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# CANADIAN

# MINING REVIEW

VOL. 4.—No. 1.

1886—OTTAWA, JANUARY—1886

VOL. 4.—No. 1

## ROCK DRILLS, AIR COMPRESSORS,

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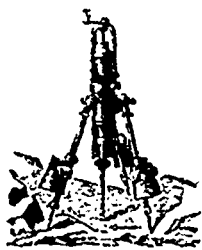
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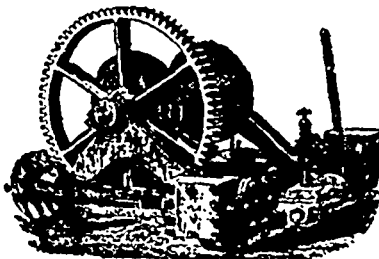
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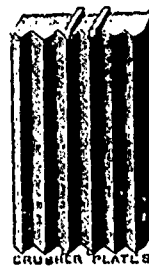
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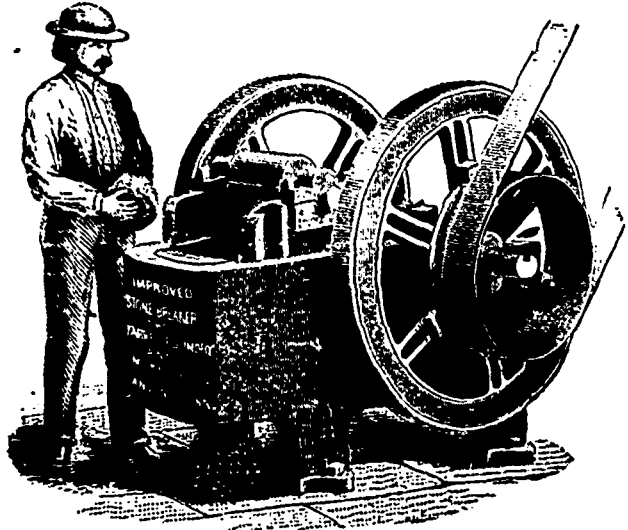
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**IMMIGRATION BUILDINGS, at the Quebec Breakwater.**

Plans and specification can be seen at the Department of Public Works, Ottawa, and at the Dominion Public Works Office, Post Office, Quebec, P.Q., on and after MONDAY, 25th inst.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures.

Each tender must be accompanied by an accepted bank cheque, made payable to the order of the Honorable the Minister of Public Works, equal to five per cent. of the amount of the tender, which will be forfeited if the party declines to enter into a contract when called upon to do so, or if he fails to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order, **A. GOBELL, Secretary.**

Department of Public Works, Ottawa, 19th Dec., 1885. 2ins

**DUK'S IMPROVED ELEVATOR BUCKET**

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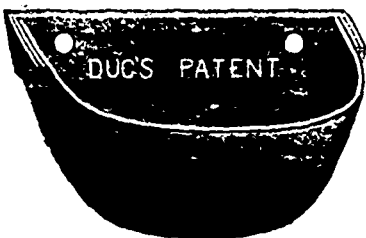
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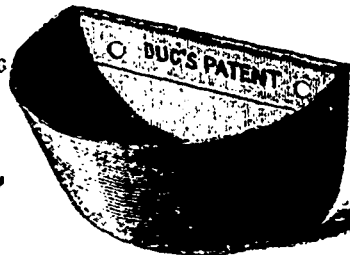
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Price reasonable and satisfactory reasons given for selling.

Full particulars obtainable at this office.



SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Engine House, Toronto, Ont.," will be received at this office until MONDAY, 25th instant, for the erection and completion of

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**At the Examining Warehouse, Toronto, Ont.**

Plans and specification can be seen at the Department of Public Works, Ottawa, and at the office of D. B. Dick, Architect, Toronto, on and after WEDNESDAY, 9th instant.

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The Department does not bind itself to accept the lowest or any tender.

By order, **A. GOBELL, Secretary.**

Department of Public Works, Ottawa, 19th December, 1885. }

**FOR SALE Valuable Phosphate and Farming Property,**

In the Township of Templeton, County of Ottawa, Province of Quebec, adjacent to the celebrated phosphate mines of McLaurin and Blackburn, Jackson Rac, J. R. Post, and others, consisting of

**LOT 14, RANGE 13 AND 1/2 14, RANGE 9, CONTAINING 399 ACRES.**

Dwelling-house, Barns, Stables and Out-houses, in good order, on the property, in proximity to a good phosphate opening from which several tons of high-grade phosphate have been raised, and where mining operations can be at once started.

The property has been partially prospected and several promising out-croppings of phosphate have been exposed. It has been pronounced a valuable phosphate location by miners working in the vicinity, and satisfactory reasons can be given for offering it for sale.

The owners, Messrs. Pearson, who hold a clear title to the lots, will sell them in fee simple, or the mining rights only.

Cost of transportation from the property to point of shipment will not exceed \$2 per ton.

For terms and full information apply on the premises, or to

**THE POSTMASTER,**

East Templeton, Pro. Que., Canada.

**MINERS WANTED.**

**50 Good Miners Wanted. 50**

Wages \$1.25 per day; regular board, \$3.00 per week.

For further particulars apply to **A. H. DeGAMP, Supt. Oxford Gold Mines.**

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**FIFTY EXPERIENCED MINERS.**

Wages, \$1.25 to \$1.55 per day; board, 3.00 per week.

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# Canadian Mining Review.

OTTAWA.

PUBLISHED MONTHLY.

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UNION CHAMBERS, 14 Metcalfe Street.

*The CANADIAN MINING REVIEW is devoted to the opening up of the mineral wealth of the Dominion, and its publishers will be thankful for any encouragement they may receive at the hands of those who are interested in its speedy development.*

*Visitors from the mining districts as well as others interested in Canadian Mineral Lands are cordially invited to call at our office.*

*Mining news and reports of new discoveries of mineral deposits are solicited.*

*All matter for publication in the REVIEW should be received at the office not later than the 20th of the month.*

*Address all correspondence, &c., to the Publishers of the CANADIAN MINING REVIEW, Ottawa.*

There are, at the present time, substantial indications that capital is seeking investment in mines and mineral lands, and those mines and mining locations that possess real value will be favourably regarded. Unquestionably good properties are in demand, but as capitalists have learned to discriminate, valueless properties need not be presented to them.

The discoveries that have been made during the year just closed indicate, in some degree, the magnitude of the mineral resources of this Dominion. In the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, the North-West Territories, and in British Columbia, important discoveries have been reported and verified, and it is to be hoped that the fortunate discoverers will see how greatly it would benefit themselves and the mining industry of Canada were they to offer reasonable inducements to capitalists to come forward and assist in developing these mineral deposits in order that they may be made productive and profitable.

On another page will be found an interesting summary, by Edwin J. Ball, Ph. D., of the progress made in mining during 1885. Mr. Ball's reputation as a Metallurgist and the position he occupies in the Royal School of Mines, London, England, must render anything from his pen of interest to our readers.

We had hoped to have been in possession, before now, of a complete statement of the asbestos mining industry of the Eastern Townships for the season of 1885, including an account of the operations at the various mines, their total output and the exportation. It has not yet reached us, but will undoubtedly appear in our next issue.

Towards the closing of the past year there were indications of an upward movement in the iron market of the United States. Between the 1st and 7th of December there were enquiries on the Cleveland, O., market for 60,000 tons of pig iron, of which 40,000 tons were Bessemer. Under this active demand prices advanced materially, and are still steadily creeping up.

In the same market, during the year just closed, more iron ore was sold than in any former year in the history of the trade.

The Colonial and Indian Exhibition to be held in London, England, commencing on the 1st of May next, will afford Canada a great opportunity to exhibit to the world at large the vastness and variety of her mineral resources. If there is not a creditable display of the product of Canadian mines, the mine owners will be held responsible, as the Minister of Agriculture, through the Geological Survey Department, has extended to them every facility for forwarding exhibits free of charge.

The fact is beginning to dawn upon the minds of men that the production of mineral is the only legitimate object and purpose of mines or mining operations, and that a sale is not the chief thing to be considered in locating and developing a mining claim. Men also realize that there is a vast difference in the comparative values of a mine and a claim. Capitalists discovered this fact some time ago, and when miners and owners have the same convictions the march of improvement and prosperity will begin.—*Mining Review, Chicago.*

The Metallurgical Association, Limited, is the title of a new company, registered in London, with the large capital of £300,000, in £1 shares, to acquire and work patents. Here is the long-desired "opening" for all metallurgical cranks. The notice speaks of £300,000 as a "large capital," but it should have been at least £300,000,000; for even that would be a small sum, compared with the inventors' valuation of a few of the grand metallurgical inventions brought to our personal notice, and which have been held back, waiting for just this opportunity to "revolutionize science." We would recommend that the capital be at once increased to at least the figure we have mentioned, and that rules be adopted to secure the equitable and safe division of the dividends, and, in the interest of the strictest economy and safety, that no inventor shall be paid in cash more than ninety per cent. of his own estimate of the value of his invention. The company should have an expert board of managers, composed exclusively of inventors upon whom unappreciative, cold, and heartless scientists have frowned.—*Eng. and Min. Journal, N.Y.*

## THE PHOSPHATE TRADE.

The last shipments of phosphate for the season, from Montreal, were made by Messrs. Wilson & Green and Lomer, Rohr & Co. on the 11th November, in S.S. Grassbrooke, to London, amounting to 629 tons, 419 and 210 tons respectively. We give below a statement of all the shipments from the opening to the close of navigation, from which it will be seen they have aggregated 23,908 tons, an increase of 1,765 tons over shipments for 1884. There has been a falling off in the amount forwarded from the Perth and Kingston districts, while the output of the Ottawa County mines has increased 2,055 tons. The prices realized for the year's production have been satisfactory to miners, some of whom have already made contracts for delivery next year at the current prices of the past season, which would indicate that they have been satisfied with the margin of profits these prices have afforded them. The increase in the annual production has not been as great during the past four years as there has been reason to expect, but there has been a steady increase, nevertheless, and it is not unlikely that it will be at a much larger ratio for the season of 1886. The production for the past five years has been as follows:—

1881.....	15,601 tons.
1882.....	17,181 "
1883.....	17,840 "
1884.....	22,143 "
1885.....	23,908 "

showing but a small increase for 1885 over 1884; but it may be said that the output for the season just closed, aggregating close upon 24,000 tons, has been of a higher standard than has ever before been forwarded from the phosphate mines of Canada, the analyses showing it to have analyzed over 80 per cent. Certain shipments from no less than four of the heavy producing mines have assayed upwards of 85 per cent. tribasic phosphate of lime, and we doubt if such results have been obtained at any other phosphate mines in the world.

