON ORE.—This ore occurs on the square mile marked 100 on the Government Plan. The country rock is a blackish slate with occasional beds of quartzite, and it is with one of the latter beds that the ore is most closely associated. The strata are in general undulating, and in places somewhat contorted, but preserve a pretty uniform Southerly dip at an angle of from 60° to 70°.

The ore deposit occurs as a true lode following very nearly the strike of the containing rocks, and so far as our explorations have gone appearing to be as nearly as possible vertical. It has been exposed by trenching and proved by small shafts from the Eastern boundary of the area Westward for a considerable distance, though as yet not quite across to the Western line. Of its extension across the entire area, however, there can be no doubt from the indications, and the ore is known to occur on some of the other areas both East and West of this, though its value has not yet been proven by actual exposure of its thickness and quality.

At the Eastern boundary of area 100 the outcrop of the lode is exhibited in a trench (marked A in Plan) and shows a thickness of 12 ft. of ore, though with some thin leaves of intercalated slate. A short distance West of this is another costeening trench in which the lode is shown to have a thickness of 5 ft. 6 in. of good and pure ore.

About 900 feet Westward from this a shaft 18 ft. deep has been sunk on the crop of the lode. At a short distance from the surface a horse of hard quartzite rock, more or less impregnated with ore, encroached on the Southern side, but at the bottom this was passed through and the ore found passing under and cutting it out. The lode was cross-cut at a depth of 13 ft. and the thickness found to be 10 ft., including, however, about a foot of slate. At the bottom of the shaft the lode was widening. From this shaft alone about 40 tons of good ore were extracted. In connection with the quartzite horse and wall a small quantity of iron pyrites was found in association with the ore.

From this shaft 1086 ft. westward on the course of the lode a second opening (marked C on Plan) was made and carried down to a depth of about 13 ft. At this place the true lode was missed, and quartzite and hard slate impregnated with ore continued to the bottom. By subsequent trenching (marked D) the lode was discovered to lie about 30 ft. South of the shaft, and it there exhibited a very favourable appearance, and showed 20 ft. of good and very pure ore. The southern wall was not found, as the rock dipped away fast, and the water was troublesome.

This deposit of specular and micaceous iron ore is situated like the red hematite on high ground, and the course of the lode is cut across in several places by deep brook vallies, which, though encumbered by drift and presenting no good exposures of the deposit at present, will offer great advantages by allowing free drainage to a very considerable depth.

LIMONITE OR BROWN HEMATITE.—This valuable ore is situated on the North side of the East River, about 2 miles above Springville, and covered by the area marked 5 on the Government Plan.

The deposit is indicated by a great quantity of surface masses of ore, some of them of considerable size; and these indications extend in a nearly North and South direction for a considerable distance on the North side of the river. Explorations on this deposit have been unavoidably detained to the last, but a few days' work has given a much better knowledge of its character and extent. The lode itself has been exposed in a small brook, and appears to run in a direction nearly at right angles to the general line of the indications. It would, therefore, appear probable that its course will be found to change considerably, or that it has been shifted by small faults. The lode where exposed shows a thickness of about 15 ft. of solid ore, or nearly double that ascertained by the first opening in which measurements spoken of in previous reports were taken. One side of the ore is bounded by a wall of solid slate, while at the other side the cheek of the solid ore is followed down by a deposit of concretionary ore 2 ft. 8 in. in width and thickening downward. The South wall of the concretionary ore, or "ore gravel," is formed of very stiff red and white clay, apparently formed from slate rock decomposed in place. The "ore gravel" was excavated from between the solid ore and the clay to a depth of 8 ft., and for several feet in length; and the South cheek of the solid ore, thus exposed, was found to be almost precisely vertical. (See section 3.)

The indications, in the form of boulders, which induced search in this brook, are small compared with those that exist on other parts of the property, on which we have as yet been unable to do any work. At one place a great quantity of very large masses of ore, some of them weighing several tons, are to be seen partly exposed; and ore masses, of greater or less size, extend quite across the area.

At a place (marked C in Plan) a large show of surface fragments attracted attention; and pits and costeeing proved the persistence of fragments to 25 and 30 ft. in depth in the alluvial matter. At this place the ore contained a considerable quantity of crystalline black oxide of manganese in admixture with it.

The various ores above described are in the neighbourhood of the great coal deposits of Pictou County, and are therefore very favourably situated for the manufacture of iron on a large scale. The Specular Ore, Hematite, and Limonite are all in the vicinity of the East River, and so situated that they might be connected by branches with a single railway following the course of the river valley. The valley is admirably suited for such a railway, being flat, and in great part consisting of "intervale" land. The proposed railway would strike the Government railway near Hopewell, at the forks of the East River, and here it might be best to erect furnaces.

Broad gauge colliery railways have cost in this vicinity from \$15,000 to \$20,000 per mile, but should it be decided to erect furnaces at the forks, and there to meet the coal brought by the provincial railway; a narrow gauge road would be quite suitable for the transport of the iron ores, and could be completed for a very much smaller sum.

Limestone of good quality and in great abundance exists in the valley of the East River, and quarries could be opened in immediate proximity to the railway. In a quarry just above Springville, 15 ft. of very pure limestone is worked. Another bed not worked,

but said to be 6 ft., underlies this, and still lower in the series is an immense bed of blackish limestone, said to yield a very strong lime.

Any railway passing down the valley of the river would have to pass over the crop of those beds. The limestone at present worked is quarried free for 40 cents per ton.

The coal of Pictou County has been shown by numerous analyses to be very free from sulphur, and is adapted for the manufacture of good hard coke. There are at present four coal mines in active operation, and others preparing for work. The price has now for some time remained at \$2 (8s.) per ton delivered on board ship at the various loading grounds.

In connection with the coal beds are fire clays, and should a demand for fire bricks arise, in all probability some of these will prove well suited for their manufacture. Fire bricks formerly manufactured from a clay in the neighbourhood of New Glasgow were considered to be of excellent quality.

Labour at present commands from \$1 to \$1.50 (4s. to 6s.) per diem.

GEORGE M. DAWSON.

MCGILL COLLEGE, MONTREAL,
Nov. 18, 1872.

ON THE GEOLOGICAL RELATIONS OF THE IRON ORES OF NOVA SCOTIA.

(Read before the American Association for the Advancement of Science, August 1873.)

BY J. W. DAWSON, LL.D., F.R.S.

The Iron Ores of Nova Scotia, long neglected, have recently begun to attract the attention of capitalists to an extent in some degree commensurate with their importance. The magnitude and variety of the deposits, the great richness of the ores, their proximity to the Atlantic and to great deposits of coal, are all features which give them very great economic value, and must eventually cause them to take no small part in contributing to the iron supply of the world. My purpose in the present paper is, with the aid of recent researches in which I have been occupied, to give a concise summary of the geological position and mode of occurrence of the principal deposits, and more especially of those facts which have been developed since the publication of my "Acadian Geology."

If we arrange these deposits in the first place under the two heads of *Beds* conformable to the stratification and *Veins*, we shall find that the former occupy three distinct geological horizons—that of the Lower Helderberg or Ludlow in the upper part of the Silurian, that of the Oriskany at the base of the Devonian, and that of the Lower and Middle Carboniferous. The latter occur in altered rocks which may be assumed to be of Silurian age, in the Lower Carboniferous, and at the junction of these two groups of rocks. We may shortly consider the deposits of these several kinds and ages in their order.

1. BEDDED ORES.

(1) GREAT HEMATITE BED OF THE LOWER HELDERBERG SERIES.

This, in so far as at present known, is most extensively developed in the vicinity of the East Branch of the East River of Pictou, and on the upper part of Sutherland's River. Here the rocks, which rise unconformably from beneath the Carboniferous beds of the Pictou coal-field, consist in great part of grey and olive slates, usually coarse and unevenly bedded, and with occasional calcareous bands, holding the characteristic fossils of the "Arisaig group," a series in Nova Scotia equivalent to the Lower Helderberg of American geologists, though in its specific forms more nearly allied to the English Ludlow than to groups of this age on the great inland plateau of America. These beds are affected with slaty cleavages, highly inclined, much faulted, and folded in abrupt anticlinals, so that their detailed arrangement has not yet been satisfactorily traced. The great ore-band which forms one of the most conspicuous marks for unravelling their complexities, has been traced mainly along two distinct lines of outcrop, both somewhat curved and broken, and which seem to lie on the opposite sides of an anticlinal axis. It has also been recognized in two other localities, where it must come up on distinct lines of outcrop, the precise relation of which to others has not yet been ascertained.

The ore bed is accompanied by a thick band of olivaceous slates, and beneath this there appears hard ferruginous quartzites, which Dr. Honeyman compares to the Medina sandstone, and beneath this, and possibly unconformable to it, are black and greenish

slates with bands of quartzite and soft chloritic and nacreous schists, which as yet have afforded no fossils. They are associated with hard beds or masses of rock rising into some of the highest eminences, and which have usually been described as trap, but which seem to consist for the most part of an indurated slaty breccia or conglomerate, corresponding very nearly in character to the typical graywacke of the older German geologists. These rocks may be of middle Silurian age, though possibly in part older, and we shall meet with them again in connection with the great vein of specular iron.

