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MINING REVIEW

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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.

OUR attention has been called by a London, England, correspondent to numerous attempts that have been made during the past year to dispose of worthless mining properties to confiding English capitalists. It would appear that during last winter London was visited by certain speculators armed with bogus reports and false statistics concerning certain phosphate locations in the Perth district and in Ottawa County, and their method of offering these properties for sale on the London market was ingenious and well calculated to deceive the unwary. Skilfully executed maps of the country, where these imaginary phosphate mines were said to exist, were exhibited, accompanying which were most exaggerated and untruthful reports, signed by some audacious individual styling himself "Mining Engineer and Expert," setting forth the enormous value of the properties that were being offered for sale, and giving estimates of the cost of production and delivery from the mines to point of shipment. As a matter of fact these very

properties are known to be worthless, by those who are familiar with their location, and the figures given in the reports, as the cost of mining and transportation, are studiously cut down quite two-thirds, with a view to showing a fictitious margin of profit on an annual output which was represented absurdly in excess of anything that has yet been accomplished in this country. Neither pains nor expense was spared in preparing the maps, the plans of the mines and the reports, and had these people succeeded in accomplishing the object of their mission among English capitalists they would have been handsomely repaid for their trouble and outlay; but, so far as we can learn, the properties in question have not, as yet, changed hands. Such attempts, as the one we have just quoted, to bring our mining industries into disfavour, should be frowned down and exposed whenever they come to the knowledge of those who are interested in the future of Canadian mines. Capital is the one thing we are in need of for the development of our mineral resources, and it is our duty to prevent, so far as it lies within our power, its being invested in wildcat and bogus enterprises. The only way to encourage capital into the country is by guiding it at the outset into channels where it will be certain to find profitable investment. At once, when we have established a value for our mineral deposits and mines, ample capital is available for their development, but to induce capitalists, by misrepresentation, falsified statements and bogus reports, to invest money in Canadian mines, is to deal a death-blow to the country's enterprises. Such a calamity we will do all we can to avert.

It is, perhaps, a natural thing that the more successful a mining company is, the briefer becomes its annual or semi-annual reports. Shareholders, content with their profits, do not care for, nor do they need, elaborate explanations on technical points, says the *New York Engineering and Mining Journal*, and that this is strikingly shown in the case of the Callao mine, of

Venezuela, which can justly boast of being the most profitable gold mine in the world, now working. From 1871 to 1883, both inclusive, this mine produced from 169,955 tons of rock, 619,506 ounces of gold, valued at 59,648,821 bolivares or francs, out of which 20,447,000 bolivares of dividends were paid. The mine is now under technical management of American engineers, Mr. H. C. Perkins being superintendent, and Mr. Hamilton Smith, Jr., consulting engineer, whose reforms are beginning to tell handsomely in increased dividends. Working 3658 hours during the six months, the 60-stamp mill, the stamps dropping most of the time 65 times a minute, crushed 14,223 tons of rock, which, together with the product of some sulphurets and concentrates, produced 96,276 ounces of gold, valued at 9,269,311 bolivares, or roughly \$1,850,000, the dividend paid out of this product being 5,280,000 bolivares, or roughly \$1,050,000, equivalent to an annual net return of 32.8 per cent. on the nominal capital of 32,200,000 bolivares. Besides the dividends thus distributed, the company paid out 800,000 bolivares for the machinery for a new 40-stamp mill purchased in the United States, and now on the ground ready to be put up, and for sinking a new shaft, and 680,069 bolivares for the machinery of the Union mine. The result of operations at El Callao during the month of September, 1884, will be found reported in another column:

A SHORT-SIGHTED POLICY.

In the Kingston, Ontario, news items of 12th November we noticed that the County Council had on that day decided to memorialize the Government to legislate so that Canadian mines can be assessed beyond the assessment of the land. This would certainly be a short-sighted policy for any municipal corporation to pursue, as it is much more to the benefit of a municipality that mining industries should be fostered and encouraged in the immediate locality than that they should be thwarted and hampered by an imposed taxation, as any revenue derived therefrom would be a mere drop in the bucket as compared with the advantages to a community that are always to be had from the employment given and the money circulated by miners. In the phosphate districts of Ottawa County the

great benefit the mining industry has been to that section of the county is made apparent by the present easy circumstances of the farmers, among whom hundreds of thousands of dollars have circulated in payment for labour and farm produce during the past two years. They are now enabled to buy and sell for cash instead of dealing with the village storekeeper on the barter system as in former days when money was to them a curiosity. Any attempt to tax the mineral in our Canadian mines will be a mistake and should receive no encouragement from parliament.

THE PHOSPHATE TRADE.

The last shipment of phosphate for this season left Montreal on the 20th of November, for Liverpool, per s.s. *Ontario*. The total shipment for the season of 1884, from the port of Montreal, aggregated 21,243 gross tons, in addition to which it is estimated that 200 tons was sent into the United States and about 700 tons consumed in Canada, making a total, for the year's output, of 22,143 tons, 1,790 tons of which came from the mines in the Perth and Kingston districts, leaving 20,353 tons the product of Ottawa County as against 15,166 tons for the previous year.

Although the average price at which the past year's output has been disposed of was not by any means as high as it has been in former years, yet the season just closed has been one of marked prosperity to mine owners. The unprecedented continuance of wet weather beginning as it did early in October, caused the breaking up of the road from Buckingham Village to the railway depot, and the consequent discontinuance of the delivery of phosphate at point of shipment quite a month earlier than would have been necessary under ordinary circumstances; and this has been the means of reducing the total shipments from the Buckingham district quite 2,500 tons. At the *High Rock* mine alone 1,100 tons has been held over and at the Union Company's and the *Emerald* mines a large quantity of phosphate, which might have gone forward this season, has been held over owing to the impassable condition of the road from the landing to the railway depot. Had this hindrance not arisen the year's shipment from Ottawa County would have aggregated very nearly 23,000 tons, the amount estimated by the REVIEW, during the summer, as the probable output for 1884. In December, 1883, we predicted that Ottawa County would forward 21,000 tons during 1884, in which we were not far astray, as is shown by the following statement:—

PHOSPHATE SHIPMENTS FOR 1884.