The American Consul at Ottawa, Mr. T. W. Hotchkiss, in a recent report on the phosphate industry of Ottawa County, addressed to the State Department at Washington, says of Canadian phosphate: "When it was first introduced in the market it was looked upon with suspicion, through a want of actual and reliable knowledge of its value as a fertilizer; but today this state of things is entirely reversed, every pound of the output being contracted for by foreign buyers in advance of production. Being a more concentrated phosphate than is known to exist in any other part of the world, the product of Canadian mines is sought after to bring up fertilizers to a high percentage of phosphoric acid. Regarding the value of this apatite as a fertilizer, a reliable authority states that Canadian apatite contains 91.91 per cent. of tribasic phosphate of lime, according to the most scientific analysis. A comparative table of the composition of certain fluorapatites shows that, with the exception of three limited deposits in the West Indies and one in Spain,

### CANADIAN APATITE RANKS HIGHEST.

It may now be said that from no other phosphate mines in the world have shipments been made of so high a standard as have been forwarded from Canadian mines during the past season."

The American Consul refers to recent foreign reports as showing that in those portions of Europe where sugar beet is extensively cultivated—France, Belgium and Denmark—no fertilizer has been found to equal the mineral



obtained in German collieries with the Brandt and the Frölich drills.

Experiments which have been made with the lime cartridge appear to show that it is only of importance in the case of fiery pits, where their use gives better results than are obtained by the ordinary mechanical methods.

A very important paper on the "Thick coal of South Staffordshire" has been published by Mr. H. W. Hughes, who gives, for the first time, comparative results, obtained from actual workings, between the three methods employed for mining this seam; square-work, long-wall in one slice; and long-wall in two slices; and he shows that the old square-work system is by far the best, both as regards the percentage of large coal and the freedom from gob fires.

The influence of coal-dust on colliery explosions has been discussed at great length during the past year, chiefly in the Austrian papers, the general opinion being that coal-dust is a very much more important factor in colliery explosions than has hitherto been accepted, and Dr. Hilt in his report on this subject to the Prussian Commission on Fire-Damp gives the results of many hundred experiments which have been made on different varieties of coals. He shows that the character of the explosion is dependent on the nature of the dust, and on the simultaneous presence of gas; and that true coal-dust explosions can explode gas-mixtures, and that, similarly, gas explosions can explode collections of coal-dust. It was further found that while free powder always ignited coal-dust, dynamite shots, and even free-lying dynamite cartridges never set fire to coal-dust alone, and they only did so when upwards of 6 per cent. of gas was present. Wetting the dust was found to be of little use, unless at least one-half its weight of water had been employed.

Numerous safety lamps have been described or tested during 1885, and those employed in the Ostrau-Karwin mining district, Austria, have been described at great length by J. Mayer in the Oesterreichische Zeitschrift für Bergund Hüttenwesen. Dr. C. Le Neve Foster, in his report on the mining exhibits at the late International Inventions Exhibition, in describing Mr. E. Evans' lamp, states that if it be placed in an explosive atmosphere, the gauze becoming filled with flame, a fine cord is burned through, which, releasing a shield, shuts the lamp entirely off from the surrounding atmosphere, and it goes out before it can lead to an explosion.

Several portable electric lamps have been proposed, but they fail chiefly on account of their weight, and it seems hopeless to look for much improvement in this direction until some very much lighter material is used in secondary batteries than those at present employed.

In several instances the surface works of collieries have been lit by the electric light with considerable success.

Various fire-damp indicators have been brought forward, the simplest being that invented by Mr. Garforth, who uses a flexible india rubber ball, which he fills with the air to be tested, and which is then ejected into the flame of a lamp.

With regard to winding ropes, Dr. Foster states that the locked-wire rope, invented by Mr. Latch, has many advantages over the older forms of wire-rope, especially as regards comparative strength. Several modifications in the methods of winding have also been described.

Wire ropeways have been erected at several mines, more especially in Austria, the one at Raibl having a free span of 700 metres.

The use of electricity as a motive power is gradually coming into use, and a small line has

recently been erected in England in which a number of trucks are moved along a wire rope-way by a current passed through a receiving dynamo attached to the train.

The experiments with the Soda locomotive have been continued in Prussia, but are not yet completed. The Lentz fireless locomotive is based on the one originally designed by Dr. Lamm, of New Orleans, and it consists of a boiler provided with an air-jacket and covered with non-conducting materials, which is partially filled with water, into which steam is passed from a generating boiler. The water becomes superheated, and, cooling slowly, gives off steam during a considerable period. The engine is chiefly intended for underground work.

But little of novelty with respect to ore-dressing has appeared, but an important paper on coal-washing plant was read by R. de Soldenhoff before the South Wales Institute of Engineers.

Wire rope has been successfully employed in Sweden in the place of ordinary pump rods; and with regard to deep boring, the bore-hole at Schladebach in Germany is said to be the deepest in existence, having reached, on Sept. 26th a depth of over 1656 metres, the temperature at the bottom being 44° C.

### THE HURONIAN MINE.

The opinions of mining experts and men of experience in mining and milling ores are always sought after by mine owners, and those owners who wish to succeed in mining ventures should permit themselves to be guided by the men who have made a life-long study of a business which they are engaging in, perhaps, for the first time. In the case of the Huronian mine, in the gold region west of Port Arthur, Lake Superior district, the company has had the benefit of an opinion, as to the value of its property, from Mr. Charles F. Eschweiler, M. E., of Milwaukee, who was employed as Superintendent of the mine during last summer. Mr. Eschweiler expresses himself in the highest terms as to the richness of the mine, and before retiring from the superintendency he volunteered sound, practical advice to the company for its guidance in the future working of the mine. His opinions and advice have been endorsed by Mr. Richard Crow, of Colorado, who had charge of the company's mill, under Mr. Eschweiler, and who also retired after he had succeeded in putting the mill in proper working order. Mr. Crow's opinions are very plainly and forcibly expressed in the following letter addressed by him to the company's manager:—

*Thos. A. Keefe, Esq., Manager of the Huronian Mining Company, Port Arthur, Ont.*

DEAR SIR,—Before leaving for my home in the West, I wish to convey to you the very high opinion I have of the Huronian Mine.

In the Western States such a mine would be considered one of great value. It has a vein which, when once properly opened up, can be made to supply a large sized mill. The longer the mine is worked the greater will be the profit derived from it.

The results of your recent mill tests show it to be a mine capable of being made a very large dividend paying concern. Those results can be improved on by abandoning the free milling process and increasing the lift of the present stamps, so that each of your batteries of five stamps will crush about two tons more per day, making the crushed product from each battery about ten tons per day. This would be an important item in working a large mill.

By putting up a new mill with stamps with double issue, and three or four vanners to each battery of five stamps, you could reckon on two batteries of five stamps doing at least as much as three batteries with a single issue.

The Huronian mine vein is very heavily mineralized, much more so than the majority of gold bearing veins. There is a splendid and most convenient site for a new mill close to where your main shaft would be. The water conveniences are admirable and your wood supply abundant. After an experience of over twenty years in the mines and mills of Colorado and the western States, including several months at the Ropes' Gold Mine on the south shore of Lake Superior, I have no hesitation in saying the Huronian mine will compare favorably with some of the best of them, and that it is a most valuable property.

Yours truly,

RICHARD CROW.

### SILVER MOUNTAIN.

#### THE WEST END MINE.

Early in December a shipment of ten tons of ore was made from the west end of Silver Mountain, which created quite a flutter of excitement among the mining fraternity of the town of Port Arthur, who await, with unabated interest, the verdict as to the value of this first shipment from the location.