The ore-bed where most largely developed attains a thickness of about 30 feet, and in places where it has been opened up by exploratory works, it has been found to afford from 10 to 20 feet in thickness of good ore. This ore is a red hematite, sometimes compact and laminated, but more frequently of an oolitic character occasioned by the arrangement of the peroxide of iron in minute concretions enveloping grains of sand. By the increase of these silicious grains it passes in the poorer portions into a sort of ferruginous sandstone. Similar beds of fossiliferous ore are well known to occur in the Clinton group of New York and Pennsylvania, and Prof. Hall informs me that they are found also in the Lower Helderberg series of New York.

Along the different lines of outcrop above referred to, this bed has been traced for several miles, and being of a hard and resisting character, it rises into some of the higher elevations of the country. Though not one of the richest ores of the district, its great quantity and accessibility render it highly important for practical purposes. The analysis made of it show a per-centage of metal varying from 43 to 54 per cent. The foreign matter is principally Silica, and the proportions of Phosphorus and Sulphur are small—one of the specimens analyzed affording none whatever, another .22 Phosphoric Acid and .29 Sulphur. The principal exposures of this bed are distant only 12 miles from the great collieries of the East River of Pictou, and less than 10 miles from the Pictou and Halifax Railway. This deposit was first described by Mr. R. Brown in Haliburton's History of Nova Scotia, 1829, and subsequently by the writer in Acadian Geology. More recently exploratory works have been carried on and a practical report made by Mr. G. M. Dawson, Associate of the School of Mines, London; and the bed has been traced and collections of its fossils made by Mr. D. Fraser of Springville.

(2) HEMATITE AND MAGNETIC IRON OF NICTAUX AND MOOSE RIVER.

This deposit takes us to the other extremity of Nova Scotia, and brings us a stage higher in geological time, or to the period of the Oriskany sandstone. It would, indeed, appear that the conditions of ore-deposit so marked in Eastern Nova Scotia in the Upper Silurian were continued in the western part of the Province into the Devonian. In many specimens of the Nictaux ore the chief apparent difference as compared with that of Pictou is in the contained species of fossils.

Where I have examined this bed, it appears to be 6 feet thick and enclosed in slaty rocks not dissimilar from those associated with the Silurian ore of Pictou. Recent explorations at Nictaux are said to have developed extensions of this deposit; but I have no details of these. As rocks of the Arisaig group are known to underlie the Nictaux beds, it is not impossible that additional beds of ore may be found in these. The normal condition of the iron of the Nictaux bed is that of peroxide; but locally it has lost a portion of its oxygen and has become magnetic. This I believe to be a consequence of local metamorphism connected with the immense granite dikes which traverse the Devonian rocks of this region.

The Nictaux ore is more highly fossiliferous than that of Pictou, and contains a larger proportion of Phosphate of Lime. In the attempts hitherto made to work this ore, the distance from coal has been a main disadvantage, but the construction of the Windsor and

Annapolis railway has diminished this. The Devonian beds holding this bed are described in "Acadian Geology." An analysis of a specimen made many years ago gave 55 per cent. of iron.

(3) BEDDED ORES OF THE CARBONIFEROUS SYSTEM.

The most remarkable of these is a bed of crystalline *Spathic iron* or Siderite, occurring in the Lower Carboniferous series, near Sutherland's River in the County of Pictou. As described by Mr. G. M. Dawson, who prosecuted works of exploration in it last year, it is a conformable bed, occurring in the Lower Carboniferous red sandstones, and varying from 6 feet 6 inches to 10 feet 6 inches in thickness. It is accompanied with smaller bands of the same mineral, and at no great vertical distance from it is a bed of gypsum. Its mode of occurrence is, on the whole, not dissimilar from that of the non-fossiliferous sub-crystalline limestones which occur in some parts of the Lower Carboniferous series associated with the gypsum. This ore is a true Spathic Iron, granular and crystalline in texture, and, when unweathered, of a light grey colour. It affords from 42 to 43 per cent. of iron, and contains from 2 to 8 per cent. of manganese. This bed is only 4 miles distant from the "Vale" colliery. From the Report of Mr. Andrews on the second geological district of Ohio, it would appear that similar beds, though on a smaller scale, occur in the Lower Carboniferous series of that State. In Nova Scotia this bed is at present altogether unique.

Clay Ironstones occur in many parts of the Nova Scotia coal-field. In the workings of the main seam of the Albion Mines, Pictou, considerable quantities of nodular black ironstone are extracted, and will, no doubt, be utilized. In the beds under the main seam there are also clays rich in ironstone concretions. Beds with ironstone balls also occur in the measures north of the New Glasgow conglomerate, and one of these is remarkable for the fact that the nodules were found by Dr. Harrington to contain nuclei of Blende, a mineral otherwise unknown in the carboniferous of Nova Scotia. No attention has yet been given to these ores as sources of iron, but it may be anticipated that a demand for them will arise in connection with the richer ores in the older formations.

II. VEINS OF IRON ORE.

(1) GREAT SPECULAR IRON VEINS OF THE SILURIAN SLATES AND QUARTZITES.

In a paper on the metamorphic and metalliferous rocks of Eastern Nova Scotia in 1848,* I mentioned the fact that the inland series of metamorphic rocks (bounding the coast series now known as the gold bearing series), and believed to be of Upper or Middle Silurian age, abound in veins of specular iron, associated with spathic iron and ferruginous dolomite, and occasionally with metallic sulphides, and I described some of these deposits. In the country eastward of Lochaber Lake, where this same formation occurs, not only are numerous small veins of specular iron and carbonate of iron found in it, but a rich vein of Copper Pyrites, noticed in "Acadian Geology," has recently been opened up and ~~found~~ *is a key* to be very valuable.

In most parts of the region these iron veins, though very numerous, are of trifling thickness; but in two localities they are known to attain to gigantic dimensions, rendering them of great economic importance.

The earliest known of these was the great vein of the Acadia mine in the Cobequid mountains, discovered by the late Mr. G. Duncan, and on which I reported in 1845. These

hills consist, on their southern side, of parallel bands of olive and black slate with beds of quartzite, all very highly inclined. The iron vein is a great irregular fissure, extending for many miles parallel to the bedding, and apparently accompanying a band of quartzite. It contains, in addition to crystalline and often micaceous Specular iron and Magnetic iron, large quantities of a rich earthy red ore, which, from the crystalline planes which it presents, would seem to have been a Carbonate of Iron decomposed and oxidised. These iron ores are associated with large quantities of a crystalline ferruginous Dolomite, allied in composition to Ankerite. This may be regarded as the veinstone to which the iron ores are subordinate, and which, in the thinner parts of the vein, occupies nearly its whole breadth. At the outcrop of the vein it is in some places weathered to a great depth into a soft and very pure yellow ochre. Small quantities of sulphides of iron and copper and of sulphate of barium are occasionally present. In addition to the above, which may be regarded as the primary contents of the vein, there occur, in some parts of it, secondary deposits of concretionary Limonite, which have of late years afforded a very large part of the ore smelted by the Acadia Company.

In some places the thickness of this vein has been found to be 150 feet, with intercalated masses of rock, but it is very irregular, diminishing occasionally to mere strings of Ankerite. It is remarkable that in the Cobequid mountains, which are cut by transverse ravines to the depth of about 300 feet, the vein does not appear to be well developed in the bottom of the ravines, but only in the intervening heights. At first I was disposed to account for this by supposing that the deposit is wedge-shaped, diminishing downward; but I have more recently been disposed to believe that the large development of the vein is dependent on differences in the containing rocks which have rendered them harder and more resisting at the points of such greater developments.

With respect to the age of these beds, they must be older than the Lower Helderberg rocks, which both at the eastern end of the Cobequids and at the East River of Pictou, rest upon them. They are, on the other hand, probably newer than the auriferous primordial rocks of the Atlantic coast. As they have afforded no fossils, their age does not at present seem capable of more precise definition. With regard to the filling of the vein fissures, this, if coeval with the metamorphism of the containing beds, or immediately subsequent thereto, would fall between the period of the Lower Devonian and that of the Lower Carboniferous, or within the Devonian age. The denudation connected with the Lower Carboniferous conglomerates and the fragments contained in these conglomerates seem to imply that the ore-bearing slates were then in the same condition as at present. On the other hand the Lower Carboniferous sandstones themselves contain in places narrow veins of specular iron, which also occurs, as well as magnetic iron, in the fissures of the Triassic trap.

On the west side of the East River of Pictou there occur rocks precisely similar to those of the Cobequid range, of which indeed they may be regarded as an Eastern continuation, and including an iron vein which must be regarded as the equivalent of that of the Acadia Mine, which it resembles perfectly in mineral character and mode of occurrence, differing only in the greater proportionate prevalence of the specular ore.*

In New Lairg, a few miles from Glengarry Station, the most western portion of this vein known to me contains much Ankerite, with strings of Specular iron; and in large loose pieces there are indications also of red ore which is not visible in place. Farther to the eastward on the West Branch of the East River of Pictou, there appears a band of quartzite 30 feet thick filled with veins of Limonite; but specular ore is not found at this place. Still farther to the eastward, and near the East Branch of the East River, the specular vein

* These veins were first described by the late Mr. Hartley in the Report of the Geological Survey of Canada, 1870.

attains a very large development, showing in some places a thickness of 20 feet of pure ore. Its course is S. 60° to 70° E., or nearly coincident with that of the containing beds; and, as on the Cobequids, its attitude is nearly vertical, and it appears to be thickest and richest in the rising grounds. In one very deep ravine the bed of quartzite usually associated with the ore seemed to be wanting, and the vein was represented by innumerable strings of Ankerite, forming a network in the slate. As in the Cobequid vein, masses of Magnetic ore are occasionally mixed with the Specular. To complete the resemblance, loose masses of Limonite are found in the vicinity of the vein, giving rise to the expectation that a vein or veins of this mineral may be found to be associated with the specular vein. The ores of this vein in Pictou County are nearly pure peroxide of iron, containing from 64 to 69 per cent. of metal, and can be obtained in great quantity from the outcrop of the vein where it appears on the rising grounds.