The total quantity of phosphate shipped from Canada during the season of navigation of 1884, to foreign ports, is as follows:—

To Liverpool.....	8,557	gross tons
" London.....	4,389	"
" Glasgow.....	3,083	"
" Hamburg.....	2,970	"
" Bristol.....	1,824	"
" Dublin.....	210	"
" Penarth, for orders....	100	"
" Sunderland.....	60	"
" Bristol Channel.....	50	"
Total.....	21,243	"
Shipped to United States.....	200	
Consumed in Canada.....	700	900
Total output shipped from the mines.....	22,143	

Contributed by the mines in the Perth & Kingston district. 1,790 gross tons

Forwarded from Ottawa County mines.....	20,353	"
Total output for 1883.....	17,840	"
" " 1884.....	21,243	"
Increase for 1884.....	3,403	"

A NEW ENTERPRISE.

We understand that some of the owners of the pyrites mines at Capelton, in the Eastern Townships, have under consideration a proposal to erect sulphuric acid works in the phosphate region of the County of Ottawa, possibly at Buckingham Village, to which a branch of the Canadian Pacific Railway is now being built. As long ago as 1865, Professor Bell pointed out the advantages which might result from the establishment of such works if the apatite could be found in any part of the country in sufficient quantities to guarantee a permanent supply of the mineral. The developments in the valley of the Lièvre, having now removed all doubts on that head, we trust it may not be long before the proposed works go into operation. The government might very properly offer encouragement in some form to an enterprise so eminently calculated to benefit the mining and agricultural interests of the country.

THE C. P. R. BRANCH LINE AT BUCKINGHAM.

The phosphate miners of the du Lièvre district are to be congratulated on having, after a long and determined struggle, succeeded in inducing the Canadian Pacific Railway Company to construct a short branch road from the landing on the du Lièvre River, north of Buckingham village, to connect with the main line at Buckingham station. The distance is not more than three and a half miles between these points, but the waggon road leading from the village to the railway has been so systematically neglected by the township corporation that for many months in the year, especially in the spring and autumn, it is practically impassable. This has for some years been a serious drawback, and has added much to the expense of the transportation of phosphate from the mines to the point of shipment, so much so that this autumn hauling had to be suspended quite a month before the close of navigation, and shippers were thus prevented from availing themselves of a low rate of ocean freight for a large percentage of the season's output of the mines. This serious impediment to the phosphate industry is now removed, or will be before the close of the year. Mr. Raefield, the contractor for the construction of the branch line, has had a force of 200 men employed on the road-bed, and by the end of the first week in December the entire distance will be graded and ready to receive the ties and rails. By the 1st of January the line will be ballasted and opened for traffic. Mr. Raefield deserves credit for the energetic manner in which he is pushing this work towards completion, and the Canadian Pacific Railway Company, in providing this facility for the transportation of phosphate, has wisely considered its own interests as well as those of the mine owners of the Lièvre valley. The road will be a paying institution, and henceforth the transportation of phosphate will be made easy as compared with former years.

GRAPHITE.

The Deposits of the Ottawa Valley—Their Origin and Extent.

In referring to the deposits of graphite found in this section of the Dominion, known as the Ottawa Valley, it will not be going beyond the limits of the subject if, at the outset, we give a momentary glance at the formation and character of the rocks in which they occur.

The Archæan era in geology includes the oldest rocks known to that science,—rocks which are supposed to have been formed from the original rocky crust produced by the cooling of the earth. They are easily seen to be the result of the disintegration of an older series, and frequently contain pebbles unlike any rocks now known.

In Canada, where these rocks are very fully represented, they are divided into two periods,—the Laurentian and the Huronian—the latter being considered the oldest. The long chain of mountains, of which a portion is visible across the Ottawa, is composed of the Laurentian rocks, the estimated thickness of which is 30,000 feet, consisting, with few exceptions, of metamorphic, or crystalline rocks.

These rugged, broken hills contain mineral deposits of graphite, associated most frequently with the limestone. In this series of rocks there are three great limestone layers, separated by gneissoid rocks, aggregating not less than 3,500 feet in thickness. The limestone of each of these layers is often mixed with, or passes into rocks which consist largely of pyroxene, or hornblende, and those portions abound frequently with valuable minerals, among the most common of which is graphite.

As to the probable origin of graphite in these rocks, Dr. Dawson remarks that—"It may fairly be assumed that in the present world, and in those geological periods with whose organic remains we are more familiar than with those of the Laurentian, there is no other source of unoxidized carbon in rocks than that furnished by organic matter, and that this has obtained its carbon in all cases, in the first instance, from the deoxidation of carbonic acid by living plants. No other source of carbon can, I believe, be imagined in the Laurentian period."

When we come to consider the enormous deposits of carbon held by the Laurentian rocks, it will easily be seen that immense periods, even of a most prolific vegetation, must have been necessary for these formations. The atmosphere of that period must have contained a great amount of carbonic acid, and the seas been charged with abundance of carbonate of lime, and have contained, in common with the land surface, enormous expanses of vegetable life. The amount of carbon, in the form of graphite, in the Laurentian system is considered by Dr. Dawson to be equal that of equal areas in the Carboniferous.

In the Township of Buckingham a band of limestone, with some interstratified bands of gneiss, about six hundred feet in thickness occurs, and is filled to such an extent with veins, or disseminated crystals or scales of graphite that the mineral is estimated to constitute one-fourth of the whole in places, and allowing for the poverty of some portions, the total vertical thickness of pure graphite cannot be less than from 20 to 30 feet. It occurs in equal abundance at several other horizons in beds of limestone, estimated by Prof. Logan to have an aggregate thickness of 3,500 feet, and the total quantity thus contained can readily be seen to be enormous.

Unlike beds of coal, which occupy the place where the forests which produced them formerly flourished, graphite has been disseminated through the rocks by changes therein. In some places, to be sure, beds are found so regular and pure that they may fairly be compared to deposits of anthracite; but these are the exceptions, the great bulk of the mineral is scattered in scales, lumps, or thin veins. Many of these veins are mere shrinkage cracks traversing in countless numbers the containing rocks, and so in size as to often resemble strings of nodular masses.

