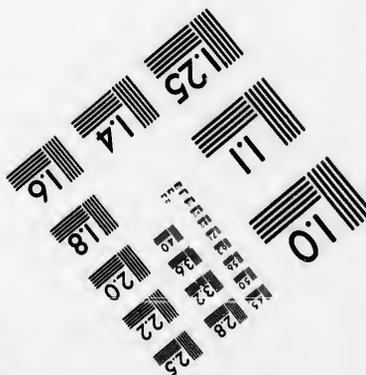
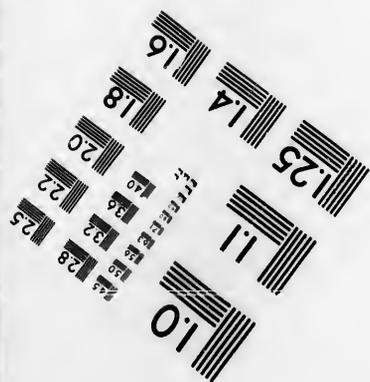
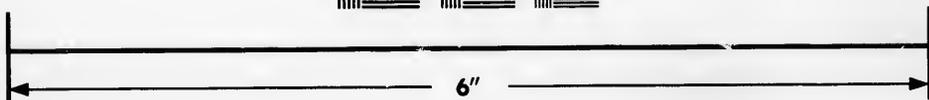
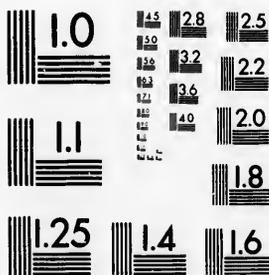


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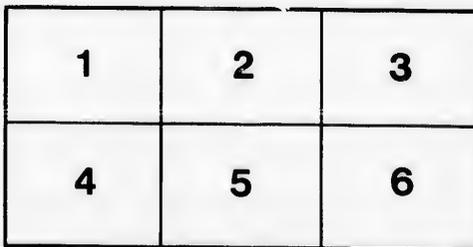
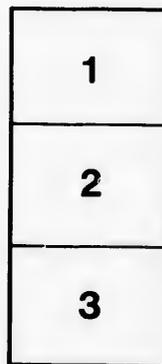