During last summer a short tunnel had been driven which tapped the vein about twenty feet below the surface outcrop, and from the point of intersection a shaft was sunk to a depth of twenty-three feet. When this work had been accomplished, some intending purchasers visited the property and proceeded to take out a quantity of ore to be submitted to a mill test. The shaft was carried down for some distance, and between the 25th of October and the 21st of November, with but five miners employed, the requisite quantity of ore was obtained. It would be difficult to estimate the value of the ore shipped, even approximately, though it has been stated by some who may be considered fair judges, that it will yield from \$300 to \$500 per ton, in which case it will be a most satisfactory result of less than a month's labor of five men. In addition to the ore shipped, a quantity was raised of a lower grade, which, owing to the cost of transportation, can be made valuable only if treated at or near the mine.

The shaft at the West End mine is down thirty-two feet below the tunnel, or fifty-seven feet below the surface outcrop. From the surface to the bottom of the shaft the vein carries good pay ore, but it is unquestionably richest at the lowest point yet reached. The result of the mill test of the shipment of ore above referred to will settle the question of a sale of the property, for or against.

M. J. J.

#### EAST END MINE.

The following extract from a letter received by a gentleman of Port Arthur from an expert who visited the east end of Silver Mountain shortly after the Cleveland company stopped work, gives an interesting account of the work done. He says: "I looked over the Cleveland company's work to-day, and find that it has all been devoted to the rich little vein; except the shaft on the top of the hill. The upper tunnel starts from a few feet north of the main vein, and runs from it towards the little one for about seventy feet, and then angles towards it for some thirty-two feet. In a few days they

would have cut through to the main vein and seen what it was like, had not the work been stopped. It is a great pity so much time and money should have been wasted in the tunnel and the main vein left totally untested, except at the top, where the chances of getting good ore were so much less. If the company had secured a survey and plan of only about 1,000 feet in the vicinity of their work, as well as of the work done, a glance would have shown how far astray they were, so far as giving the main lode any trial was concerned.—*Port Arthur Sentinel.*

## LAKE OF THE WOODS Gold Mining District.

Among the mining districts of Canada none has, perhaps, attracted so much public attention and produced so little tangible result in the shape of successful and flourishing mining concerns as that of the Lake of the Woods. It is some half dozen years or more now since the pioneer prospector, Frank Moore, brought in the first gold-bearing quartz, and from that time on Rat Portage has been enjoying a quiet little "boom" of its own. Its prospects as the centre of a mining district, together with the saw mills that then began to cluster around it, and the advent of the railway, have built it up from a mere Hudson's Bay Company's outpost to a thriving town of no mean pretensions and hopes. There has been the usual influx of gold hunters, both speculators and prospectors; the usual egress of the disappointed and disgusted, carrying off with them very valuable experience, doubtless, but leaving their money behind them, and the usual percentage of pilgrims to these rocky, rough-pathed shrines of Mammon who have pinned their faith on the place, and having taken up as many claims as they could conveniently persuade surveyors to take shares in payment for the surveying thereof, have settled down as the "ragged millionaires" of the town, waiting with impatience for the propitious turn of fortune's wheel that will enable them to "realize." With all this coming and going and prospecting, the town of Rat Portage has thriven, and bids fair, by an intelligent development of her natural resources, to make for us some day a busy, vigorous city at the western gates of Algoma. Every chain almost of the lake shore and its thousands of islands has been explored in the search for auriferous veins. Hundreds of locations have been taken up in some fashion or another, and half as many have been surveyed and officially applied for; many *bona fide* mines have been started, and many thousands of dollars have been sunk in genuine enterprise; and yet there has been no assuredly successful mine established. Failure or suspension of work *sine die* has been the rule, with one or two exceptions. Expensive machinery has been brought in and expensive buildings have been erected on some locations, only to be pulled down and carried off, or left to take care of themselves, two or three years later. Why is this? There certainly is gold in the country, and some leads carry such percentages of it as, any expert would declare, should authorize mining operations. The men who know the country have confidence in even its immediate future, in spite of these failures. The hard real fact that quartz showing free gold is being constantly brought from different parts of the lake, and that repeated assays have demonstrated that it

is in such quantity as will pay to mine, and the knowledge that similar grade ores are mined successfully in other countries is more than enough to sustain the faith of the believers in the mineral resources of the Lake of the Woods region, in spite of individual failures. If we examine for a moment the cause of these failures and the causes of the general lameness that has characterized mining enterprise in this region hitherto, we shall see that there is no real cause for alarm as regards its prospects as a mineral producing country. First we find that most of the mining schemes set on foot in the Lake of the Woods district were closely associated with the famous land boom in Winnipeg some few years ago, when every chance speculation that offered was eagerly snatched at. Companies were then formed to mine gold on the Lake of the Woods, but before they were well started the boom flattened out, money became scarce, and the mines, after dragging on a half-hearted life for a few months, and getting deeper into debt than into their lead, gradually ceased to evince any signs of life. But not only was this display of enterprise nipped in the bud by the frost of poverty of funds, but had all the money necessary been forthcoming it would in some cases have been expended in mining leads that a little knowledge of mining engineering and a little scientific examination would have shown could have yielded no adequate returns for the expenditure. Enterprise of this kind, misdirected or weakly sustained, is a questionable boon to a mining district, and the failure it brings to itself brings with it discouragement to others. In many of our new mining fields in Canada, ignorance of the principles of mining, and bad management in the initial outlay, is the fruitful source of failure, and the Lake of the Woods is no exception. The advice of trained mining engineers is sadly wanting in most mining concerns, and the importance of the profession is not recognized as it must be if we are to become the great mineral producing country we now give promise of. Another unfortunate obstacle in the way of the progress of the Lake of the Woods district has been the delay in patenting claims, necessitated by the uncertainty of jurisdiction pending the boundary award. The refusal of both Dominion and provincial authorities to grant patents for mining locations has certainly deterred several capitalists from investing their money, although assured of the success of the venture by personal examination and prospecting of the location offered for sale. This is especially true of Americans, who view with distrust any suspicion of uncertainty as to their patents. The settlement of this vexed question and the issue of patents will probably be the signal for the influx of a moderate amount of American capital, which, if expended in a business-like way, will be of the greatest service in developing the region. Gold there is; but to win it from the rocks it is essential to be able to command both money and engineering skill. The gold, though in fairly paying quantities, is rather finely disseminated, and its treatment requires careful and economical management to secure good profits, since there is not likely to be any bonanza that will render good or bad management a matter of indifference.

The Bank of England by law is obliged to purchase all gold bullion offered to it of standard fineness at 77 shillings and 9 pence per ounce, which bullion it can have coined at the mints at the rate of 77 shillings and 10½ pence per ounce.

## KINGSTON RED GRANITE.

The question having incidentally arisen as to the relative durability of so-called syenite and granite under conditions of exposure and abrasion, it was thought desirable to obtain scientific opinion. The question was accordingly submitted to Mr. Willimott, a well-known scientist in high official position. The written opinion of that gentleman is contained in the following letter addressed to the president of the Canadian Granite Company:—

A. MACLEAN, Esq.,

President Canadian Granite Co., Ottawa.

DEAR SIR,—Yours of the 30th at hand, asking my opinion of the relative value of the so called Syenite now being used by the corporation of Ottawa for road macadam, and the "Canadian Granite Co.'s" granite from Kingston.

The rock called syenite is probably a hornblende gneiss (the latter mineral greatly predominating), together with a small quantity of feldspar, and variable proportions of quartz. The whole impregnated more or less with iron pyrites.

The granite, which is of a medium grained texture, is composed of a dark salmon red cleavable feldspar, without any apparent visible signs of decomposition. This material is cemented with a bluish white opalescent quartz in just sufficient quantity to give binding properties to the feldspar, the two minerals assuming great uniformity. There are two accessory minerals, hornblende and mica—the former occurring in greenish black specks, and the latter much more sparingly in disseminated scales. In texture it is much finer grained than the Bay of Fundy, and of a more decided color.

The granite is harder than the syenite, but not so tough; this superiority of the latter, however, is sadly marred by the presence of distributed pyrites, which in some cases mark the lines of stratification. This mineral decomposes very rapidly, leaving small empty cells, and thereby increasing the absorptive power of the rock. So, altogether, taking the inferior hardness of the syenite and its likelihood of early disintegration, I cannot but think the granite altogether better calculated for road material.

We may imagine two pieces of the same size, one the syenite, the other granite. When first laid down the syenite is probably the toughest, but after the lapse of a very short time it would be found that the granite would resist a much greater strain than the syenite, through reasons before mentioned. And again, leaving the decomposing agent (pyrites) out of the question, the syenite, on account of its inferior hardness, would be reduced to its minimum in much less time than the granite.

I am, dear sir,

Yours respectfully,

CHAS. W. WILLIMOTT.

## Iron Mining in Ontario.

The only iron mine that has been continuously worked during the past year in the Province of Ontario, is the *Coe Hill* mine in the County of Hastings, but, on account of the low price of iron, there has been a limited shipment of ore. Up to the 6th July, when the company ceased forwarding from the mine, about 10,000 tons had been shipped and since that date upwards of 20,000 tons have accumulated in the ore heap and await shipment when the market will have improved. This mine is operated by the Ontario Central Railway Com-

pany, and the ore is shipped to Cleveland. It is one of the most promising iron mines in Canada and is rapidly developing into a heavy producer. The vein varies in width from 12 ft. to 40 ft., and has an average of quite 20 ft., as has been proved by three shafts sunk on the vein to the depths of 95 ft., 100 ft., and 130 ft. respectively.