The graphite contained in these is supposed to have flowed into them in the form of hydro-carbon; or it may have been in a state of aqueous solution at an enormous heat. It is indirectly derived from the rocks traversed by the veins, and has deposited with its sediments from these beds. Hence there is no occurrence of fossils as in coal, and the vegetable origin of graphite can only be inferred from analogy, and from the fact of a few scanty organic remains, as those of Eozoon, having been found in the containing rocks.

Dr. Dawson sums up his argument in the following statements:—"First, that somewhat obscure traces of organic structure could be detected in the Laurentian graphite; secondly, that the general arrangement and microscopic structure of the substance corresponds with that of carbonaceous and bituminous matters in marine formations of more modern date; thirdly, that if the Laurentian graphite, has been derived from vegetable matter, it has only undergone a metamorphosis similar in kind to that which organic matter in metamorphosed formations of later ages has experienced; fourthly, that the association of graphite matter with organic limestones, beds of iron ore and metallic sulphides greatly strengthens the probability of its vegetable origin; fifthly, that when we consider the immense thickness and extent of the Eozoic and graphite limestones and iron ore deposits of the Laurentian, if we admit the organic origin of the limestone and graphite, we must be prepared to believe that the life of that early period, though it may have existed under low forms, was most copiously developed, and that it equalled, perhaps surpassed, in its results, in the way of geological accumulation, that of any subsequent period."

The graphite of the Buckingham district occurs in three distinct forms, always in, or in close proximity to bands of crystalline limestone, gneiss, pyroxine, or quartzite, and sometimes even in iron ores, as is the case at Hull; secondly, in distinct imbedded masses, or pockets in the limestones; thirdly, in veins traversing in every direction the containing rocks.

The first form is most common and occurs in greatest abundance in the limestones, often forming such large deposits as to possess great economic value, as at Buckingham.

The second form is also of common occurrence and has been worked in Buckingham and Lochaber, where the deposits are considerable. In the latter township the bed which has been opened is over ten feet in thickness and yields about 20 per cent. of pure material.

The last, or fissure graphite is not so common, and though of much greater purity and brightness cannot, in general, be worked to such profit.

It is said that plumbago was mined in a desultory fashion some thirty years ago in the vicinity of Grenville, and that the farmers around Buckingham were accustomed to use the purer specimens, which they picked up, for polishing their stoves. More recently, how-

ever, plumbago mining was engaged in by a New York company, the Dominion of Canada Plumbago Company, and the Montreal Mining Company, who carried on operations in the Townships of Lochaber, Buckingham and Templeton, respectively; but, through bad management, want of experience and a reckless expenditure of money, operations had to be suspended and the industry has not since been revived.

The Graphite obtained from the deposits of the Ottawa Valley is, from its purity and other qualities, eminently adapted to all the uses to which plumbago has been applied. Granular graphite, such as was formerly obtained in Cumberland, and has been mined in other European countries, is suited chiefly to the manufacture of pencils, and for stock where strength is not needed, but it is almost useless for crucibles; while the foliated graphite of Ceylon is used entirely for the latter purpose. The plumbago of this country, consisting as it does of both varieties, can be used for all the numerous forms in which this valuable mineral is employed.

LOCALITY.	Specific gravity.	Volatle matter.	Carbon.	Ash.
	Pr.ct.	Pr.ct.	Pr.ct.	Pr.ct.
Canada, Buckingham: vein graphite variety, foliated	2.2689	0.178	99.675	0.147
Canada, Buckingham: vein graphite variety, columnar	2.2679	0.594	97.626	1.780
Canada, Grenville: vein graphite variety, foliated	2.2714	0.109	99.815	0.070
Canada, Grenville: vein graphite variety, columnar	2.2659	0.108	99.757	0.135
Ceylon: vein graphite variety, columnar	2.2671	0.158	99.792	0.050
Ceylon: vein graphite variety, foliated	2.2664	0.108	99.678	0.213
Ceylon: vein graphite variety, columnar	2.2546	0.900	98.817	0.293
Ceylon: vein graphite variety, foliated	2.2484	0.301	99.284	0.415

These analyses prove the oft repeated claim that Canadian Graphite is equal to the best Ceylon.

The present commercial depression and the consequent diminished production of iron has caused a temporary decrease in the demand for plumbago crucibles for steel smelting, but appearances point to a decided revival of the iron industries, and when we know that one firm alone in England has been accustomed to use from 800 to 1,000 tons annually in the manufacture of crucibles, we may hope yet to see a resumption in plumbago mining in the Ottawa Valley. With the benefit of past experience, and the increased facilities for transportation, there exists no reason why this enterprise should not become a most important industry in the district if fostered and encouraged by capitalists and conducted under practical and economic management.

KINGSTON RED GRANITE.

The Red Granite property on the east side of the harbour at Kingston, which belonged to the estate of the late Hon. John Young, has lately been acquired by parties in Ottawa, who are about to work it on a considerable scale. The granite, which is of a good medium sized grain in point of crystalline texture, is sound and uniform and of a beautifully rich flesh or salmon-red colour. It rises to a height of 90 feet from the edge of the water in Deadman's Bay, the eastern arm of Kingston Harbour. The position offers unusual facilities for working the quarry and obtaining a reliable supply of labour for dressing the stone. Vessels employed in the grain trade, which are now obliged to return in

ballast, can carry the granite either in the rough or in finished blocks and paving stones to the western cities. At Kingston Mills, on the Grand Trunk Railway, within two or three miles of the quarry and connecting with it by sheltered navigable water, the falls of the Catarqui River offer an unlimited and never-failing water power which may be taken advantage of for sawing, turning and polishing the stone. It is expected that this granite will command a high price on account of its very pleasing colour and the fine polish of which it is susceptible. The opening of the quarry and works will be a boon to the old "Limestone City," which may hereafter become known as the *Granite City*.

OXFORD GOLD MINING COMPANY.

Lake Catcha District, Nova Scotia.