(2) LIMONITE VEINS OF THE EAST RIVER OF PICTOU.

The valley of the East River of Pictou above Springville is occupied by a narrow tongue of Lower Carboniferous rocks, having at one side the slates containing the ore last mentioned, and on the other a more disturbed country already referred to as containing the great Lower Helderberg bed of Hematite. It is highly probable that the river valley follows the line of an old pre-carboniferous line of fracture, denuded and partially filled with the Lower Carboniferous beds including large deposits of limestone and gypsum. At the line of junction of the Carboniferous and older rocks on the east side of the river, occurs the great Limonite vein of the district, forming a vein of contact of exceeding richness and value. It follows the sinuosities of the margin of the older rocks, and varies in thickness and quality in different places; being apparently richest opposite the softer slates and where these are in contact with a black maganesian limestone, which here, as in many other parts of Nova Scotia, forms one of the lowest members of the Carboniferous series. The ore is sometimes massive but more frequently in fibrous concretionary balls of large size, associated with quantities of smaller concretionary or "gravel" ore. In some places the ore of iron is associated with concretions or crystalline masses of Pyrolusite and Manganite.

a Denuding agencies in the Post-pliocene period have removed portions of the vein and its walls, and have deeply covered the surface in many places with débris. Hence the outcrop of the vein was originally marked by a line of masses of the ore too heavy to be removed by water. From the analogy of the other veins to be mentioned in the sequel, I was led to believe that the source of these masses would be found in the Lower Carboniferous rocks, and so stated the matter in the first edition of "Acadian Geology" (1855). Subsequently, however, the vein having been exposed in situ, and one wall proving to consist of metamorphic slate, it was described by Dr. Honeyman and by Mr. Hartley of the Geological Survey as a vein in the Silurian Rocks. Still more recently exploratory works conducted by Mr. G. M. Dawson, with the aid of Mr. D. Fraser, have clearly proved that the vein follows the junction of the two formations. The ore of this vein is of the finest quality, affording from 62 to 65 per cent. of metallic iron.

(3) LIMONITE OF SHUBENACADIE, OLD BARNS AND BROOKFIELD.

At the mouth of the Shubenacadie River, the lowest Carboniferous bed seen is a dark-coloured laminated limestone, in all probability the equivalent of the Manganesian limestone already referred to, as well as of the Manganiferous limestone of Walton, the Plumbiferous

limestone of the Stewiacke, and the lower black limestone of Plaister Cove, Cape Breton.* This limestone and the sandstones and marls overlying it, are traversed by large fissure veins, holding a confused aggregation of iron ores and other minerals, as Limonite, Hematite, Gothite, Sulphate of Barium, Calcite, &c., some of which appear sufficiently large and rich for profitable exploration. In the same formations, further to the eastward, at Old Barns, similar veins are found to be largely developed, and at Brookfield, 50 miles east of the Shubenacadie, and apparently near the junction of the Lower Carboniferous with older rocks, large surface masses of Limonite appear to indicate an extensive deposit of similar nature, but which have not, I believe, been yet so far opened up as to establish their practical importance.

(4) IRON VEINS OF THE TRIASSIC TRAP.

Veins of Magnetite and Specular Iron occur in several localities in the great beds of trap associated with the Triassic red sandstones of the Bay of Fundy, but so far as known these ores are insignificant in quantity.

It will be observed from the above notes, that while the iron vein of the Cobequid hills is at no great distance from the coal-field of Cumberland, with which it has now railway connection, the still larger and more important deposits of Pictou are very near to the extensive collieries of that district, and to railway and water communication, so that every facility appears to exist for their profitable exploration, and it may be anticipated that they will soon be rendered available for the supply of iron of superior quality, more especially to meet the large and increasing demand of the Dominion of Canada.

* See "Acadian Geology."

(3) LIMONITE OF SHUBENACADIE, OLD BARN AND BROOKFIELD.
At the mouth of the Shubenacadie River the lower Carboniferous bed seen is a dark-
coloured laminated limestone, in all probability the equivalent of the Mansfield limestone
already referred to, as well as of the Mansfield limestone of Watson, the Triassic

From J. W. DAWSON, F.R.S., to RICHARD POTTER, Esq., *London.*

MONTREAL,

June 13th, 1873.

MY DEAR SIR,

I beg to give you the latest facts as to the new developments on the iron properties of the East River of Pictou.

Before leaving Pictou I re-visited the new exposures of Red Hæmatite on Area No. 108, and found them to be three in number, extending in a S.E. direction across the area, the extreme points being distant about 900 yards from each other.

No. 1 (Ross's Farm) exposes one ~~bed~~ of the bed, containing a thickness of about 8 feet of good ore. ch

No. 2 (S. McDonald's), about 200 yards distant, occurs in a very favourable position for mining,—on the brow of a steep hill, and the opening made exposes about 10 feet of good ore. The strike of the bed is apparently N. 30° E., and the dip S.E., at about 40°.

No. 3 (Kennedy's), about 700 yards beyond No. 2, is a trench 25 feet long, showing good ore on its bottom and sides, except at one end, where some rock appears. The trench seems to cut diagonally across the bed, and does not give the means of measuring its thickness, but I think this must be greater than at the other places.

The general direction of these exposures does not coincide with their strike individually, and from this I infer that the course of the outcrop is tortuous; I believe, however, that is continuous, and that it can be traced into connection with the old exposure to the Blanchard Road settlement.

The sketch-map attached shows the position of these discoveries, and also that they afford facilities for opening this valuable deposit near the river; and, in the first instance,

will save the expense of a branch road to the Webster locality on McLellan's mountain. The ground on which these new exposures exist is elevated and dry, and overlooks the valley of the East River.

The pits sunk in the Limonite, on No. 46, have been very satisfactory, showing a thickness of 14 to 15 feet of ore in a very accessible situation. Bedded Hæmatite has also been discovered on the east of this area, and though, where exposed, it does not seem to be of great dimensions, the occurrence of the bed holds out hopes of its extension, on areas 48 and 49.

I have taken specimens of the ores from the new openings for analysis. In so far as I can judge, from inspection, the ore of No. 108 is less silicious than that of other parts of the bed.

As stated in a previous letter, the newly discovered Limonite or Brown Hæmatite deposit at Cullens, near the provincial railway, proves to be a band of quartzite, about 30 feet thick, penetrated in all directions by veins and masses of the ore. From its magnitude and proximity to the railway, it must prove a most valuable deposit.

Mining areas have been taken out to cover these new discoveries, and also the extension of the Limonite on No. 46.

These new facts should be highly satisfactory to the purchasers of the property, not only as enlarging the known quantity of the ore, but also as diminishing the immediate necessity for the construction of a railway to the more distant part of the Hæmatite bed, as the extension of this can now be reached directly from the valley of the East River.

I may remark, here, that an analysis of the Limestone, at Springville, shows it to be very pure, containing 93.90 per cent. of carbonate of lime, 2.45 of carbonate of magnesia, and .03 per cent. each of sulphuric and phosphoric acid. There is another bed of Lower Carboniferous Limestone, extensively developed in the vicinity of the iron, which seems to be strongly impregnated with manganese, and of which I have taken samples for analysis. I anticipate that it may prove valuable as a flux.

Yours truly,

(Signed) J. W. DAWSON.

To RICHARD POTTER, Esq.,
London.

*Copy Letter from DAVID FORBES, ESQ., F.R.S., F.G.S., Member of the Council of the
Institute of Civil Engineers.*

8th March, 1873,
11, York Place, Portman Square.

Dear Sir,

In reply to your favour, enclosing a copy of Principal Dawson's Report on the Pictou Iron Mines, and accompanied by samples of the Ores from these Mines, I have much pleasure in stating that the Report impresses me with a very high opinion as to the value of this mineral property, the more so, as I know Dr. Dawson personally as a geologist of the highest standing.

The local circumstances in Nova Scotia, such as the proximity of coal, facility of communication, &c., also appear to me to be so much in favour of making Iron on the large scale in that country, that I have no misgivings as to its success, provided it be entered into with adequate capital and judicious management.

I remain, dear Sir,
Yours truly,
DAVID FORBES.

To EDWARD PRENTICE, ESQ.,
Conservative Club.

In another letter, under date the 27th December, 1872, he states that, having read the Reports and examined the Ores, he is of opinion "that Iron of a *superior quality* can be made in Nova Scotia at a *comparatively low rate*;" and adds, "that, if judiciously carried out, with sufficient capital, it cannot fail to prove a commercial success."

Copy Letter from the Director-General of the Geological Survey of Great Britain.