In Tudor Township, County Hastings, work was started at the *St. Charles* mine in October the object being merely to prove the vein and forward a shipment of ore, before the close of navigation, to be tested. The vein appears to have a width of about 30 ft., and on it a test shaft has been sunk 25 ft. in depth disclosing a fine body of magnetic ore. This mine is situated within a mile of the track of the Ontario Central Railway, and a spur has been put in which connects it directly with the main line.

## CORRESPONDENCE.

### MINING NEWS.

*Editor of the Canadian Mining Review :*

SIR,—I have been a constant reader of your paper from its commencement, and I wish to congratulate you on the steady progress which has been made by *THE MINING REVIEW*, until it is now recognized as a well established medium of great value to the mineral interest in the Dominion. There is one point, however, to which I would like to call the attention of your numerous readers, namely, the importance of their sending you mining news and reports of the discovery of minerals. It has often been a matter of surprise to me how you are able to obtain the large amount of news of this sort which *THE REVIEW* already contains. Your efforts to supply a good mining paper deserve to be more generally seconded by all mining men, and in fact by everyone interested in any way in the development of the mineral resources of our common country. Hereafter I shall send you any items of information of this kind which come in my way, and if other miners in all parts of the Dominion would do the same we could make *THE REVIEW* more valuable to each other, and create a more general interest in a real live mining paper. It is impossible for the editor of a journal devoted to a special subject, no matter how gifted he may be, to know everything which may be going on over the length and breadth of half a continent. I am sure that all miners and mine owners in the country wish you success in an enterprise so well calculated to benefit themselves, but the trouble is that there are not enough of them who have been willing, heretofore, to sit down and write you from time to time what they know would be of interest to your readers, and which they would be quite willing to tell if asked verbally. The information I refer to might often be the means of leading to a sale and the development of valuable properties, which would otherwise never be heard of by those desirous of investing in them. Although most of us are more accustomed to handle the pick than the pen, still I have no doubt, Mr. Editor, that you would value even rough or hurried notes on new discoveries, or on the condition or progress of any mine or mineral property that may be working, and that you would put such notes into shape for the press, or see that the printers' proofs were carefully revised. I trust, therefore, that many other miners will join in helping along *THE REVIEW* in the way I have indicated.

OLD MINER.

[Since the first number of *THE REVIEW* was issued, our experience has been such as to lead

us to endorse the sentiments expressed by our correspondent, and we feel ourselves indebted to him for his practical suggestions. Canadian mining news and reports of new discoveries of mineral deposits cannot reach those interested in such matters through a better or a more direct channel than by appearing in the columns of this journal. It is always available for the publication of reliable information, and it would be gratifying to us if our readers will be guided by the hints thrown out by "Old Miner" and use *THE REVIEW* more generally for distributing news and reports affecting the mineral resources of the Dominion.—Ed.]

### Canada Consolidated Gold Mine.

This property has been worked for some years but, as yet, unsuccessfully, and from the reports which have reached us from time to time we are forced to believe that the cause for this is not due to poor ore or to the size of the veins that have been opened, and must be looked for in the management or in the manner in which the ore has been treated. The mine is situated in the Township of Marmora, Hastings County, Ontario, and within a short distance of the village of Deloro. Three shafts have been sunk on a vein, varying in width from 5 to 15 ft. and averaging about 7 ft., and some drifting and stoping has been done on the vein. The deepest of these shafts is now at a depth of 135 ft. and drifting and stoping has been done at the 60 ft. level. Another shaft known as the *Tuttle*, is down 60 ft. on the vein, from which level they have been drifting and stoping with a view to meet the 60 ft. level of the deep shaft, and from this portion of the vein the richest ore has been obtained. The workings from these two shafts are now about 180 ft. apart, and between them (the *Tuttle* and deep shaft) another shaft is being sunk to catch the common 60 ft. level, but we are not informed for what purpose this third shaft is being put down. The ore of this vein is a mispickel, rich in arsenic and carrying about \$15 in gold, per ton. If there is no fault to be attached to the management at this mine, and if the ore is properly treated, it is difficult to find a tangible reason why a vein averaging nearly seven feet in width and carrying quite \$15 to the ton in gold, as well as a large quantity of arsenic, cannot be worked at a handsome profit. These are the conditions at the Canada Consolidated Gold Mine in Hastings County; a seven feet vein yielding \$15 per ton in gold and rich in arsenic, and yet it has been, up to the present time, a losing enterprise. We will be pleased to any one who will account to us for this state of things.

### MANUFACTURE OF IRON IN CANADA.

At the meeting of the American Institute of Mining Engineers at Halifax, in September last, a paper was read by Mr. J. H. Bartlett, of Montreal, giving a complete resumé of the attempts which have been made to manufacture iron in the various provinces of the Dominion since the year 1737 to the present time. Mr. Bartlett has compiled his paper from reports of recognized authorities on the subject, who have, from time to time, been employed to investigate the iron industries, and from facts obtained from the records of the various organizations which have been engaged in the manufacture of iron in Canada during the past century and a-half. Mr. Bartlett's paper presents the facts as he has found them, after much

research, to exist, and, without offering any comment, leaves us to draw our own conclusions. The information that he has put into our hands is such as to lead an enquiring mind to look for the cause of the repeated failures he has thus placed on record, and he leaves us to find out for ourselves why, in almost every instance, disappointment should have attended the efforts of our iron manufacturers rather than a realization of the success promised them by promoters. It is evident that Mr. Bartlett's intention has been to open up a broad field for discussion, and for our own part we congratulate him on his success in so doing. In almost all instances in Canada, of which we are informed, where attempts have been made to manufacture iron profitably, and have proved abortive, the cause of failure can be traced to bad management, ignorance, and systematic disregard of economy, together with too limited capital, and, in many instances, unlimited capital could not have overcome the disastrous effect of the shortcomings of promoters and managers—perhaps mismanagers might be more appropriate. Mr. Bartlett's paper has disclosed unpleasant and uncontrovertible facts, and in the absence of an intelligent explanation of their existence the industry of iron manufacturing in Canada will not, henceforth, hold out much inducement for the investment of capital. It now behoves those who are interested in the development of our iron ore deposits to account for the cause of failure in the past, and to point out a place whereby iron can be successfully and profitably produced.

It will be impossible for us to publish Mr. Bartlett's paper *in extenso*, and we, therefore, content ourselves with printing the following review of it which has appeared in the *Cleveland, Ohio, Iron Trade Review*:—

"The history of iron manufacture in Canada appears to have been written in failures. Reading with much interest the 35 pages of a paper read before the recent Halifax meeting of the American Institute of Mining Engineers, by James Herbert Bartlett, of Montreal, on 'The Manufacture of Iron in Canada' we have been struck with the almost uniform disaster which has attended the efforts of enterprising capitalists to utilize the mineral resources of the Dominion. The discovery of iron ore in the St. Maurice district of the Province of Quebec dates back to 1667, when the West Indian Company had a practical monopoly of all mines and minerals in that vast region. It was not until 1737, however, that, after numerous vicissitudes, any practical effort was made to utilize the mineral wealth displayed. In that year 'La Compagnie des Forges,' being duly chartered by Louis XV., of France, erected a blast furnace. Want of capital, however, caused a suspension of the works, and the Crown took possession of and operated them. The iron was sold at the rate of from 25 to 30 castors (beaver skins) per hundred-weight. Quantities of it were also exported to France. The works finally passed into the hands of private parties by lease, and by 1810 the manufacture of iron was the most important industry in Canada, there existing then a considerable export of cast-iron articles, particularly of stoves. From one set of men to another the works descended until they passed into the hands of the present owner, Mr. George McDougall, of Three Rivers, the furnace having been in blast till the summer of 1833, when, owing to the ore and fuel becoming exhausted, it was finally closed. When working it was the oldest active blast furnace on the American Continent. Toward the last its business had steadily fallen off until there was no profit in it.

We have cited this particular instance, first, because it was the pioneer iron-making enter-



prise of Canada, and secondly, because it is but a type of nearly all the concerns which have followed it. The Radnor forges, at Fermeville, established in 1860, sunk over a million dollars through bad management and were finally destroyed by fire. L'Islet Blast Furnace, near St. Maurice, has not been in operation for years. The Canada Iron Mining and Manufacturing Company's blast furnace, at Hull, was started in 1857 and soon after abandoned as a failure, economically. The St. Francis River Mining Company's furnace, in the County of Yamaska, built in 1869, was abandoned in 1880 on account of the exhaustion of the ore supply. The same may be said of the works at Baie St. Paul, Moisie, Quebec, Haycock, and Montreal (abandoned after \$80,000 had been spent in experimenting with crude petroleum as fuel). The only successful works in the Province of Quebec are the Grantham Iron Works, in the County of Drummond, and four concerns in Montreal.

Turning to Ontario, we find the history of her sister Province repeated in nearly every instance. The first attempt to manufacture iron in Ontario was made at Lyndhurst, County of Leeds, in 1800, water being utilized to drive the machinery and work the blast. Only ruins remain to tell the story of the ultimate financial disaster. Normandale Furnace, in the County of Norfolk, built in 1815, made a few tons of iron and then became "bunged up" and sent the disheartened projector to his grave. Subsequently it enjoyed a term of high prosperity but was ultimately abandoned on account of the failure of the supply of raw materials. Another "big hole" into which English, Canadian and American capital was successively "blown" was the Marmora Iron Works, once successful, but now in ruins. The Madoc Blast Furnace, built in 1845, had a short run and finally ran into the ground. So, also, with the Houghton Iron Works, the Furnace Falls Iron Company (1882), the Toronto Rolling Mills and Iron Works (1860-1873), the Steel, Iron and Railway Works Company, of Toronto (1866-1873), Dale's Patent Steel Company, Toronto (1873), and the London Steel Works (1853-4)—all tell the same wearisome and disheartening story. The only iron works now running in Ontario are the Hamilton Iron Forging Company and the Hamilton Rolling Mill.