At the close of last year the President of this company presented his first annual report to the stockholders which showed that during the year the company had been able to pay dividends aggregating \$30,000 and to expend as well a large sum of money, out of profits, in machinery and other plant. We are now indebted to the company's secretary for a full and comprehensive report of the active continuance of mining operations during the year which is just closing. The company has during the year made some very important accessions to, and improvements of, its plant. Early in the year it was found necessary to have increased power for hoisting and pumping purposes, and also to use this power in the most advantageous and yet simple manner. The number of workings on the various lodes that would be required from time to time in the future, showed the necessity of electing either a system of independent machinery, more or less separated, or a system of concentration of power at the mill. Again if the latter were adopted, what method of power transmission would be the best. It was determined to concentrate the power all at the mill, and distribute it, as required, by means of wire-rope transmission. To this end an additional engine and boiler was placed in the mill to act in conjunction with the engine and boiler already in use. This with two engines and boilers only the destruction of the mill could interfere with continuous work. Then on the main counter shaft, revolving 60 times a minute, was placed a 2 ft. bevel wheel that transmits the power to an upright shaft by means of a 1 ft. bevel wheel. On the upper end of this upright shaft (in the top floor of the mill) was attached several sheaves 7 ft. in diameter grooved to take a $\frac{7}{8}$ in. wire rope. These sheaves make 120 revolutions a minute. As they revolve in a horizontal plane it will be seen that the wire ropes leading on and off these sheaves can be made to carry the power in any direction of that plane. The wire ropes are supported on 1 ft. guide wheels to the place where power is to be utilized. Here is erected a frame of sufficient substantiality to carry a horizontal shaft $3\frac{1}{8}$ in. diameter; on this is a 45 in. bevel wheel connecting with a 9 in. pinion on an upright shaft, which latter again carries on its upper end a 7 ft. sheave similar to those in the mill and which receives the wire rope. From this gearing it will follow that the horizontal shaft revolves 24 times per minute. On one end of this latter shaft is a pump disc connected with the pump rod. On the middle of the shaft is a drum 10 ft. in diameter on which is wound the hoist rope. This drum is loose on the shaft; on one side of it is a friction wheel

on a feathered key that by means of a lever worked by the deck hand carries, when desired, the drum with it, thus hoisting at a speed of 240 ft. per minute. Such is a general description of the system of power transmission. The most notable feature is the use of horizontal sheaves. In the same way is the power carried to the pump at the lake, 500 ft. away, from where the water is brought to the mill for battery and boiler use. In the same manner power is transferred to the blacksmith shop where it runs the fan.

Also a tramway has been built leading from the principal workings up to the top floor of the mill where the ore breaker is. A car of the capacity of an ordinary cart is loaded at the mouth of the shaft directly from the hoist buckets and then pulled by a rope along this tramway up into the mill where it dumps automatically, descending again to the shaft by its own weight.

The additional engine and boiler necessitated the enlargement of the mill which was made in the shape of an annex.

The company has just built on the grounds for the superintendent a commodious and handsome house which is now occupied by him and the assistant superintendent.

The Provincial Government together with private subscription of mine owners has completed a road from Chozetcook harbor to the mine and will probably extend it to Petpiswick harbor on the other side, thus supplying a much needed want of good and direct transportation.

A steam drill is now being put in operation on the Coleman lode that the superintendent reports will make a great saving in the cost of mining ore from that lode.

All these improvements, though lately curtailing to some extent the dividends, are now enabling the company to prosecute its mining work in the most satisfactory and economical manner.

The underground work has been confined principally to the mill and Coleman lodes. Since the annual report of the company, in December last, there has been mined and milled of the mill lode 398 tons, and of the Coleman lode 1,906; giving a result of 1,939 ounces of gold. The whole product of bullion to date (November) has netted the sum of \$103,043. From this has been paid \$36,000 in dividends to the stockholders.

GOLD MINING IN MARMORA.

For some time back the Gatling or Canada Consolidated Mine, which is under lease to Messrs. Stephens and Newberry, has been worked with a force of about 35 men, of whom a dozen or so are miners, the rest being underground labourers, mill and surface hands. The Deep Shaft is now down 135 feet, and the General Tuttle Shaft, to the south of it, 100 feet. From the Deep Shaft the levels run 340 feet south and 100 feet north, while from the other they extend through about an equal length on the vein, so that nearly 1,000 feet of ground have been proved. It is said that up to the 1st of June last, the gold actually obtained from this mine amounted to about \$10,000, and since that time to \$3,500 more. The difficulties in the way of extracting the gold from the obstinate arsenical ore of this mine are reported to be at last overcome, and with the stock of ore on hand and the large quantity in sight, there is a good prospect for the future.

MICA MINING.

This industry is likely to become one of much importance in Canada, owing to the many valuable discoveries of extensive deposits of mica of a good quality in various localities in the Provinces of Ontario and Quebec, and to the rapidly increasing demand for the mineral by stove manufacturers and for other purposes. For the benefit of those who have engaged in mica mining in Canada, we quote from an article which has appeared in the *Chicago Mining Review*, bearing on this industry in the State of North Carolina, as follows:—

"Just as surely as 55,000,000 people use more stoves than did half that number, so surely is mica of good pattern for the purposes of stove manufacture in far vaster and sharper demand than was that mineral fifteen years ago, when North Carolina first brought itself into notice as a mica bearing country. It is therefore not a very surprising fact that in the mica belt, 'cut glass,' as the product is called, to-day fetches rather more than five times the price it did when first marketed. Not only are more stoves made now than formerly, but the numbers in use are vastly increased, and they are of greater capacity and more ornamental than were those of any past period. Besides this, the mica plates of old, well used stoves often need renewing, as they get crushed or worn out by careless firmakers, so that from the stove industry of the United States alone a demand for clean, well cut mica, varying in size from 2 inches by 2 to 7 by 20, is constantly assured, a demand rising with the advent of every winter, and likely to continue as long as the nation itself. At the present day not less than 275,000 lbs. of the finished article are needed for the United States supply, and some of the finest quality is taken up for export.