*Geol. Survey of England and Wales,
Jermyn Street,
13th January, 1873.*

Dear Sir,

I am well acquainted with Mr. George Dawson. He attended all the classes at the Royal School of Mines during three years. In every branch he distinguished himself in the highest degree, and he gained the esteem of every one who knew him.

I have the highest opinion of his ability and integrity, and I know his range of knowledge to be unusually extensive. He also served on the Geological Survey of England for a summer as an amateur, and proved in the field that he easily understood and could take part in all the operations of the Survey in Cumberland.

Believe me,
Yours very truly,
AND. RAMSAY.

To EDWARD PRENTICE, ESQ.

Dear Sir,
I have the honor to acknowledge the receipt of your letter of the 11th inst. in relation to the proposed bill for the relief of the insolvent debtors of the State of New York.

11th March 1837
11 Wall Street, New York

In reply to your letter, enclosing a copy of the report of the Committee on the subject of the insolvent debtors of the State of New York, I have much pleasure in stating that the report suggests the very high ground to which the value of the insolvent property should be raised, and the maintenance of the highest standing.

The first arrangement in your report, such as the provision of a court, is a commendable one, and appears to be a step in the right direction. It is, however, to be feared that the success of the measure will be defeated by the introduction of a bill with separate capital and individual assets.

I remain, dear Sir,
Yours very truly,

DAVID FORBES

W. Edward Parson, Esq.

The report also states that the 27th December 1836, he states that the insolvent debtors and creditors of the State of New York, that the law is not only a failure in New York, but a failure in every State, and that it is impossible to carry out with sufficient capital, it cannot fail to prove a successful success.

Dear Sir,
I have the honor to acknowledge the receipt of your letter of the 11th inst. in relation to the proposed bill for the relief of the insolvent debtors of the State of New York.

11th March 1837
11 Wall Street, New York

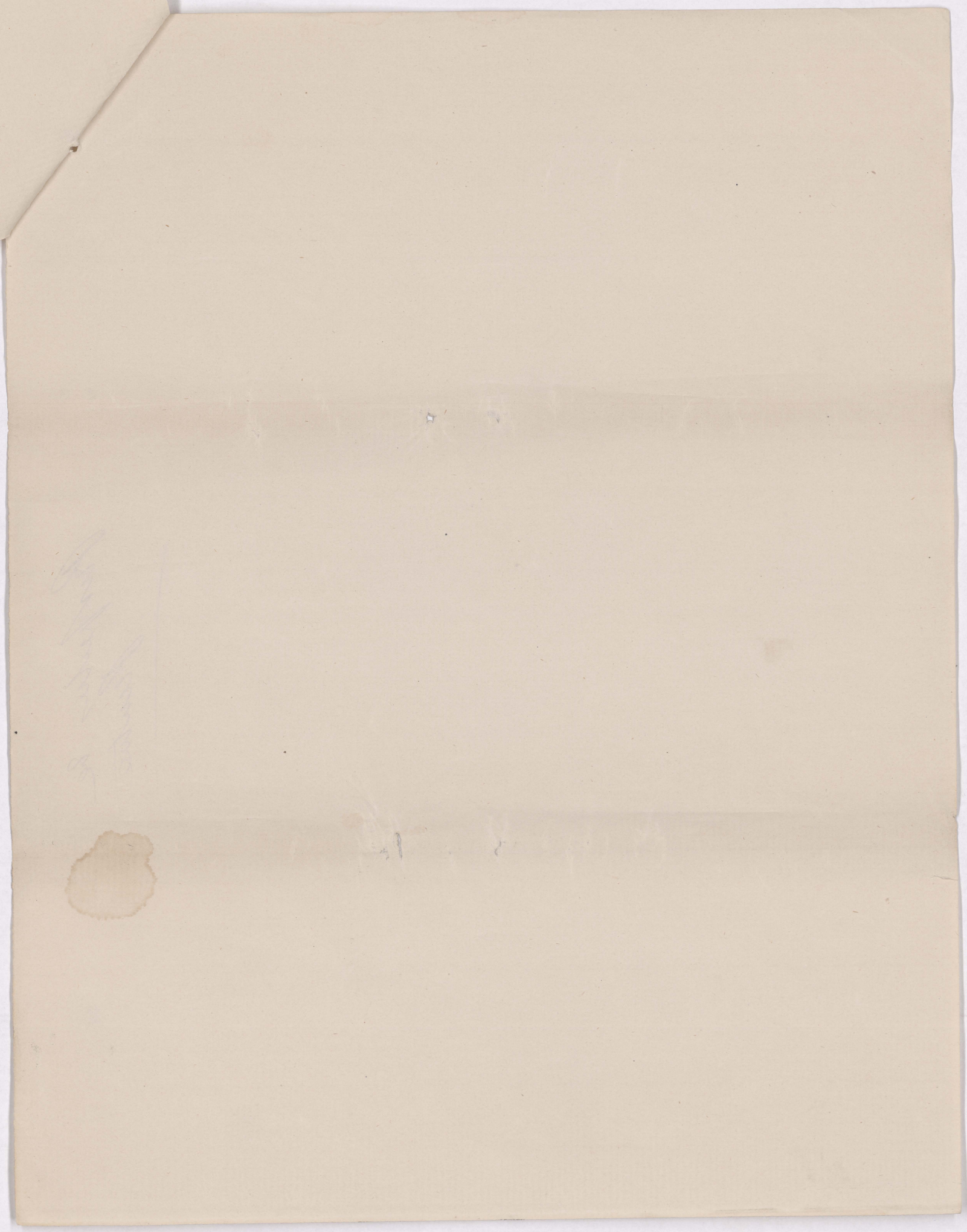
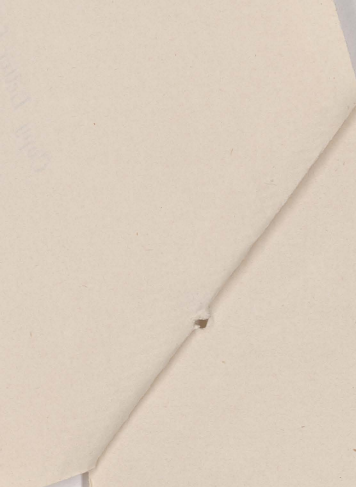
I am very much interested in the report of the Committee on the subject of the insolvent debtors of the State of New York, and I have much pleasure in stating that the report suggests the very high ground to which the value of the insolvent property should be raised, and the maintenance of the highest standing.

The first arrangement in your report, such as the provision of a court, is a commendable one, and appears to be a step in the right direction. It is, however, to be feared that the success of the measure will be defeated by the introduction of a bill with separate capital and individual assets.

I remain, dear Sir,
Yours very truly,

ANN HANCOCK

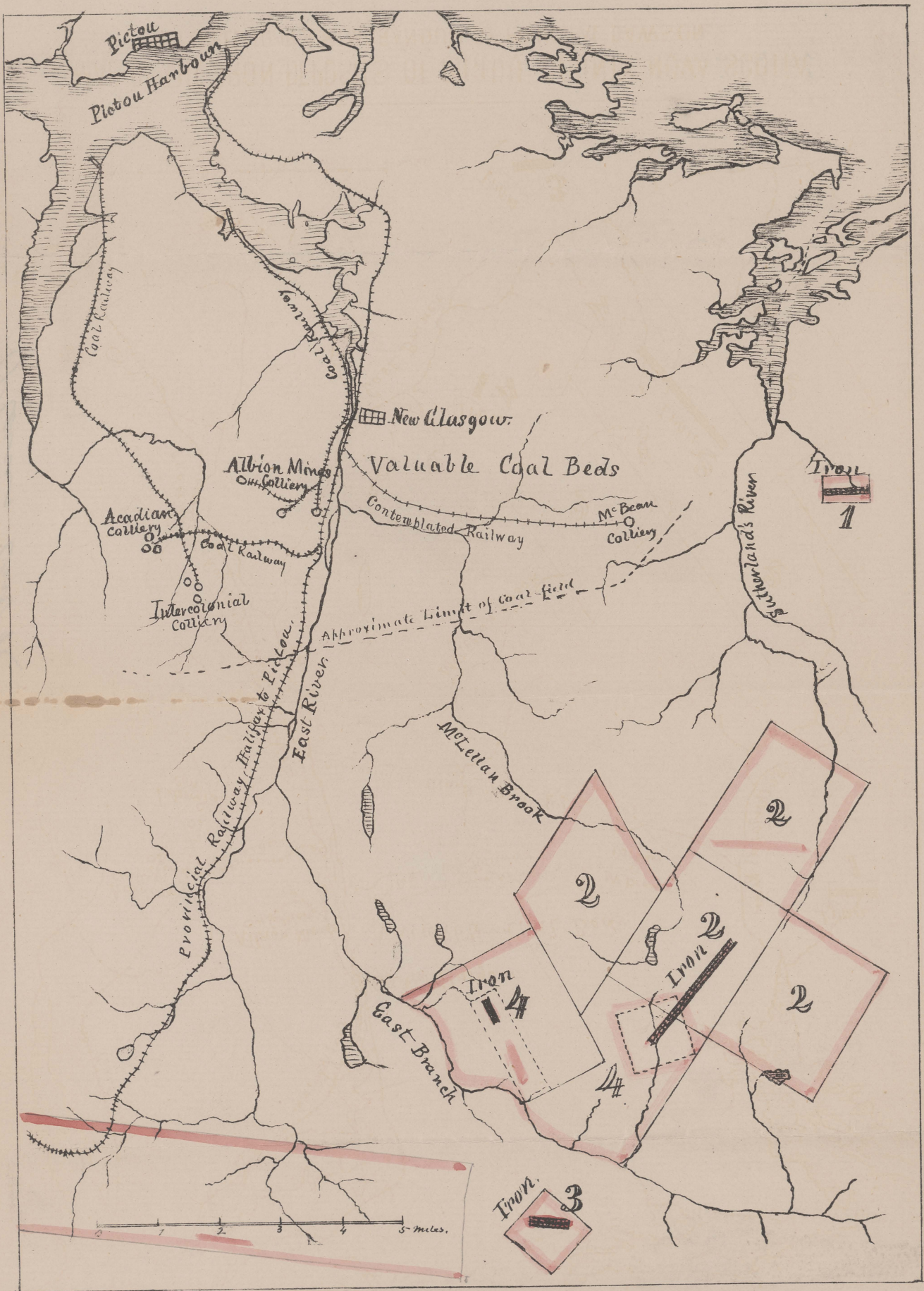
W. Edward Parson, Esq.