In New Brunswick only one attempt has been made to erect smelting works, namely, at Woodstock in 1835, which, however, were closed down in 1862. Three rolling and forging mills are now running—one at Coldbrook and two at Portland.

In the discovery of iron ore Nova Scotia precedes all other provinces, first mention of the same having been made in 1664. The first attempt to manufacture iron was not made, however, until the beginning of the present century. Passing over several minor projects (which, it seems needless to remark, resulted disastrously), we refer briefly to the celebrated Acadia Iron Works, at Londonderry, only to say that, after a remarkable history of ups and downs for 35 years, during which millions of dollars have been sunk, they are now in liquidation. There are at present in operation four successful forge and plate works at Halifax and Trenton.

Subsequent to the publication of the foregoing, Mr. T. D. Ledyard, of Toronto, addressed a letter to the Editor of the *Iron Trade Review*, which has since appeared in the columns of that journal, as follows:—

"I noticed an article in a recent number of the *Review* giving a doleful account of failures of iron works in Canada. It is only too true that many of these enterprises have been unfortunate, generally, however, through bad management. There was great extravagance in connection with the Marmora Iron Works and the iron was teamed about 60

miles to Belleville at great expense. John McDougall, of the Caledonia Iron Works, Montreal, and McDougall, a son, of Three Rivers, in Quebec, have been successful for a number of years in smelting iron, mostly from box ore. It is difficult to see why a furnace in connection with such an ore property as described in the enclosed report should not be successful. There is plenty of excellent ore, well situated, with fuel and flux close at hand." Yours truly, T. D. LEDYARD.

If our view of the manufacture of iron in Canada was a trifle doleful, our correspondent will have to settle that with the writer of the paper read before the Halifax meeting of the American Institute of Mining Engineers, whose main points were condensed into our article.

The deposit referred to by Mr. Ledyard is in the township of Belmont, Peterborough, Ontario, six miles west of the Central Ontario Railway and within four miles of connection with the Ontario & Quebec Railway. Selected specimens of the ore have analyzed as high as 64.26 per cent. of metallic iron, as low as 0.04 per cent. of sulphur, a faint trace of phosphorus and no titanium. Explorations appear to show that the deposit is of wide extent. The ore is strongly magnetic and of fine grain. Professor Hayes, of Toronto, says of the advantages which this district affords for the smelting of ore:

"The facilities for obtaining hard wood and charcoal from the surrounding country are especially favorable, from the close proximity of Belmont Lake and its tributary waters, including Crow River, which flows through Lots 14 and 15 of the same range, within a mile and a half of the mine. A fine site for erecting a blast furnace is found on Crow River close to the branch railway line, on which there is also powerful and never failing water power. A abundance of limestone for flux is found on these waters."

It is estimated that the ore can be laid down at the furnace for \$1.25 per ton. The Canadian Government gives a bonus of \$1.50 per ton on all iron and steel manufactured in Canada. With such apparently favorable conditions as these, the question would naturally arise, Why has not capital long since taken hold of an enterprise so promising?

We would urge others to take up the subject as Mr. Ledyard has done and to point out the advantages of iron smelting in Canada, in contradistinction to the unhappy experience of the past, as pointed out to us by Mr. Bartlett.—(Ed.)

#### ORIGIN OF THE NATIVE IRON OF GREENLAND.

Since 1813, pieces of native iron have been brought from Greenland by many explorers, and have, in nearly every case, been ascribed to meteoric origin. Steenstrup, in his third voyage to Greenland (1876-1880), however, found the iron native in a basaltic rock at Asuk, in grains varying from a fraction of a millimeter to eighteen millimeters. It is also found on the western and northern sides of Disko Island, and in other places. This settles beyond a doubt the question of the origin of the Greenland native iron, and the ore may be of great commercial importance in the future.

#### IMPROVEMENT IN THE BESSEMER PROCESS.

An improvement has been made on the Bessemer steel process at the Edgar Thompson Steel Works which, it is said, will have the effect of making Bessemer steel equal in quality to crucible steel, while it will cost only about one-tenth of the price. The change consists in a thorough mixing of Spiegel iron or manganese with molten iron in a ladle, so as to uniformly carbonize it. Bessemer steel can be produced at a cost of a cent to a cent and a half per pound, while that made in crucibles costs at least eleven cents per pound.

It is in contemplation to erect a large asbestos manufacturing mill at Thetford, Quebec.

#### MINERAL WOOL.

In the last issue of the *REVIEW* we referred briefly to this material and the various uses to which it can be applied to advantage. It is also known by the name of *silicate cotton*, and is useful for the insulation of heat, as a protection against frost, for a preventive of the spreading of fire, for deadening sound, and as a safeguard against the ravages of rats, mice and insects. *Mineral wool* is the slag of blast furnaces converted into a fibrous state. The process consists in subjecting a small stream of the molten slag to the impelling force of a jet of steam or compressed air, which divides it into innumerable small shot or spherules, forming a spray of spark-like objects. The threads are spun out immediately upon the detachment of the slag particles from the main body of the stream, their length and fineness being dependent upon the fluidity and composition of the material under treatment. When the slag is of the proper consistency, the shot are small at the outset, and are to some extent absorbed into the fibre; but in no case will they entirely disappear, so that it becomes necessary either to separate the two while still in mid air, by strong currents, or else to put the bulk of the product through a riddling machine. The finer and lighter threads are carried away from the shot, and heavier fibres, making a gradual separation between the extreme fine and the coarse. The production is divided into two grades; the *ordinary* includes all the *mineral wool* weighing over fourteen and less than twenty-four pounds, and the *extra* includes what weighs less than fourteen pounds to the cubic foot.

The resemblance of the fibres to those of wool and cotton has given the names by which the material is known, *mineral wool* and *silicate cotton*, but the similarity in looks is as far as the comparison can be followed. The hollow and jointed structure of the organic fibre, which gives it flexibility and capillary properties, is wanting in the mineral fibre. The latter is simply finely spun glass of irregular thickness without elasticity or any such appendages as spicules, which would be necessary for weaving purposes. The rough surfaces and markings of the fibre can only be detected under a strong magnifying glass.

The drawing out of the fibres is a mechanical operation; it is a remarkable illustration of the wide variety mineral substances will assume under different conditions of cooling. Fleecy *mineral wool* is, in reality, identical in composition with the hideous blast furnace slag.

The peculiar reason why *mineral wool* is a non-conductor of heat is owing to the quantity of air it contains. Air is subtle and rapid in its movement, and is so slow to convey heat, except on its own motion, that it becomes a distributor of it, and also a barrier to its transmission, according as it has, or has not, freedom to circulate. If the air-confining material is not very loose and porous it will be found to transmit heat, and the reduction of the percentage of volume of air, by making the material more compact, develops its capacity for conducting heat.

One cubic foot of slag weighs 192 pounds, while the same weight in ordinary *mineral wool* measures eight cubic feet, so that the resulting fibres encase eight times the quantity of air that the slag did; in other words, the cubic foot before conversion contained 100 per cent. of material, and after conversion only 12 per cent., therefore the product must contain 88 per cent. of its volume of air. The *extra grade* has 92 per cent. of its volume of air, and is, conse-

quently, a better non-conductor than the ordinary.

The transmission of sound is prevented by a filling of mineral wool, because of its elasticity and want of solidity. It therefore possesses the properties of heat-proofing, fire-proofing and sound-proofing, and is also valuable on account of the irritation which the glass fibres cause to insects and vermin, and the fact of there being nothing in its composition to help to breed or harbor insects.

One objection that has been raised to the use of mineral wool, made from furnace slag, is that it will corrode pipes or boilers whenever leaks occur or exterior dampness penetrates it. Water is, of course, the primary cause of the rusting, but it is claimed that the percentage of sulphur contained in the slag becomes dissolved by the water, and in the form of sulphuric acid attacks the surfaces unless they are kept dry by radiated heat. In order to obviate this fault, where it would be objectionable, an article is now being manufactured from non-sulphur bearing rocks which is absolutely free from sulphur and its compounds. It is distinguished by the name of rock wool, and though more costly than the slag wool, the difference in weight reduces the cost of transportation in favour of the former article.

It is admitted that silicate cotton stands at the head of the list as an insulator, 10 inches thick, being equivalent to 12 to 15 inches of wood charcoal; but it is very much more costly, and it is claimed by some that it possesses the fault of being friable and liable to fall into powder, especially if used on board ship, from the incessant motion of the vessel when out at sea. This objection has been controverted from the fact that it is the practice of the Chicago, Milwaukee and St. Paul Railway Company to jacket their locomotive boilers with extra mineral wool, and that since 1878 the passenger cars of the Pennsylvania Railway Company have been lined with ordinary quality. The vibrations in both cases must be severe, and its adaptability for these purposes has been established.