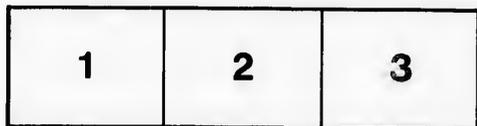
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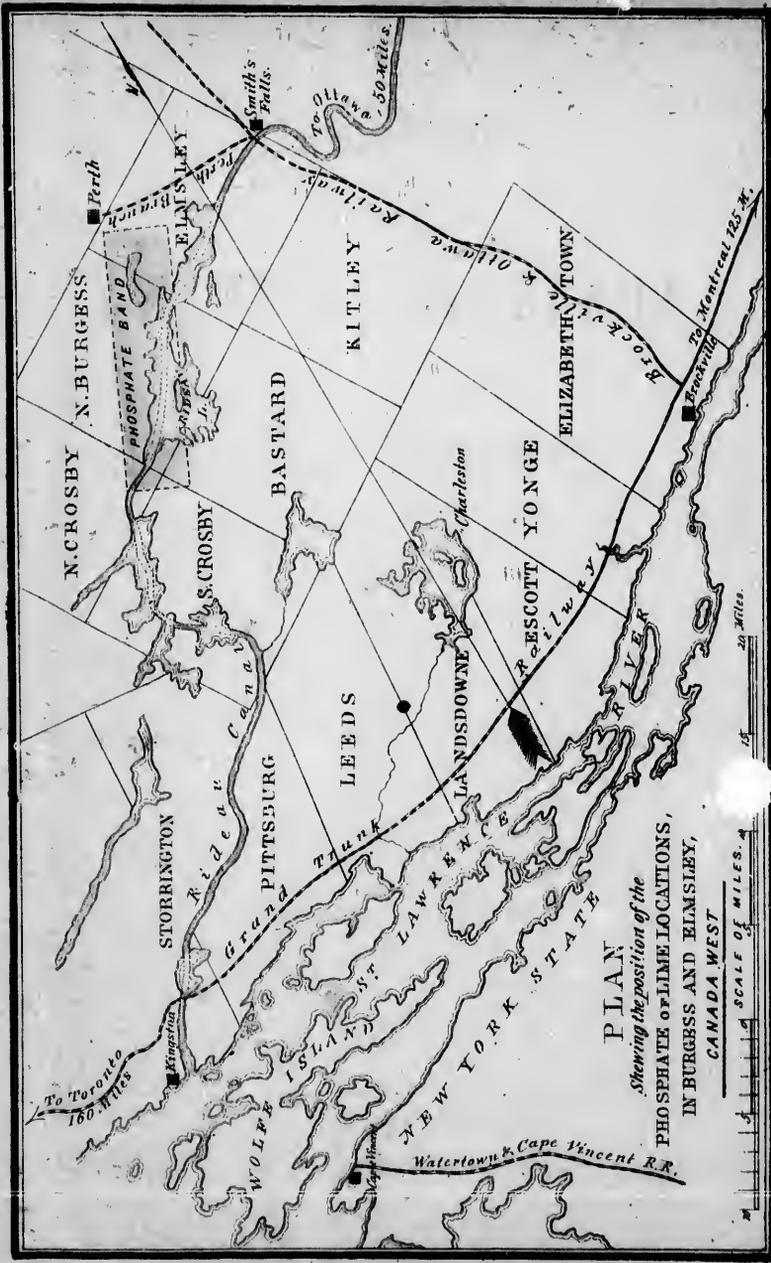
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**PLAN**  
 Showing the position of the  
 PHOSPHATE OF LIME LOCATIONS,  
 IN BURGESS AND ELMSELEY,  
 CANADA WEST