Mica is found in North Carolina wherever the huronic slates (ponderous, non-lamellar shales) come in contact with, or are intersected by quartz, gneiss, granite, or feldspathic seams. These run almost invariably from northwest by north to southwest by south, and are clearly traceable for miles until the end of the highlands is reached, and the lower levels of North Carolina attained. Mica seams almost invariably dip at about 60°, and when lost or nipped out are usually sought for and refound by striking backwards through the north slate or boundary, or other solid containing rock.

The mines are of two sorts, soft mines, called locally "fluking," and rock mines, the distinction between them being that the soft mines exist where, from natural causes, the feldspar has become degraded, leaving the mica comparatively free and unbound; and hard mines are, as a matter of course, those where the surface mica was bounded by gneiss, which remains harsh and massive. The mica found in these latter mines is, as a rule, of better quality than that found in the fluking, but the soft mines are easy of access, and so long as no great depth is attained, requiring as they do no heavy driving and blasting, are workable by a few hands.

Fluking mines, however, when followed downward change to rock mines or give out altogether at from forty to sixty feet.

The best mines open at the present day are the *Clarissa*, 3½ miles from Bakersville, Mitchell County and the *Ray* mine, in McDowell. It is said that "more mines than miners" is true of the mica industry in North Carolina and that there are but two instances on record of professional miners having engaged in this profitable branch. As a consequence unskilled labour has played the very deuce with the best mines and even the *Clarissa* and *Pigah* mines, two of

the most famous in the district, are "hogged" to such an extent as to present rather the appearance of chance excavated pits than of regularly worked adits, shafts and drives. The *Clarissa* is, for this reason, to-day a monument of shameless want of foresight and ridiculous grasp-at-everything-in-sight-and-lose-the-future, greediness and ignorance. It is, in its deepest hole, nearly 340 feet deep, but has been so irregularly excavated that it cannot be pumped; so that now, when it should be paying cent per cent, it is abandoned, filled with water, an eyesore, and an unprofitable one at that. The driving of a single regular shaft to a proper well, at low water level, would have saved the mine to its owners, but they were too careless to prepare for the advent of water in quantities greater than could be hauled out with buckets on a rope. This mine just previous to its abandonment was running at \$100 per day, and yielding cent per cent.

In Mitchell county, where the best mica is found, but two mines at this time are in a marketable state. One of these is the *Pine Mountain* mine, a deep rock vein on the *Clarissa* lead, but fortunately for its owners nearly 900 feet higher than its water-logged neighbour. This is one of the most characteristic properties in the county. It was opened at the surface in February last by Colonel Borden, a miner of skill and experience, who was since shot dead, in a trespass trouble, by a party of opposing claimants to the *Hoppe A* and *Franklin* mines some 9 miles farther down the country.

At 25 feet Col. Borden got the lead open and found some 2,500 lbs. weight of rough mica, yielding 241 lbs. of fine glass. Then his death took place. This was on May 31st, and in June a splendid block of mica measuring 34 inches through was got out, then a horse of feldspar cut out the vein. This is invariably looked on as an occurrence of the best omen, and work was rapidly prosecuted with a double staff of hands. The feldspar was so hard that the work took thirteen steel to the foot in driving, and the blasting lasted for no less than thirty-five working days. The supporters of Colonel Borden, men who knew nothing of mining, and who had only entered upon the enterprise for relationship sake, soon got tired and actually quitted work, directing their local agent to sell out on the very day that the pay seam was again reached.

This mine, during the few days it was worked after the pay streak was regained, paid hugely.

As stated above 2,500 lbs. of solid mica yielded but 241 lbs. of merchantable, the causes for which are explained as follows:—The masses or lumps of mica have to be split into plates. These are sorted out into sizes and resplit into fine thin sheets, which in turn have to be prescribed into regular patterns, mostly of an oblong shape and running at every variety of dimensions, from 2 inches by 2½ to 7x9 inches. In cutting off excess, shaping down the sheets to patterns, getting rid of spots, cracked, stained, and unsightly places, much waste occurs, and 10 per cent. is accounted a good yield from fine mica in the block.

This mica cutting is an industry in itself, requiring experience. It is mostly done by females at from 50 to 75 cents per day, and costs, as a rule, 13 cents per pound of prepared merchantable mica.

The other marketable mine is a "fluking" mine called "The New Sinkhole." It yielded \$6,000 worth of the product since its discovery in July last, and has been taken by a New York company at a long lease (9 years) on a royalty. For the lease the New Yorkers paid a fee of \$12,000. They are making progress

but are likely to be obstructed by surface water, and possibly by difficulties in the way of timbering up soft clays, mostly Kaolin, through which their seam leads. The produce of mica is now not equal to the demand, and mines are getting scarcer and dearer.

Canadian mine owners will do well to see to it that their properties are properly opened and that mining operations are proceeded with in a systematic manner with a view to permanent work.

LAKE SUPERIOR MINES.

ACTIVITY AT THE RABBIT MOUNTAIN MINE.

RESUMING WORK AT THE TWIN CITY, AND THE BEAVER MINE TO BE OPENED.

The *Sentinel* informs us that Mr. H. H. Miller, Superintendent of the Twin City Mining Company, and Mr. Thos. A. Keefer, arrived in Port Arthur Saturday, 25th October, from Twin City Mine with the first load of high grade silver ore from that property. It is the intention of the company to make a consignment to the smelters before the close of navigation. Messrs. Miller and Keefer report considerable activity in the Rabbit Mountain Mine making things look happy and cheerful around there.

The new find at Silver Mountain is attracting a great deal of attention. The road is cut through to the new mine from the Twin City location, so that now there is direct communication from Port Arthur via the working mines in the Rabbit Mountain district. The Silver Mountain location is owned by Oliver Daunais, Capt. John and Richard Trethewey.

The Twin City Mining Company is organized and Mr. Miller, the Superintendent, has made arrangements to resume work on 96 T at once. The silver ore taken from this mine is as fine as from any in the district, and the prospects of the company are most encouraging.

The Beaver mine, on mining location 97 T, is another silver vein which is spoken of very highly. It is a strong vein, boldly cutting a mountain several hundred feet high. The vein and silver in its outcrops shows on both sides of the mountain. It will be an easy mine to work, like the Twin City, as the ore can be taken out without hoisting or pumping. Arrangements have been made to cut out a road to this mine and build cabins for the winter's work.