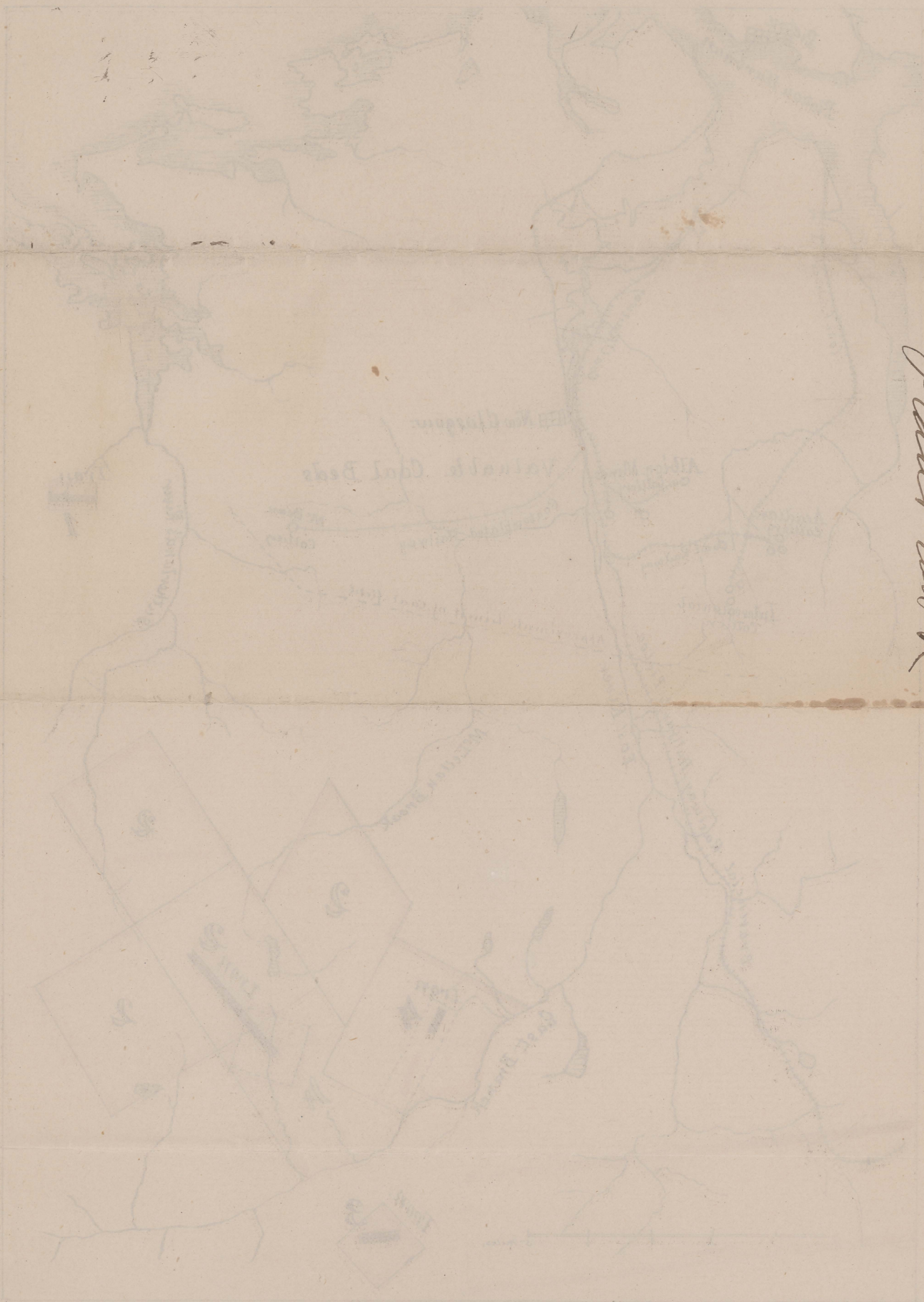
[Faint, illegible handwritten text]



*Perkins &
Pentecost*

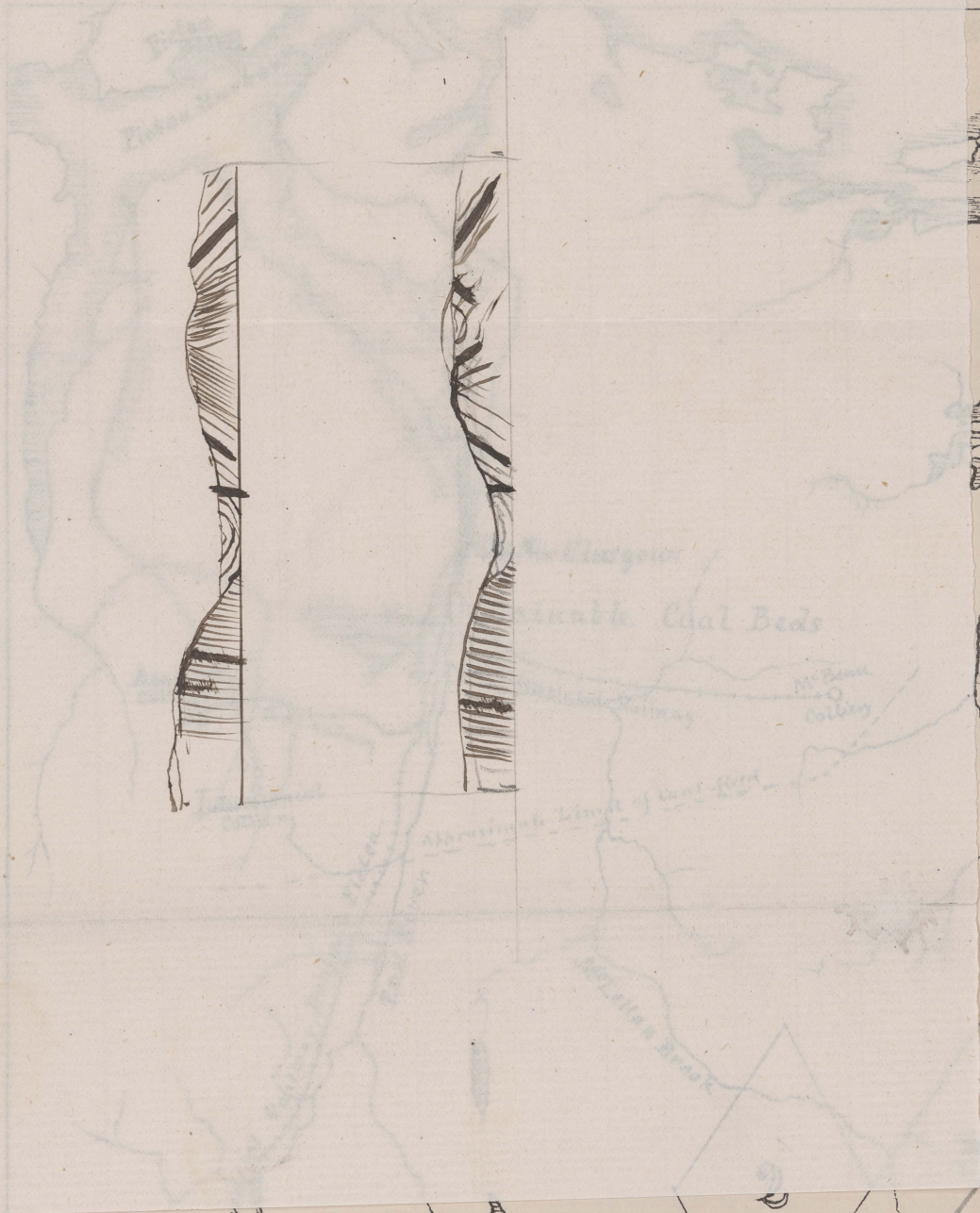


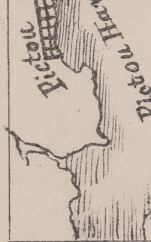
MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA.
 REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON.