**The Krupp Iron Works at Chemnitz.**

The American Consul at Chemnitz, Mr. George C. Tanner, reports, under date of September 1, 1885, the following interesting particulars concerning the Krupp works at that place:

The Krupp Iron Works, which were founded in 1810, employed in 1855, 693 workmen.

The number of workmen in 1882 was 10,598; the number of houses they occupied was 3,208, in which, including families, 16,200 people lived. These houses were built in flats containing from two to five rooms, the rent of which ranged from \$16 to \$50 a year. A boarding house was also established by the managers of the Krupp Works which would accommodate 500 men, where dinner with meat four times a week, coffee, butter, and everything is provided but bread. A co-operative store exists and has proven very beneficial to the operatives of Mr. Krupp. A sick club has existed since 1856 and in 1882 had 11,011 members and a fund on hand of \$313,490.

The pensions in 1882 amounted to \$10,042, and the death liabilities to \$1,000. There is a sanitary committee at the works. The works have had a fever hospital since 1871 and an infirmary since 1872. A disinfection house and appurtenances have also been instituted on Ditmar's plan. Baths are placed near the entrance of the works for the use of the working people.

In 1876 a life insurance fund was started and is now in a flourishing condition. A high school

with twenty class-rooms, and a private school with sixteen rooms are among this gentleman's beneficent care, and since 1876 five technical schools have been in existence in which, among other instructions, women are taught household work or the art of making home comfortable on a minimum of expenditure. Charities for disabled men, women and invalids generally, have been in operation for more than ten years where those not utterly disabled may prosecute light work, such as brooms, baskets, shoes and other labour of the kind which goes to the co-operative stores. In one week of last year the number of labourers dependent upon and who received the benefits of Mr. Krupp's humane treatment was 65,381.—*P. and M. Journal, N. Y.*

**SPRING HILL COLLIERIES, NOVA SCOTIA.**

One of the results of the Halifax meeting of the American Institute of Mining Engineers, held in September last, has been to bring prominently before the American people the importance of the mineral resources of Nova Scotia—notably, her coal fields and iron ore deposits. The most important development in the coal fields of the province has been at the Spring Hill collieries, of which the *Engineering and Mining Journal*, in an article on the subject, says—“The Cumberland coal basin, Cumberland County, Nova Scotia, is the most easterly coal field in the province, and it is also one of the most important in area and in thickness of coal. The limits of the Cumberland coal field are not definitely known, but little exploration work having been done; but it is estimated by Mr. Edwin Gilpin, inspector of mines, to cover 300 square miles out of some 685 square miles of known productive coal area in the province.

By far the most important development in the Cumberland field is at the Spring Hill collieries, where extensive mining operations have been carried on during the past ten years by the Cumberland Coal and Iron Company, which owns some 20 square miles in this field. These operations have proved this basin to contain the following seams and intermediate measures:

Coal, North seam worked	13 feet.	105 feet
Strata	.....	.....
Coal seam	5 "	120 "
Strata	.....	.....
Coal seam	2 " 4 in.	131 "
Strata	.....	.....
Coal, Main seam worked	11 "	80 "
Strata	.....	.....
Coal, South seam, worked	11 "	12. "
Strata	.....	.....
Coal, opened	8 " 6 in.	190 "
Strata	.....	.....
Coal	4 "	176 "
Strata	.....	.....
Coal	2 " 9 in.	.....
	57 ft. 7 in.	936 ft.

Other workable seams are known to exist below these.

Three of these seams are extensively worked and have produced in the past eight years the following quantity of coal:

1878	100,021 tons.	1882	210,000 tons.
1879	89,465 "	1883	200,000 "
1880	127,237 "	1884	250,000 "
1881	160,185 "	1885 (estimated)	300,000 "

The extent of the workings shows clearly both the regularity of the coal-seams and the quality of the coal. With regard to the former, it may be said that the beds are remarkably uniform in thickness and quality, with neither faults nor pinchings, and but very little shale in the seams. The inclination of the beds varies from about 38 degrees at the south end of the field (where the measures are cut off abruptly by a fault that cuts across the line of strike), to 14 degrees at the north slope on the south seam,

nearly four miles on the outcrop distant from the fault. The mines are opened by four slopes of various depths up to 1,300 feet, and levels have been driven out for a length of more than two miles.

**THE QUALITY OF THE COAL.**

The coal is a good steam and coking coal, as the following analyses, made by Mr. Edwin Gilpin, Jr., testify:

	North seam.	Main seam.	South seam.	6-foot seam.
Moisture	1.625	.78	1.39	3.47
Vol. combustible	28.972	31.32	31.22	26.98
Fixed carbon	63.431	62.51	61.78	61.43
Ash	4.272	5.31	5.79	5.07
	100.000	99.08	99.98	100.00
Sulphur	781	1.53	.80	.23
Theoretical evaporative power	8,000	.....	8,40	8,80

In ordinary shipments in quantity no doubt the amount of ash, and with it the percentage of sulphur, would exceed the figures here given; but it is nevertheless true that this property produces a fuel of excellent quality for general manufacturing purposes, and even unwashed slack yields a fair furnace fuel; while, if the slack were washed and coked in, say, a Simon-Carvès oven, it should produce an excellent coka at a very moderate cost. The great thickness and regularity of the beds, their freedom from slate bands; the soundness of the roof and floor, which neither fall nor creep; the comparative dryness of the mines and their total freedom from fire-damp—which has never been met with, though the mine has a depth of 1,300 feet on the seam—are all conditions which promote economical production, and should, with a large and easily accessible market, make this property not only extremely valuable to its proprietors, but a very important and interesting source of supply for our American consumers, manufacturers and furnace men to consider.

The Spring Hill collieries are connected by 27 miles of railroad—owned by the colliery company—with the fine shipping port of Parrsboro' on the Bay of Fundy. By a proposed extension of about one mile the docks can be placed where there will be open navigation the year through, with the exception of a few weeks in winter. On the other side, these collieries connect with the Intercolonial railroad, and it is proposed to add a short line of railroad to the port of Pugwash, on the waters of the St. Lawrence.

So far as the colonial markets are concerned, the Spring Hill collieries supply the Dominion Government, principally for the Intercolonial railroad; the Richelieu & Ontario Navigation Company; the Grand Trunk railroad; Montreal, and other roads and cities. A small quantity of the slack only comes to the American market, though freights to New York harbor from Parrsboro', it is said, could be made at \$1 to \$1.25 a ton, for large and regular shipments.

American industries have an especial interest in this great coal-field, for it may become a very important source of supply for manufacturing and metallurgical works situated along our Eastern seaboard. Considering the fact that we export to Canada far more coal than we import from all countries, there is a fair probability of reciprocity in coal, at least, being enacted in the interest of our coal and manufacturing industries.

We imported only 64,515 tons of Nova Scotia coal last year; while we exported, almost exclusively to Canada, in the same year, 1,342,018 tons of anthracite and bituminous coal. In Canada our coal pays a duty of 60 cents a ton; while Nova Scotia coal coming into this country pays a duty of 75 cents a ton for all except slack, which pays 30 cents a ton. No doubt the

removal of the duty on both sides would increase our exports far more than our imports of coal and it would afford a cheaper fuel to our metallurgical works situated on the Atlantic coast.

At what price could we then obtain coke in New York harbor? Spring Hill slack could probably be delivered f.o.b. at New York, with a fair profit to the mines, at \$1.75 a ton, and run of mine at perhaps \$2 to \$2.25. And as the by-products of coking in the vicinity of New York could be utilized, and would return a profit on the operation, the cost of coking need not be counted. A good furnace coke could therefore be delivered here at from \$3.50 to \$4 a ton, which is about the present price of furnace coke here, while to work at Boston and farther east the cost would be still less.

Experience has demonstrated that with the present duty no considerable amount of Nova Scotia coal can come in while our superior Cumberland and Clearfield coals are sold at the mines, including miners' profit at 75 cents a ton and are carried by our railroads at three mills per ton-mile; but the time will come, whether through reciprocity in a few raw materials, or later on and better yet, by annexation of the New Dominion, when the vast mineral resources of Nova Scotia will be developed by opening to them an enormous market in our Eastern States. Then will the great Spring Hill collieries, which, not in their infancy, have a capacity of from 1,200 to 1,500 tons a day, grow into the realization of the magnificent, though by no means visionary, plans of their very able and enterprising managing director, Mr. R. G. Leckie.

COAL IN CHILI.

The only sources from which fuel can be obtained in all South America are, it is said, the coal mines that lie at the extreme southern limit of the populated districts of Chili. Taicahuano is the nearest port of importance; but the towns at the mines are Lota and Coronel. The mines are entered by shafts that are immediately over the water of Lota Bay, so that the coal is drawn on trucks to the mouth of the mines, and dumped into launches and lighters, which are towed out to the anchorage of ships. It is said that it costs \$1.35 a ton to mine and deliver this coal on ship-board, and that the owner, Donna Isidora Cousino, of Santiago, who is said to be the Cruesus of South America, will not sell at less than \$7.50 a ton, just a shade less than the cost of imported Cardiff coal.

COST OF PRODUCING CHARCOAL.

In the manufacture of charcoal iron, one of the most important points to be considered is the cost at which charcoal can be produced in the vicinity of the furnaces, and for the benefit of those who may be seeking such information we publish the following extracts from an article on this subject which has appeared in the *Journal of the United States Association of Charcoal Iron-Workers*.