The roads are in a bad condition, although considerably improved by the late frost. When good sleighing comes, there will be more activity in the district.

THE IRON ORE DEPOSITS OF CENTRAL ONTARIO.

IMPORTANT DEVELOPMENTS THIS SEASON.

A correspondent of the *Iron Trade Review*, Cleveland, O., has written an interesting letter to that journal descriptive of a recent trip made by him over the line of the Central Ontario Railway and a visit to the iron mines owned by the Railway Company. This line of railway was completed last spring from the company's docks at Waller's Bay, on Lake Ontario, to the Coe Hill Iron Mine and the last rail laid on May 31st. The first cargo of iron ore went over the line on June 2nd, and the road was opened for passenger traffic on September 1st. The ore trains consist of 1 to 16 flat cars, each

carrying 15 to 17 tons of ore. The total quantity of ore shipped this season from the company's docks to Cleveland, O., up to the 20th October, amounted to 40,000 tons, of which 15,000 tons were mined during last winter, the balance, 25,000 tons, having been mined during the past summer. On that date about 2,600 tons remained on the stock pile at Coe Hill, and about 80 tons of ore was then being mined daily. This would seem to indicate that about 50,000 tons of ore would be shipped before the close of the season. After giving a description of the country traversed by the C. O. Railway, the railway itself, its grades and curves, etc., the *Review's* correspondent refers to what has been accomplished at the mines during the past season in the way of development, as follows:—

ORTON MINE.

This comparatively new development lies in Tudor Township, about two miles west of the main line of railroad. It probably presents the largest showing of any of the properties now being developed, being apparently about a mile in length. There is a very large surface exposure, but unfortunately the first specimens mined showed about 7 per cent. of titanium; otherwise the ore was found to be very pure. A diamond drill is at present in operation on this property, and it is claimed that specimens of ore taken from this same body, some 200' down, show no trace of titanium. This appears improbable, but it was the report made to the company last week, with further tests yet to be made. At the

EMILY AND ROBINSON MINE,

six miles north, a large surface opening has been made, though no definite results have been arrived at as yet. The outcroppings as shown at the Emily Mine are very large, but the vein has not yet been located. A diamond drill is at work here, and it is expected to do considerable work this winter by way of development. Analyses show from 68 to 69 per cent. of metallic iron. Considerable ore will probably be taken out this winter, preparatory to being shipped next spring over the branch road which is to be built.

BAKER MINE.

At this mine a number of test-pits have been sunk, showing a formation about three-quarters of a mile in length and in shape like a horse shoe. The surface ore shown is of good quality. This mine will probably be developed on an extensive scale next season. Nine and a half miles southwest of the northern terminus of the road is the

CHANDOS MINE.

Here a cut has been made across the vein showing a width of from 50' to 60' at the top. This vein is traceable for a half mile. The ore is, to all appearances, entirely free from sulphur. The prospectors have bored with a diamond drill to a depth of 260', going through two veins, one 40' the other 18' in width—all good Bessemer ore, analysing from 65 to 69 per cent. of metallic iron. A company to be known as the Arthur Mining Co. is now being incorporated to develop this vein, and work will be vigorously pushed next season.

There are two or three other developments in this range, but nothing has been done at them this season.

COE HILL MINE

The most important work in developing the new region is in connection with the Coe Hill Mine, at the northern terminus of the railroad. Evidences of hard work and liberal expenditure

are to be seen on every hand. Coe Hill, a rocky eminence some 850' above Lake Ontario, has been transformed from a bleak and barren exposure, to a veritable hive of industry. Dumping chutes have been put up, tramways laid, a hoisting plant put in position, a town laid out, and boarding and dwelling houses erected. Twelve tenement houses are in process of erection, besides two large boarding houses. Upon the crown of the hill is the hoisting apparatus, consisting of a 350 H. P. engine built by the Globe Iron Works, of Cleveland; a battery of boilers made by the Weddell Foundry, of Trenton, and one of the well known hoisting drums of the Webster, Camp & Lane Machine Co., of Akron, O. Over this apparatus is to be erected a \$2,500 building 34x60', with an I. 20x60'.

In the way of development the following work has been done: At the extreme east end of the works is Shaft No. 1, so numbered from its position, not because it is the oldest. In this shaft a depth of 40' has been reached, after going through 3' of soil, but no rock. A width of from 28' to 30' is shown in the ore vein, all of Bessemer magnetic quality, the needle showing a dip of from 95° to 100°.

Shaft No. 2 is down to a depth of 75', and a companion shaft has been sunk to a depth of 80'. These are to be connected by drifts. From present appearances, the rock seems to have been split, and the belief is that it is pinched out and that the two parallel veins will be found to come together below, with a combined width of 65' to 68'. Of course this is by no means demonstrated as yet, but the indications appear to point that way.

Shaft No. 3 is down about 85' showing the vein to be of continuous formation. On the surface the vein shows an average width of 50' to 60'.

Much work has also been done in stripping and in sinking test-pits, all of which show that the course of the vein is almost due east and west and with an ascertained length of 1,300'. The course of the vein, even from the surface, is quite distinct beyond Shaft No. 3. In digging for the foundations of the engine-house, a parallel vein was unexpectedly struck, compelling a change in location. An examination of these two veins would appear to carry out the idea of the proprietors that the rock is pinched out and that the two veins come together below. Opinions vary, however, as to whether their surmises are likely to prove correct.

A mistake has been made in opening up a considerable portion of the vein from the surface, instead of sinking shafts and drifting under, thereby leaving the workings exposed; but Capt. James, an experienced Lake Superior mine captain, has taken charge of the works and is now conducting the developments on more approved principles.

CANADA AS A COMPETITOR.