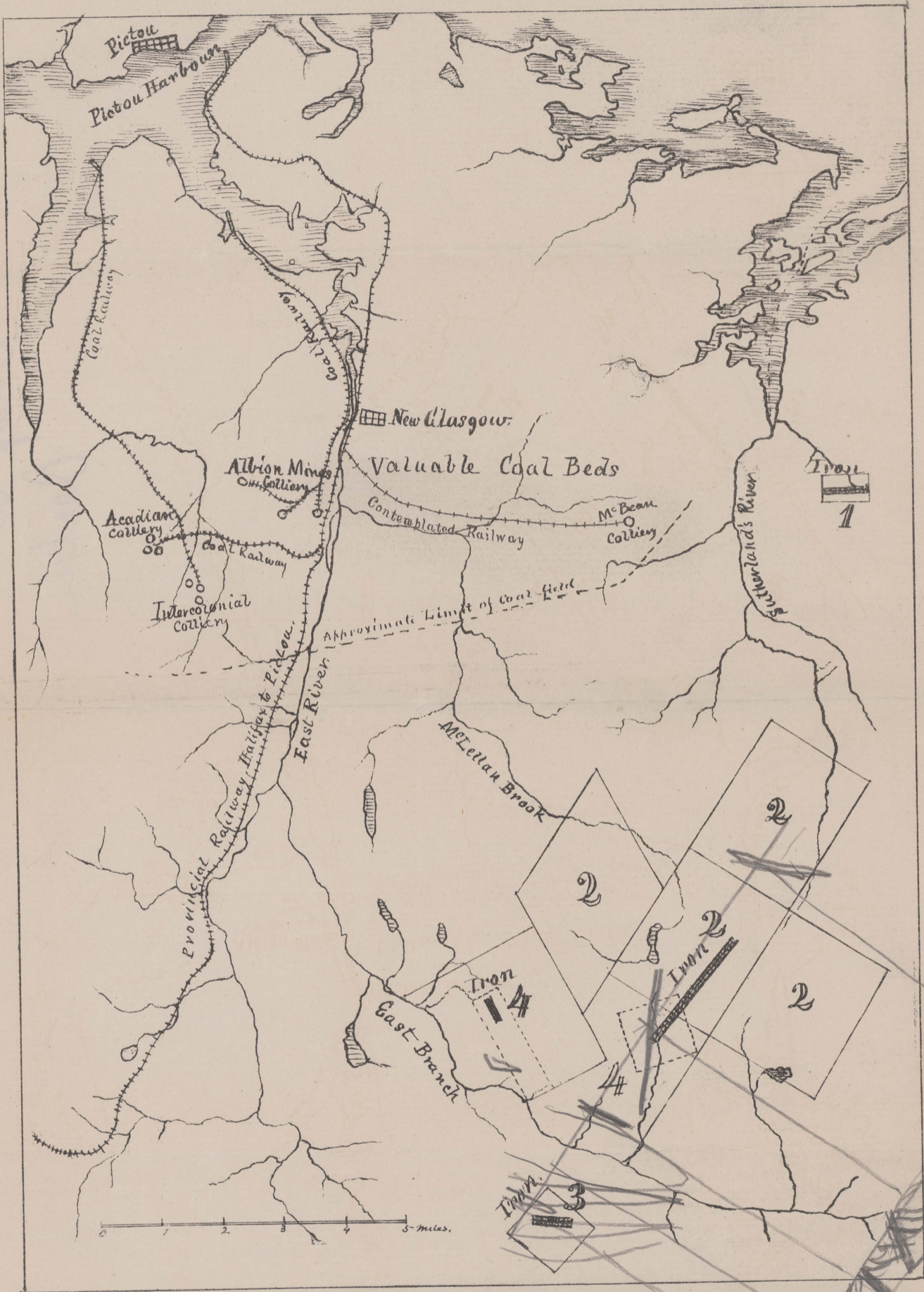
Plan East M

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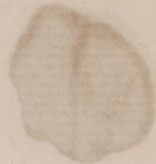




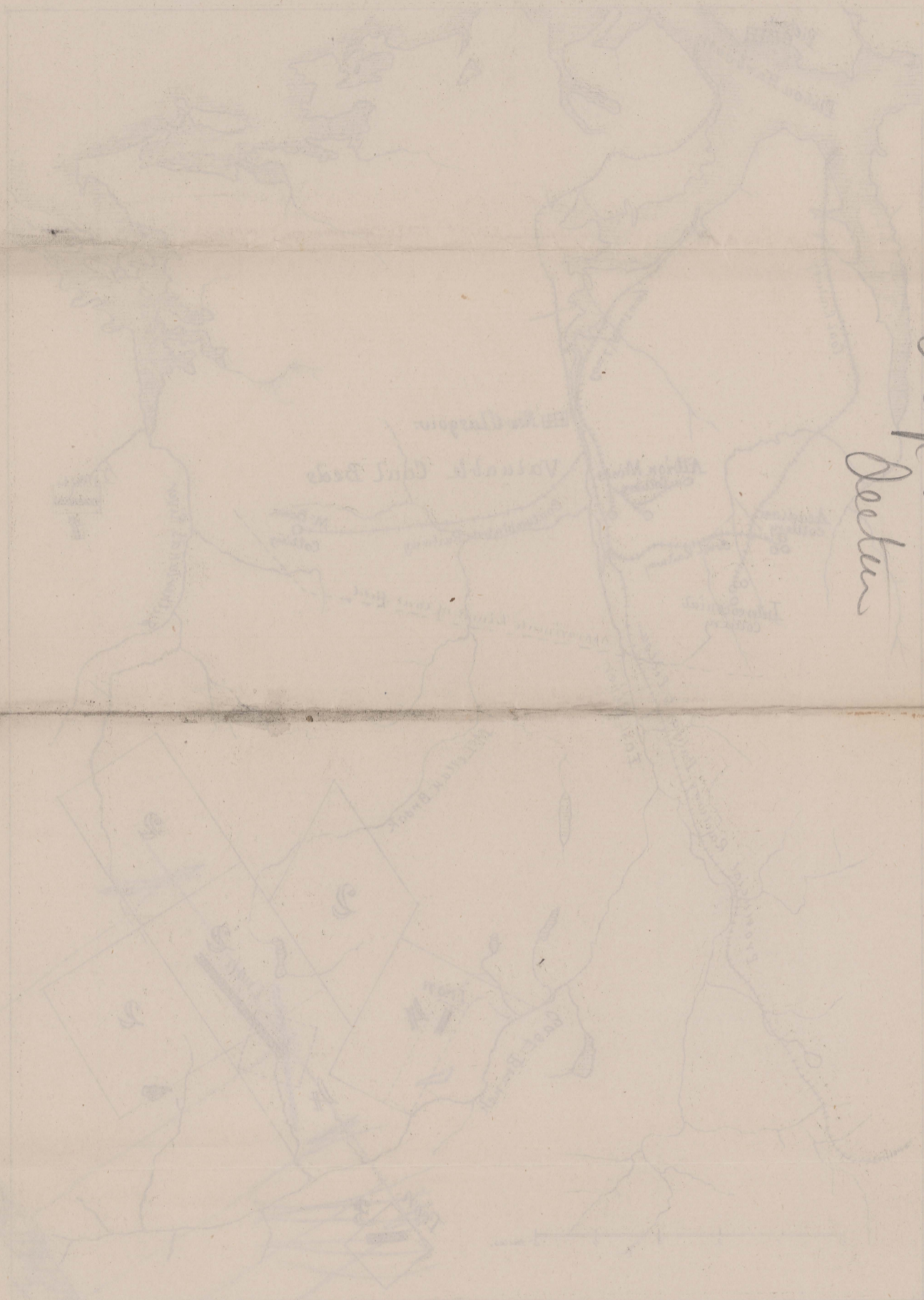
MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA
DRAWN BY A. H. HAYDEN, GEOLOGICAL SURVEY OF CANADA



MAP OF THE IRON DEPOSITS OF PICTOU COUNTY, NOVA SCOTIA.
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Map with
Darker



MAP OF THE IRON DEPOSITS OF BIGTON COUNTY NOVA SCOTIA
REFERRED TO IN A MEMORANDUM BY PRINCIPAL DAWSON

MEMORANDUM ON IRON ORES
IN THE
COUNTY OF PICTOU, NOVA SCOTIA.

BY
J. W. DAWSON, LL.D., F. R. S.

These ores, from their variety, richness, accessibility and proximity to large deposits of coal already extensively worked, are in my opinion the most valuable at present known on the Eastern Coast of North America, though up to this time they have not attracted the attention which they merit.

The areas referred to in this memorandum, amounting to about 30 square miles, are believed to include the whole or nearly the whole of the Pictou County deposits, as follows:

1 *The Sutherland's River Deposit (marked 1 on the map).*

This is a bed or vein of Crystalline Carbonate and Red Oxide of Iron, from eleven to fourteen feet in thickness, and included in the sandstones of the Millstone Grit formation. From an analysis by Dr. T. Sterry Hunt, published in the Report of the Geological Survey of Canada for 1869, it appears that the ore contains 42 to 43 per cent of Iron, and is of a quality likely to prove specially adapted to the manufacture of steel. In connection with this I may state that it contains about 8 per cent of Carbonate of Manganese.* This deposit has been opened up for a short distance on the outcrop, and is no doubt of great extent, though this remains to be proved by further openings. The land, as well as the mining right, has been secured; and the locality is only four miles distant from the rich and valuable coal seams of the "MacBean area," now being opened up and connected with navigation in Pictou Harbor and with the other coal mines on the East River of Pictou by a railway.