"In the manufacture of charcoal, one of the prominent factors of cost is the value of the wood used, and we have found instances in which parties seem to misunderstand or fail to appreciate the bearing that a few cents per cord, added to the price of cord-wood, has upon the cost of a bushel of charcoal made from it. This want of appreciation we find the more marked where the smaller yields of charcoal are obtained, and where, as a consequence, the proportion of the cost of wood per bushel is greater than where a larger number of bushels of char-

coal is obtained from a cord of wood. For the purpose of showing the importance of attention to this subject, we have prepared the following table, which illustrates the value of using the process or processes of carbonization that gives the largest yield in bushels per cord, particularly where the cost of chopping wood or the value of standing timber is great.

"We have known wood to be cut for 30 cents a cord, and have been informed that in exceptional cases over \$1 a cord has been allowed choppers.

"Where kilns or retorts are used, cord-wood is often purchased, delivered on the railroad or hauled to the plant; and for such delivery some charcoal iron-works pay from \$3 to \$4 a cord. We have, therefore, shown the cost of wood as ranging from \$1 to \$1 a cord for wood purchased, cut, and delivered; the prices advancing from 5 cents up to \$2 a cord, and from that figure advancing by 10 cents to \$4 a cord.

"In coppice growth, or where inefficient colliers are employed, or where the cord of wood purchased is not a full cord, a yield in meilers as low as 20 bushels of charcoal from a cord of wood has been obtained, and where liberal cord measure is obtained, it is claimed that 75 bushels of charcoal a cord can be secured by the judicious operation of retorts, and we have

VALUE OF WOOD IN 100 BUSHELS OF CHARCOAL.

Price of Wood, Stumpage, Chopping, or Delivered at Works.	Yield of Charcoal in Bushels obtained from one Cord of Wood.							
	40	45	50	55	60	65	70	75
Per cord.								
\$1.00	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.05	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.10	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.15	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.20	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.25	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.30	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.35	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.40	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.45	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.50	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.55	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.60	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.65	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.70	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.75	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.80	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.85	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.90	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
1.95	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.00	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.10	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.20	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.30	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.40	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.50	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.60	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.70	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.80	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
2.90	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.00	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.10	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.20	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.30	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.40	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.50	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.60	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.70	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.80	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
3.90	2.25	2.22	2.20	1.82	1.67	1.54	1.43	1.33
4.00	10.00	9.89	9.80	7.27	6.67	6.15	5.71	5.33

therefore embraced in the table a yield covering every possibility, and varying from 20 bushels to 80 bushels. The figures advance by fives, and from these and the cost of wood any intermediate amounts can be approximated.

The cost of wood per 100 bushels of charcoal is given to obviate using fractional parts of a cent for single bushels, and it has not been deemed necessary to carry the calculations beyond where the wood would cost less than one tenth of a cent a bushel, nor more than 10 cents a bushel of charcoal."

The table published in the *Journal of the United States Charcoal Association of Iron-Workers* runs from 5 cents to \$4 a cord for wood, and from 20 to 80 bushels yield, but we have only printed those figures which will apply to localities in

Canada where it is at all likely that the manufacture of charcoal iron may be engaged in.

"We have been furnished with a detailed estimate of the actual cost of meiler coaling in a tract of large timber yielding 60 cords an acre in Tennessee, the cost being taken from absolute expenditures.

COST OF MAKING 100 BUSHELS (255 CUBIC INCHES EACH) OF CHARCOAL.

Making hearth and preparing dust for cover	\$0.220
Hauling wood, leaves, and water to hearth	.750
Drawing charcoal from cover	.375
Setting and covering wood	.375
Tools	.050
Hire of cattle and feed	.085
Wages of boss collier and incidental expenses	.200

Total ..... \$2.055

Or a little over 2 1/6 cents a bushel of 2748 cubic inches.

"Coaling sapling wood costs from 2 1/4 to 3 1/2 cents a bushel.

"To this add cost of cutting and ranking wood, value of wood-leave, and hauling charcoal to works."

Plymouth Consolidated Gold Mine.

The result of the operations at this mine for the nine months ending 30th September, 1885, show that work has been carried on during that period at a profit of nearly two hundred per cent., which is made the more remarkable by the fact that this enormous profit has been realized from ore that did not yield \$13 per ton in gold, average. The monthly production, expenditure and disposition of profits, have been as follows:

QUARTERLY REPORT, OCTOBER 1ST, 1885.

Gold Bullion produced January, 1885	\$85,721 99
February	80,974 87
March	80,135 03
April	82,191 67
May	81,927 29
June	82,656 70
July	82,240 83
August	73,156 97
September	75,644 98
Total product for nine months, 1885	\$724,660 43
Operating Expenses—January, 1885	\$25,761 45
February	26,721 11
March	24,418 34
April	27,152 62
May	24,929 72
June	27,704 61
July	29,666 29
August	29,831 35
September	26,910 17
Total Operating Expenses, nine months 1885	\$246,105 86
Profit	\$478,554 57
Cash on hand, January 1st, 1885	74,225 06

Amount applicable to dividends.....\$52,879 63

Paid nine monthly dividends (Nos. 20 to 28, inclusive) of \$50,000 each.....\$450,000 00

Construction Account, nine months.....\$45,853 79

Cash surplus, Oct. 1st, 1885.....\$86,985 84

The cash on hand, \$86,985.84, is "actual surplus," the Company having no indebtedness whatever.

In his quarterly report the president states that the year has been an unusually dry one. The rainfall of last winter and spring was extremely light, and the season commenced with but little snow in the mountains. A summer of excessive heat followed, causing large loss of water by evaporation. The supply of water for power had thus been curtailed and rendered it necessary for several weeks to run one of the mills on short time. On this account the product for August and September were below the average, and the same cause will have reduced the output for October. By November it was expected the fall rains would have commenced, and it is unlikely that the drawback of the past season will be repeated for many years to come.

Since 1880, when diggings for amber commenced under the Smaland Peninsula in East Prussia, the yield of the veins here has greatly increased. In 1864, the revenue was \$8,500, against \$125,000 in 1883.

### South African Diamond Trade.

Returns recently published in Kimberley give the production of Cape diamonds from the four chief mines during the three years ended Aug. 31st last, as follows:—

	Carrats.	Value.
Kimberley.....	2,291,322	£2,211,229
De Beer's.....	1,447,365	1,516,353
Du Toit's Pan.....	1,483,184	2,029,526
Bultfontein.....	1,619,878	1,758,070
Total.....	6,842,629	£7,515,178

Dividing the three years into two periods of eighteen months each, it appears that the production of the Kimberley mine fell off one half during the second period, while the other three mines increased their output one-sixth. The exports in each year are as follows:—

	Carrats.	Declared value.
Four mos. ended Dec. 31, 1882..	796,516	£1,156,773
In 1883, 12 months .....	2,413,974	2,777,521
In 1884, 12 months .....	2,283,686	2,777,588
In 1885, 8 mos. ended Aug. 31.....	1,357,196	1,585,795
Total 36 months.....	7,011,372	£8,297,677

It thus appears the exports of diamonds from the colony (making allowance for exports not included in the returns) can not have been worth less than £9,000,000 for the three years, or an average of £3,000,000 a year. Were this sum struck out from the total export trade, the balance against the colony would obviously be very serious. The importance of suppressing the trade in diamonds stolen from the mines, to which the Cape Government has latterly given increased attention, is thus apparent.

### MINING NOTES.

#### NOVA SCOTIA.

A bar of gold was taken to Halifax on December 1st from the Archibald & Mott mine, at Salmon River. It weighed 900 ounces and was valued at \$17,000.

The gold mining property near Oxford is now under the management of S. J. Keyes & Co., and report says it is likely to prove as rich as the well known Oxford mine.

It is reported that a party engaged in prospecting in Lunenburg county has discovered several rich lodes, and it is expected that next spring will see a boom at the Lunenburg gold mines.

The reputation of the Salmon River and Albion mines will, in the opinion of an expert, be equalled by that of the Crow's Nest mine in Guysboro, the indications being that the latter mine will become an important gold producer.

Mr. Van Slooten is reported to have said that he has succeeded in raising \$1,000,000 of capital in England and the United States for investment in Cape Breton mines, provided the concessions asked for last winter from the local legislature are granted.

The discovery of auriferous deposits in the vicinity of Pleasant River, Queen's county, has caused some excitement in the district. The county has, in consequence, been visited by numerous gold prospectors, some of whom have been successful in their searches.

Work was resumed at the Coxheath copper mine in the beginning of December. About twenty hands were then employed and it was the intention to increase the force when work was well under way. This mine will be operated extensively by the Eastern Development Company, the present owners.

#### QUEBEC

The asbestos mines in the townships of Thetford, Coltraine and Broughton suspended operations at the end of November, and work will not be resumed until spring.

The Villeneuve mica mine continues to yield abundantly, and the output is of the same high grade as that which was shipped last autumn and established the reputation of the mine.

Since the death of Mr. Roberts, work has not been resumed at the Bristol iron mine in Pontiac county. Mr. Roberts was president of the company owning the property and it had his personal attention.

Work was suspended at all the phosphate mines in the du Lièvre district between the 24th of December and the 4th of January. The full force has resumed work and phosphate is coming to the surface as rapidly as ever.

The phosphate location, Lots 7 and 8 in the 7th Range of the Township of Bowman, has changed hands. The present owners have a force of miners at work developing the property and are confident that it will prove a rich and productive mine.