Concerning the future of these developments opinions vary with the predilections of the observer. Certainly the work of prospecting has been thorough, the showing of ore is flattering, the analyses are all that could be desired, and the arrangements made for getting the ore out and delivering it on board the vessels are complete and ample. The projectors of the enterprise are all skilled men-of-affairs, with plenty of capital and an abundance of energy. Whether the outcome of all this expenditure will meet their expectations remains yet to be seen. The indications point strongly to such a result; only opinions are offered to the contrary. As to the cost per ton at which these ores can be laid down on the docks in Cleveland, in competition with Lake Superior ores, the

following comparative estimate is submitted in each case taking the figures of the parties interested:—

	Canada	Lake Superior
Mining	\$ 1.00	\$ 2.00
Railroad freight	1.00	.45
Lake freight, trimming and unloading31	1.10
Duty75
Insurance03	.03
Total	\$ 3.72	\$ 3.58

This, of course, is putting the two regions on an equality in the matter of ownership and not allowing for any royalty. If this were taken into the account, it would probably be offset by the increasing cost of mining which will be experienced in Canadian mines as compressed air plant, pumps, &c., have to be added to their outfits.

BRITISH COLUMBIA MINING NOTES.

Many of the creeks emptying into the Skeena will be prospected in the spring.

This year has not been a prosperous one for the gold miners in Cassair district, the outputs being below the average of other seasons.

The output on Quartz Creek has been good, one man having taken out \$6,000. Others located on the creek have also done fairly well.

About twenty-five white and a number of Chinese miners have been engaged during the past season on Thibert Creek and have done fairly well.

Summing up the information which has come from the northern mines it would appear that the Lorne Creek diggings are paying from \$7 to \$10 a day per man and some new claims have been found on some of the adjacent creeks.

Conflicting reports come from Lorne Creek, while the total amount of gold mined may not be large quite a number of individuals have put together \$800 to \$1,400, the result of their season's work, which, in the light of the golden days of Cariboo, does not seem large though it is much better than empty pockets.

On Dease Creek there have been five white miners and twenty Chinamen during the past season. One who has been in the Cassair district for the past ten years reports that little money has been made this season, though a few have done moderately well and one has done excellently.

The shipments of coal to foreign ports (exclusive of amount furnished foreign steamers at Victoria) from Nanaimo and Departure Bay for the month ending October 31st, amounted to 36,824 tons, valued at \$147,295. This is the largest foreign shipment for a single month in the annals of coal mining on Vancouver Island.—*Victoria British Colonist*.

Some prospectors who have been on Kitsini Kaline River report having struck diggings on that stream where they have taken as much as \$5 to the pan. Many of the miners think of going to this place in the spring, and, if the reports are found to be true, there will likely be a rush to that point. The river empties into the Skeena, but is got at from the Naas.

GENERAL MINING NOTES.

The deepest gold mine in the world is the Eureka, Nevada County, California.

Twenty thousand tons of Canadian iron ore had been shipped this season, up to the end of October, from Kingston, Ont., to Fairhaven and Cleveland.

The daily output of the Vancouver Coal Company, it is reported, has reached over 600 tons and with the assistance of the steam engine placed underground at the Esplanade shaft, the management anticipates raising the output, within a very short period, to 1,000 tons a day.

The Essex Gold Mine, Tangier district, Nova Scotia, has lately started up under a new organization and has made its first shipment of bullion. The old *Trapper* shaft has been cleaned out and shows a rich vein. The *nugget* lode maintains its reputation and the management is much pleased with results and prospects for future working.

The Ophir, Mexican and Union Consolidated Mining Companies have jointly sunk a winze 3,300 ft. into the bowels of the earth for exploration purposes, and it is still going down. It is said that if a much greater depth is reached it will puzzle the inventive genius to devise a steel wire that will be strong enough to carry its own weight.

The product of the famous CALUMET and HECLA for the four fiscal years ending 30th April, 1884, in copper 77½ per cent. fine, as also of ingot copper, has been as follows:—

1881.....	20,300.1147	1881.....	15,979.1300
1882.....	20,905.1187	1882.....	16,094.1985
1883.....	20,392.1480	1883.....	15,714.258
1884.....	22,956.155	1884.....	17,707.07

Letters patent have been issued by the Government of Ontario for the incorporation of the "Rabbit Mountain Mining Company of Ontario," with a capital stock of \$2,000,000 divided into 200,000 shares of \$10 each. The company will operate the Rabbit Mountain Silver Mine, and other mines on the north shore of Lake Superior, with its head office at Port Arthur.

EL CALLAO. This famous Venezuelan Gold Mine produced 14,102 ounces of gold during the month of September, 1884, remitted to the Messrs. Baring Brothers, of London. Estimated at the usual value of such gold per ounce, such produce was worth \$273,000. The dividend paid for the month was one of \$4.80 per share, aggregating \$154,560. The product this year to the close of September aggregated about \$2,775,000, of which shareholders have received \$40.80 per share.—*N.Y. Mining Record*.

A resident of Calgary, N. W. T., Mr. McRae, has returned to that town from British Columbia where he has located some valuable gold placers. He reports that a quantity of gold has been taken from the small tributaries to the Columbia River. From Canon Creek two men took \$200 in one week. Mr. McRae expresses the opinion that very rich placers are likely to be discovered next year. He has had a successful season in the district, but, on account of the snowslides, he has been compelled to suspend operations until next spring, by which time he will have had an opportunity to prepare for active mining on an extensive scale.

MINING HISTORY.

The history of British lead and silver mining reaches back into the realms of tradition. The mines at Combo Martin and Beer Alston, in Devonshire, are said to have enriched Edward the First and Edward the Second, and were re-opened by Queen Elizabeth, Combo Martin being discovered years before the reign of Henry the Seventh. The mines in the Mendip Hills were known in the reign of Edward the Fourth, a rude map, drawn about 1480, being still extant, together with a curious copy of the laws governing the district. The famous lead mines of the Alston Moor district, in Cumberland, had royal protection in 1233, and Richard the Second granted privileges to Nicholas Veterijont, which was confirmed to his son by Edward the Third. In 1620 the mines were reported exhausted; but in the eighteenth century they were re-opened. The Cardiganshire mines were certainly known in the time of Henry the Seventh. In 1690 they were "boomed" by the owners, and in 1698 the public was favoured with a highly coloured prospectus, which reads curiously like some of the modern documents of that kind. Thus, "with a stock of £20,000 and good management, the said mines would yield a yearly profit, over and above all charges, of £171,970 19s. 9d. for lead, besides the silver, which it is believed will yield, one ton with another, about £14 in silver per ton of metal, and may, in all probability, double the valuation of these mines." In 1700 the company was regularly formed under the title of "The Government and Company of Mine Adventurers in England." About 650 shareholders took the bait, embracing people of every class, but they never realized anything, and the mines which started with such brilliant prospects collapsed amid a flood of papers and pamphlets of accusations and vindications.—*Chicago Mining Review*.