2. *The great Iron Ore Bed of the East Branch of the East River of Pictou (No. 2 on the map.)* This is a conformable bed, included in the Upper Silurian slates. It consists of dense oolitic Red Oxide of Iron, probably averaging 40 per cent of metal, and is in some places about 40 feet in thickness. It has been traced for about three miles over the areas marked 2 on the map, and no doubt extends for a much greater distance. The greater part of its extension is included in the mining claims embracing about twenty square miles and shown on the map. This deposit is capable of affording an unlimited supply of ore, and from the nature of the country there are the best facilities for opening it by adits or by open workings.

3. *Specular Iron Veins on the west side of the East Branch of the East River (No. 3 on the map.)*

This deposit consists of a network of veins of rich Specular Iron Ore running through quartz rock, and is believed to be of great extent and value, and to afford a quality of ore adapted for making the best kinds of wrought iron and steel. In Mr. Hartley's Report, in the Report of the Geological Survey of Canada, it is stated that an average sample of the mixed ore and veinstone yielded on analysis 45 per cent of metallic iron. Other areas adjoining that marked on the map, have recently been secured, with the view of tracing the extension of this deposit.

4. *Hematite Vein of East Branch of East River, (No. 4 on the map.)*

This is a thick vein of Crystalline Brown Hematite or Limonite, capable of affording 59 per cent of metallic iron and free from all injurious impurities. The extent of this deposit has not yet been explored, but it is stated by Mr. Hartley of the Geological Survey to be eight feet in thickness where exposed; and it extends through the areas covered by the mining rights referred to.

* See note on next page.

The above mining areas 2, 3 and 4 are situated near to each other and to the valley of the East River, and about ten miles distant from the extensive collieries of the General Mining Association, the Intercolonial Mining Company and the Acadian Mining Company, as well as other deposits of coal in the Pictou coal-field, not yet opened on so large a scale. Abundant supplies of fuel could thus be obtained at a moderate price and of a quality well adapted for the manufacture of iron, being remarkably free from sulphur and producing an excellent coke, (I believe present prices are from 7s. to 8s. sterling per ton for the best bituminous coal.) The intervening country already has good common roads, the main provincial railway between Pictou and Halifax is only 8 miles distant, and there are no special engineering difficulties to be encountered in constructing a railway between the coal and iron mines, either by the valley of the East River or by that of McLellan's Brook.

Limestone and building stone abound in the vicinity of these deposits, and there are also beds of clay iron-stone in the coal measures which might become sources of additional supply of ore.

The county of Pictou being one of the most populous in Nova Scotia, and already the seat of considerable mining industries, presents great facilities for obtaining skilled labour, machinery, and supplies of fuel. Wood, for purposes of construction as well as for charcoal-making, is abundant and cheap. The Harbour of Pictou and the Railway to Halifax, afford ample means of shipment.

Additional information as to the above deposits, and also as to the extent and quality of the Pictou coal, may be obtained in the Report of the Geological Survey of Canada for 1869, and in the writer's "Acadian Geology."

J. W. DAWSON.

Montreal, May 2, 1872.

Note on Spathic Iron of Sutherland's R.—No. 1 of previous page.

* As it may be important with reference to the question whether this ore would produce a *Spiegel-eisen*, I give Dr. Hunt's analysis:—

	I.	II.
Sesquioxide of Iron	16.98	20.52
Carbonate of Iron,	65.61	57.40
Carbonate of Manganese,	7.98	8.29
Carbonate of Lime,	2.67	4.02
Carbonate of Magnesia,	3.23	5.66
Silica,	3.76	2.38
Hygroscopic Moisture,	0.76	1.43
Sulphur	none	undet.
Phosphorus	.013	"
	101.003	99.70

No. 1 was a specimen from the Bank of Sutherland's Book. No. 2 was from a costeening pit about 75 feet farther westward.

Original
Merrill
R. B. Merritt

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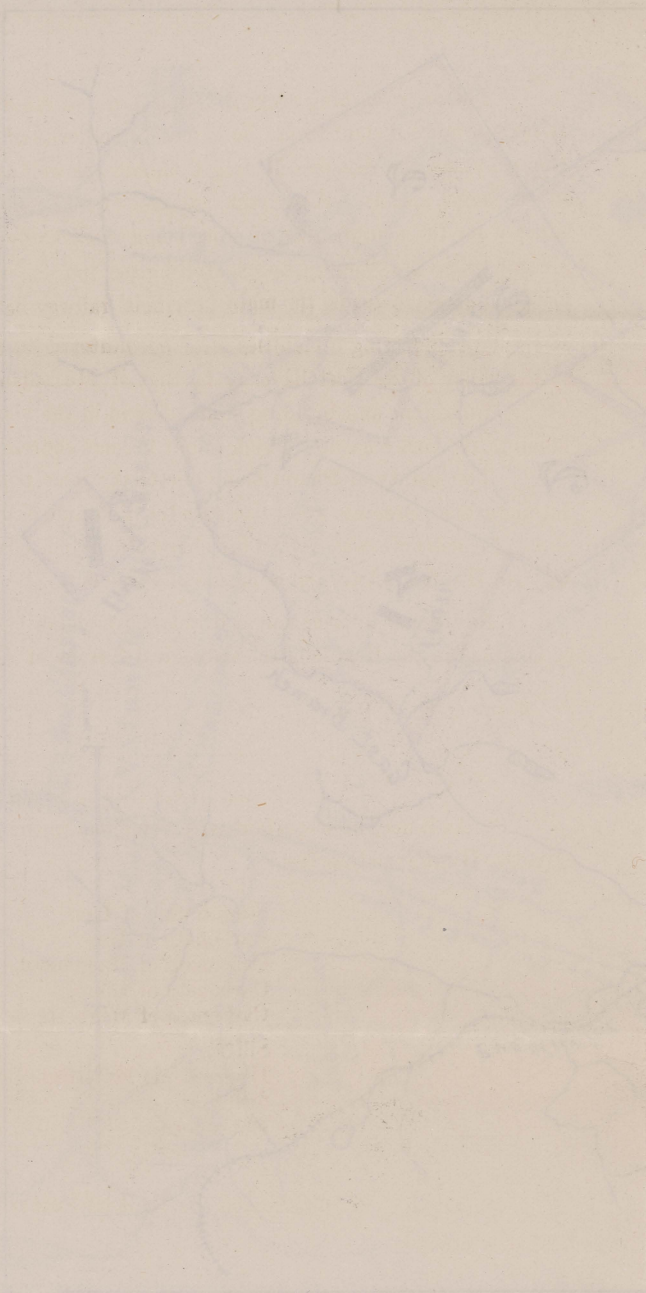
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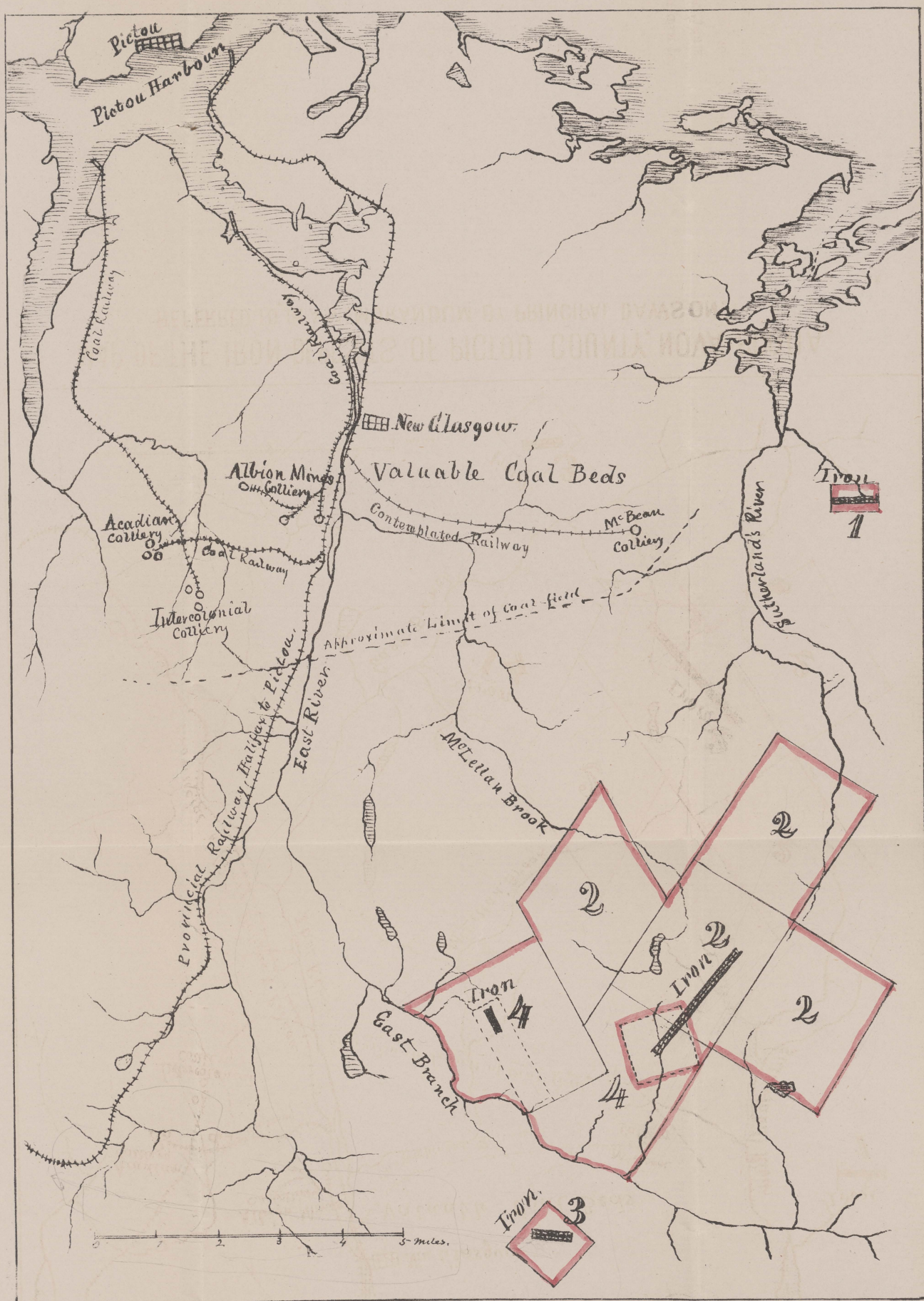
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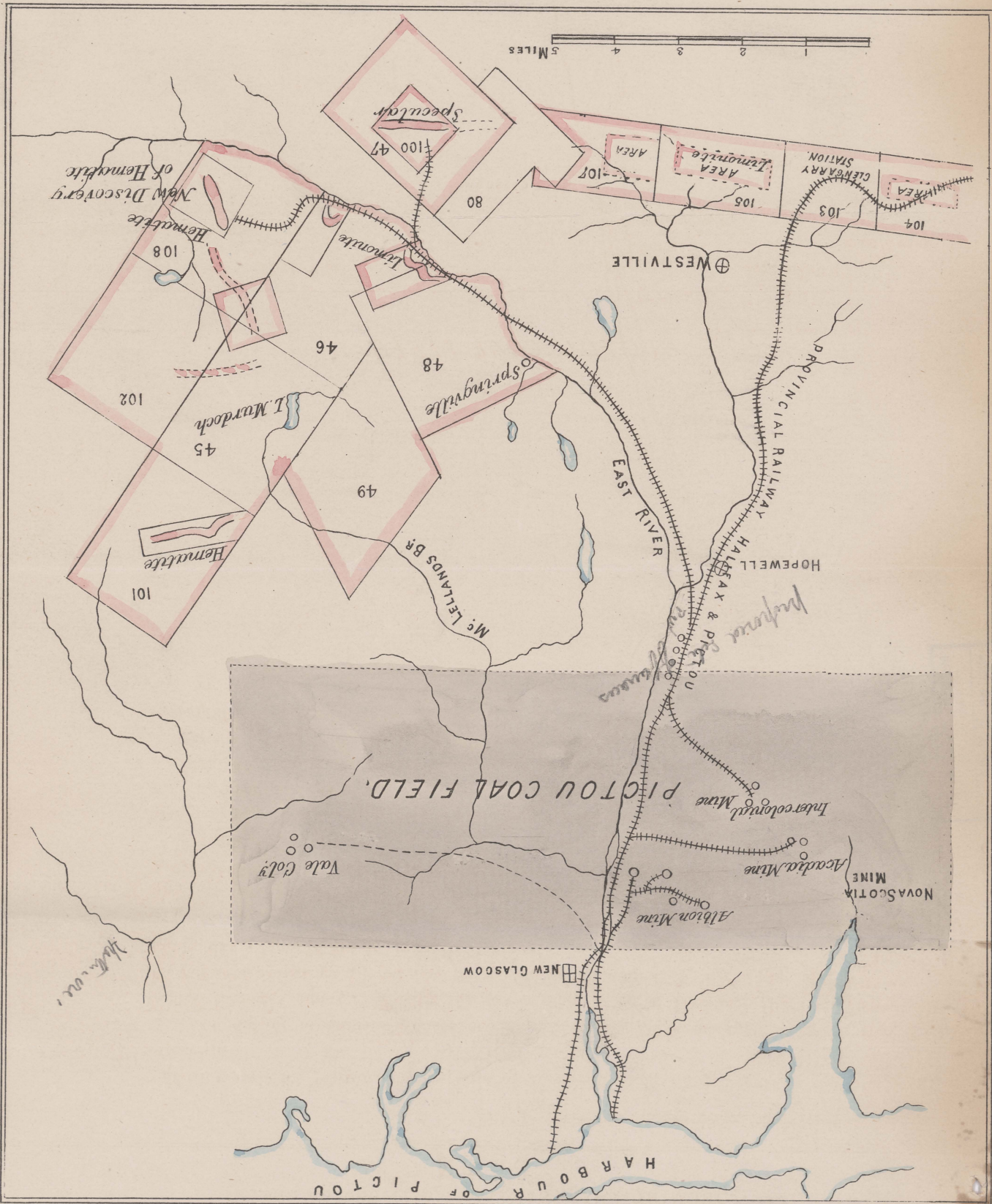