#### ONTARIO.

The *Cox Hill*, in the county of Hastings, is the only iron mine that was worked continuously in the province during the past year, and from it 30,000 tons of ore were raised, of which 10,000 tons were shipped to the United States.

#### Thunder Bay District.

It is reported that a mill for the reduction of silver ores will be erected at an early date at the *Rabbit Mountain* mine. There are now five working mines in the district.

The owners of the *Rabbit Mountain* have concluded arrangements to work their own mine and the adjoining property, known as 40 T., on an extensive scale.

A mill test, by Balbach & Sons, Newark, N.J., of 2,785 pounds of pure ore from the east end of Silver Mountain, gave 1,039½ ounces of silver, which is highly satisfactory to the owners.

It is stated that the result of operations at the west end of Silver Mountain exceeds the most sanguine expectations, and that another rich outcropping has been discovered about one hundred feet to the west of No. 2 tunnel.

The new shaft at the Huronian mine is being rapidly sunk on the new vein, and the bottom of the shaft is in very rich ore. This vein has proved rich from the surface, and continues to improve. Work at the mine is progressing favorably, though but a small force is employed.

A new company, on the 16th December, completed the purchase of a part interest in the *Beaver*, *Silver Creek* and another mine. The force of miners at all three mines has been increased, and it is the intention of the company to put up a mill and reduction works in connection with these mines.

#### BRITISH COLUMBIA.

The discoverer of Granite Creek has discovered another creek which he calls the *Eagle*, and states that he thinks it will prove a much richer creek than *Granite*. Samples from rich quartz ledges have been sent down for assay.

On the Stewart river, 60 miles from its mouth, it is stated that the miners are taking out \$30 per day, per man, with rockers.

A large number of miners have gone into Scotch Creek where the diggings are reported to be very rich. The creek is easy of access, the steamer running direct to its mouth.

Nearly all the claims on Granite Creek shut down for the season about the end of November. A few miners continued to work as the weather was favourable. There are about 600 miners on the creek.

Parties arrived from Victoria in December from Granite creek had been to Eagle creek and Hine's gulch and report considerable excitement at the mines on account of the new strike, and that a large number of miners had proceeded to Eagle Creek and taken up claims.

An immense quartz deposit has been discovered on the Yukon river, which yields, according to rough assays, \$10 per ton. The facilities for crushing are ample, there being good water power and other necessaries for milling the ore near at hand.

#### UNITED STATES.

A great mass of asbestos in North Georgia has been fully opened, and the product sells at \$40 to \$60 a ton.

In Colfax county, New Mexico, rich prospects have been discovered which, it is predicted, will prove an inviting field for a large number of mining companies.

The Gemaine Consolidated Co., Colorado, has struck a very fine crevice on the fourth level of the Bates-Hunter mine. The vein is twelve feet between the walls.

The output of Leadville mines, it is expected, will have reached \$12,000,000 for 1885. The place has about 100 producing mines, producing about 1,000 tons per day of the value of \$10,000.

It is reported that Mexican prospectors have discovered a rich gold ledge about fifteen miles south of Independence, California, specimens from which have assayed \$150 to \$200 in gold, per ton, besides a fair percentage in silver.

Notwithstanding the comparatively low price of copper, there has been an appreciation in the price of the shares of the Calumet and Hecla and seven other copper mining companies of Lake Superior since the 1st January, 1885, of about \$13,000,000 in the aggregate.

The Plymouth Consolidated Gold Mining Company has one of the most productive gold mines in America, situated at the town of Plymouth, Amador county, California. From June, 1883, to December, 1885, both inclusive, thirty-one consecutive monthly dividends have been declared of \$50,000 each, aggregating \$1,550,000.

The *Treadwell* gold mine on Douglas Island, Alaska, to which frequent reference has been made in these columns, is now classed among the greatest producers in North America. The lode contains an enormous body of low-grade ore, which is crushed in a 120-head stamp mill, and the tailings concentrated on 48 Fraze belts. The concentrates (sulphur's) carry about \$80 a ton, and are to be treated by chlorination.

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(Opposite Russell House).  
OTTAWA.

**J. OBALSKI,**

MINING ENGINEER,

Will examine and report on mines, and  
make analyses.

OFFICE, 63 ST. GABRIEL STREET, MONTREAL.  
CONSULTATION FREE.

## PHOSPHATE PROPERTY

In the Township of Portland West,

### FOR SALE.

Lots 25, 26, 27 and 28, in the 3rd range. Some excellent surface shows have been uncovered on these lots and only require capital for developing. Price and particulars given at the office of the **Mining Review.**



## WELLAND CANAL ENLARGEMENT.

### Notice to Contractors.

SEALED TENDERS addressed to the undersigned and endorsed "Tender for the Welland Canal," will be received at this office until the arrival of the Eastern and Western mails on MONDAY, the 25th day of JANUARY next (1886), for raising the walls of the Locks, Weirs &c., and increasing the height of the banks of that part of the Welland Canal between Port Dalhousie and Thorold, and for deepening the Summit Level between Thorold and Raucay's Bend, near Hamberston.

The works, throughout, will be let in Sections. Plans of the several localities, together with plans and descriptive specifications, can be seen at this office on and after MONDAY, the 11th day of JANUARY next (1886), where printed forms of tender can be obtained. A like class of information relative to the works north of Allanburg will be furnished at the resident Engineer's Office, Thorold, and for works south of Allanburg, plans, specifications, &c., may be seen at the resident Engineer's Office, Welland.

Contractors are requested to bear in mind that tenders will not be considered unless made strictly in accordance with the printed forms, and, in the case of firms, except there are attached the actual signatures, the nature of the occupation and place of residence of each member of the same; and further, an accepted bank cheque for the sum of *Two Thousand Dollars* or more—according to the extent of the work on the section—must accompany the respective tenders, which sum shall be forfeited if the party tendering declines entering into contract for the works at the rates stated in the offer submitted.

The amount required in each case will be stated on the form of tender. The cheque or money thus sent in will be returned to the respective parties whose tenders are not accepted. This Department does not, however, bind itself to accept the best or any tender.

By order,  
A. P. BRADLEY,  
Secretary,  
Department of Railways and Canals,  
Ottawa, 9th December, 1885.



## Notice to Contractors.

SEALED TENDERS addressed to the undersigned and endorsed "Tender for Public Buildings, at Peterborough, Ont.," will be received until TUESDAY, the 20th day of January next, inclusive, for the erection of Public Buildings, for the

POST OFFICE  
AND

The Customs and Inland Revenue Offices,  
At Peterborough, Ont.

Plans and specification can be seen at the Department of Public Works, Ottawa, and at the office of J. E. Delecler, Architect, Peterborough, on and after FRIDAY, the 18th day of December next.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures. Tender for each building to be separate, and forms will be supplied for each.

Each tender must be accompanied by an accepted bank cheque, made payable to the order of the Honourable the Minister of Public Works, equal to five per cent. of the amount of the tender, which will be forfeited if the party declining to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted the cheque will be returned. The Department does not bind itself to accept the lowest or any tender.

By order,  
A. GOBELL,  
Secretary.

Department of Public Works,  
Ottawa, 7th December, 1885.

## TIMBER LIMIT

ON LAKE WINNIPEG

### FOR SALE.

50 Square Miles.

This limit will be very valuable.  
Apply at the office of the **Mining Review** for price and particulars.

### FOR SALE,

White Marble Quarry on Calumet Island.

At this quarry there is an inexhaustible supply of most beautiful white marble. Samples to be seen and information obtained at the office of the **Mining Review.**



## GRAND COLONIAL

Exhibition in London, Eng.  
1886.

FIFTY-FOUR THOUSAND FEET RESERVED  
FOR CANADA.

First Royal Exhibition Commission Since 1862.

THE Colonial and Indian Exhibition to be held in London, England, commencing May 1st, 1886, is intended to be on a scale of great magnitude, having for object to mark an epoch in the relations of the parts of the British Empire with each other.

In order to give becoming significance to the event a Royal Commission is issued for the holding of this Exhibition, for the first time since 1862; and His Royal Highness the Prince of Wales has been appointed President by Her Majesty.

The very large space of 54,000 square feet has been allotted to the Dominion of Canada by command of the President, His Royal Highness.

This Exhibition is to be purely Colonial and Indian, and no competition from the United Kingdom or from foreign nations will be permitted, the object being to exhibit to the world at large what the Colonies can do.

The grandest opportunity ever offered to Canada is thus afforded to show the distinguished place she occupies, by the progress she has made in Agriculture, in Horticulture, in the Industrial and Fine Arts, in the Manufacturing Industries, in the Newest Improvements in Manufacturing Machinery and Implements, in Public Works by Models and Designs; also in an adequate display of her vast resources in the Fisheries and in Forest and Mineral wealth, and also in Shipping.

All Canadians of all parties and classes are invited to come forward and vie with each other in endeavoring on this great occasion to put Canada in her true place as the premier colony of the British Empire, and to establish her proper position before the world.

Every farmer, every producer, and every manufacturer, has in erecting, it having been already demonstrated, the extension of trade always follows such effort.

By order,  
JOHN LOWE,  
Sec. of the Dept. of Agriculture,  
Ottawa, 1st Sept., 1885.

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Developed and Undeveloped Mines and Minerals of Commercial Value

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