THE METAL MARKET.

Messrs. E. W. Carling & Co., 16 Philpot Lane, London, Eng., report under recent date:—

Metals have shown a better tendency during the week, iron being generally in improved demand both for pig and manufactured sorts at hardening prices:—

IRON.—Scotch pig, @ £12 7½s. to £13 4½s. cash; Welsh bars, £5 10s. to £5 15s.; nail rods, £6 to £7; Hoops, £6 17s. 6d. to £7 10s.; sheets, £7 17s. to £9.

TIN.—Steady, dearer and in more demand @ £74 5s. to £74 15s.; for fine foreign Australian, £74 5s. to £74 15s.; English bars, £81 10s. to £82; plates I. C. coke, 14 x 20, £15; charcoal I. C., £18.

COPPER.—Firm, Chili bars good ordinary brands, cash, £53 10s. to £53 12s. 6d.; English tough ingot, £58; best selected, £59; sheets and rod, £64 to £65.

YELLOW METAL.—Sheets, 5½d.; sheeting, 5½d.

LEAD.—Steadier @ £11 to £11 5s., although little business passing; bars, £11 15s. to £12; patent shot, £13 15s.; sheet, £11 15s.; pipe, £12 7s. 6d.

ZINC.—Usual gauges, £18 5s. to £18 10s.

WIRE.—Fencing, rolled, No. 4, £6 15s. to £7; annealed drawn, No. 6, £8 5s.; No. 7, £8 5s.; as No. 8, No. 9, £8 15s.; No. 10, £9 5s.; galvanized drawn, Nos. 4, 6, £11 10s.

BRASS.—Wire, Nos. 1, 2, 6½d.; rolled brass, 6½d.; sheet, 6½d.

NAILS.—Wrought strong rose, 1½ to 3 in., 6d. to 8d., discount 40%; 3½ to 6 in., 35% discount; pointed, 30%; cut nails, £10 to £15 according to gauge.



NOTICE TO CONTRACTORS.

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Post Office Letter Box Fronts," will be received until Monday, 15th proximo, inclusive, for the supply of about 10,000 post office letter box fronts.

Parties disposed to submit tenders may obtain forms of tender, specification and any further particulars at this Department.

Parties tendering will be required to submit with their tender a sample of the box they are prepared to provide.

Tenders will not be considered unless made on the printed forms supplied, and signed with the actual signatures of the parties tendering.

The Department will not be bound to accept the lowest of any tender.

By order,
F. H. ENNIS,
Secretary.

Department of Public Works,
Ottawa, Nov. 17th, 1884.



NOTICE TO CONTRACTORS.

SEALED Separate Tenders (including plans and specifications), addressed to the undersigned, and endorsed, "Tender for heating apparatus, Port Hope, Ont.," will be received at this office until Friday, the 5th December next.

Copies of plans of the building proposed to be heated and a memorandum of requirements will be furnished to those desiring to tender, who will be required to indicate the arrangement, etc., of their apparatus and furnish a fully detailed specification.

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 fail to complete the work contracted for. If the tender be not accepted the cheque will be returned. The Department will not be bound to accept the lowest or any tender.

By order,
F. H. ENNIS,
Secretary.

Department of Public Works,
Ottawa, 5th Nov., 1884.



Notice to Contractors.

SEALED Separate Tenders addressed to the undersigned, and endorsed "Tender for Heating Apparatus, Hamilton, Ont.," will be received at this office until Thursday, the 11th December next.

Plans and specification can be seen at this Department, and also at the Clerk of Works Office, New Public Building, Hamilton, on and after Thursday, 27th instant.

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 on 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 will not be bound to accept the lowest or any tender,

By order,
F. H. ENNIS,
Secretary.

Department of Public Works,
Ottawa, Nov. 24th, 1884.

GRAPHITE.

Wanted, fair average samples of about 1 lb. each, with prices, F.O.B. Address J. S. Merry, Assay Office, Swansea, Wales.

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B. & S. H. THOMPSON,
Montreal.



NOTICE TO CONTRACTORS.

SEALED Tenders addressed to the undersigned, and endorsed "Tenders for Hydraulic Elevator, New Public Building, Hamilton," will be received at this office until SATURDAY, the 13th day of December next, inclusive for the placing of a Hydraulic Passenger and Freight Elevator in the above building.

General conditions, form of Tender, and all necessary information can be obtained at this Department on and after Monday, the 22nd instant.

Tenders must be made on the printed forms supplied.

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 fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department will not be bound to accept the lowest or any tender.

By order,
F. H. ENNIS,
Secretary.

Department of Public Works,
Ottawa, Nov. 18th, 1884.

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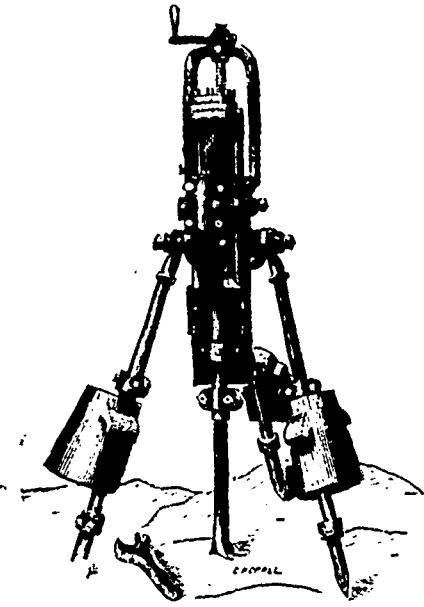
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