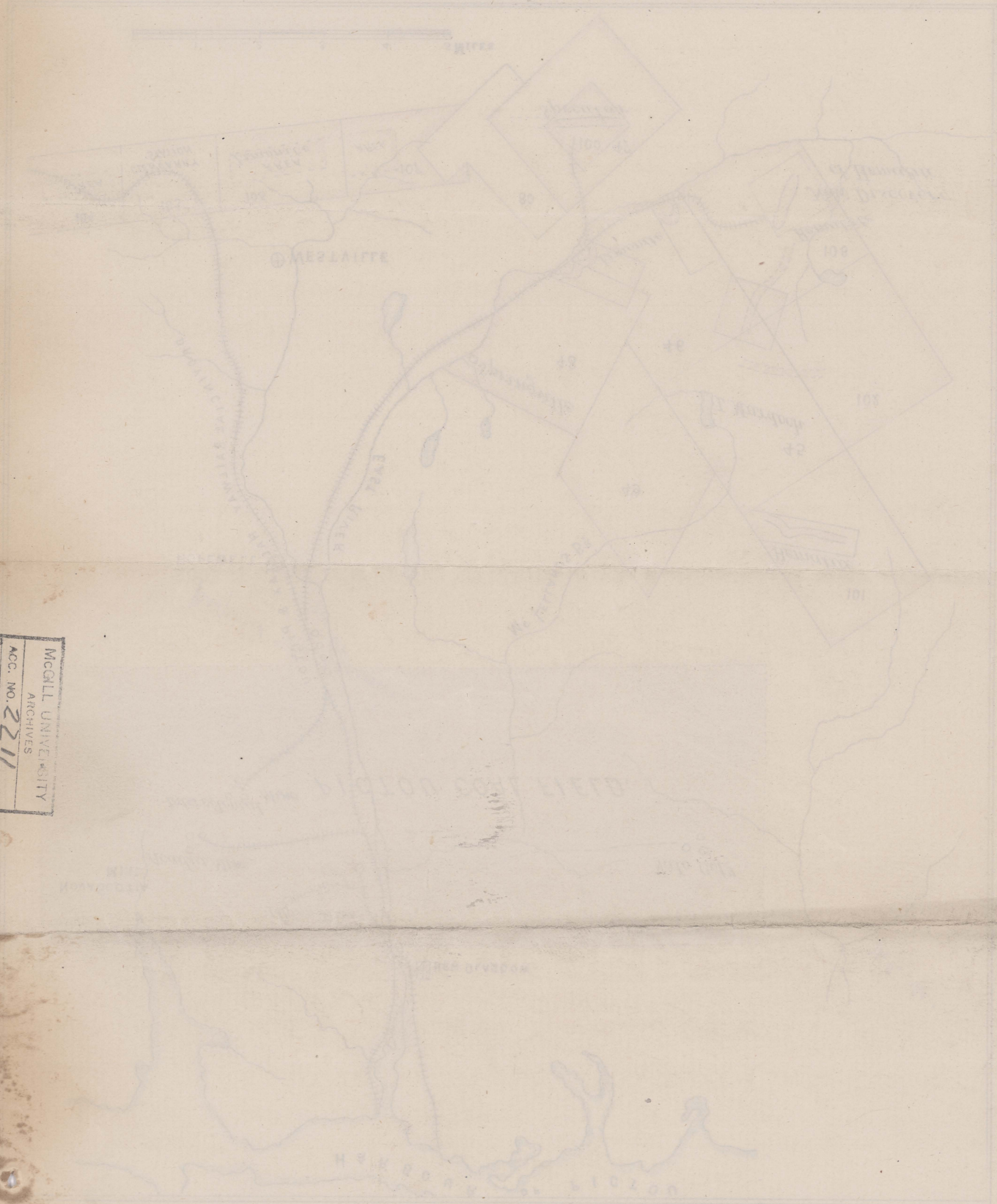
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Wm. W. W. W.
W. W. W. W.
W. W. W. W.
W. W. W. W.

PLAN
 SHEWING THE RELATIVE POSITIONS OF THE
 PICTOU COAL & IRON FIELDS.



VICTOR COALS & IRON FIELDS
SHOWING THE RELATIVE POSITIONS OF THE
B.G.M.



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