Roberts & Reinhold, litho. Montl.

C. Robb, Mining Engineer.

Roberts & Reinhold, Litho, Montl.

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MONTREAL

APATITE COMPANY

INCORPORATED UNDER 27 AND 28 VIC., CAP. 23

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CAPITAL . . . . . \$100,000.  
SUBSCRIBED . . . . . \$100,000.

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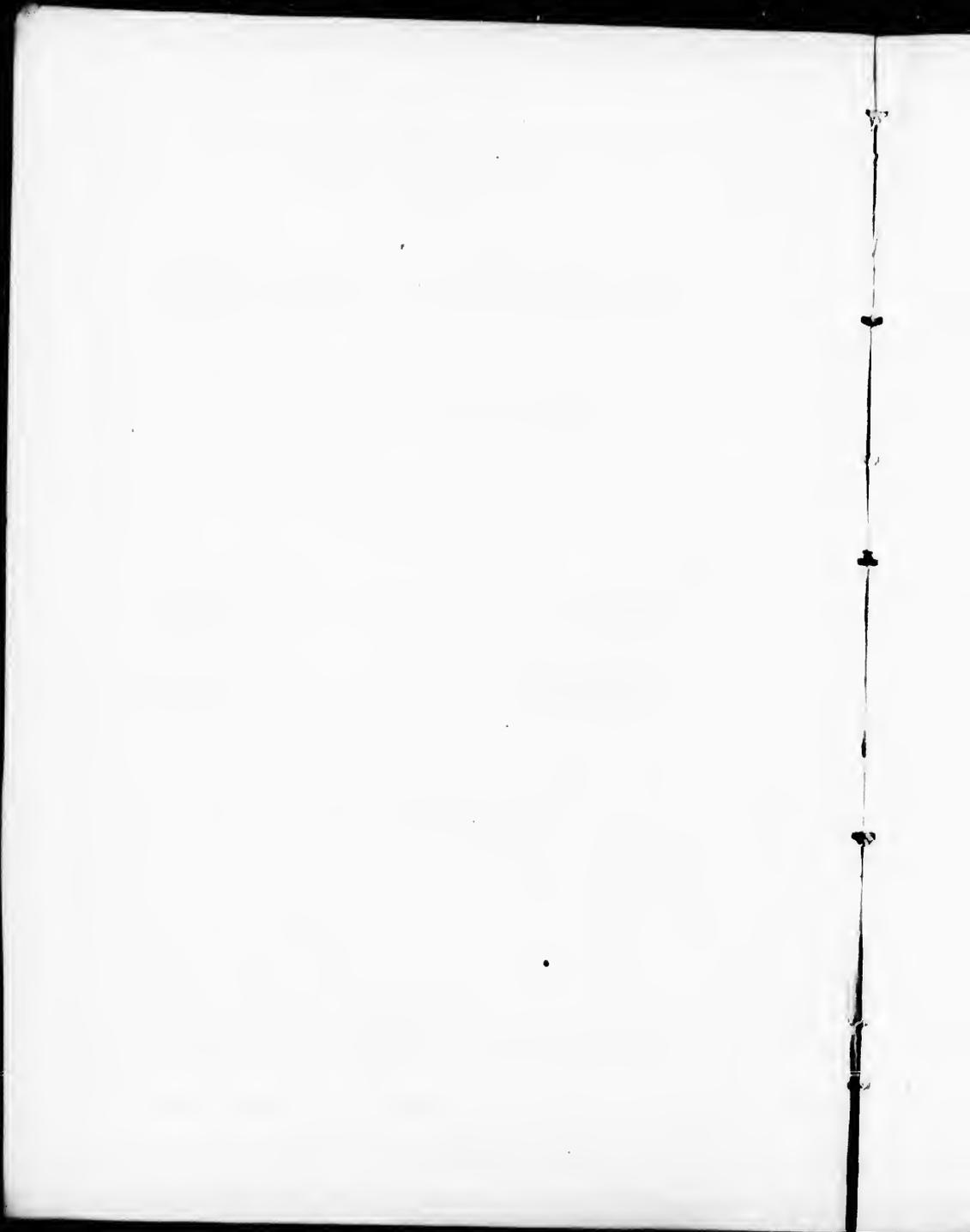
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1865.

C. Robt. Mining Engineer.



## MONTREAL APATITE COMPANY.

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The Montreal Apatite Company, incorporated under the General Mining Act of Canada, [1864] with a limited liability to the Shareholders, is now being organized for the development of the extensive beds of the mineral, generally known as "Phosphate of Lime," existing on the property of this Company, situated in North Burgess, on the Rideau Canal, about six miles from Perth, C. W.

The explorations of the Geological Survey and the developments of the Rideau Mining Company, on one of the adjoining lots, prove that the quantity in this locality is almost inexhaustible, lying in surface deposits as well as in well defined veins, yielding 90 per cent. Apatite, and capable of being wrought at small expense.

The value of this Mineral as a manure (reduced to a Superphosphate) is now admitted, and bids fair to rival the far-famed guano, adding to the economic minerals of Canada a product as valuable as her Iron, Petroleum, Copper, or Gold.

The demand is limited only by the wants of Agriculture in all parts of the civilized world, whilst the supply, except from these extensive fields of Canada, cannot be met by the deposits of Sweden and Spain.

The property of the Company consists of 170 acres freehold of land and minerals; 527½ acres freehold of minerals; 795 acres leasehold of minerals, subject to an annual rent of \$160. The titles are perfect in every particular.\*

The proximity of this property to the Rideau River, one of the lots fronting thereon, and adjoining the one worked by the Rideau Mining Company, affords facilities for mining and shipping at the lowest possible cost.

The cost of mining, shipping and realizing, is thus estimated per ton :—

Mining and Picking, . . . . .	\$4 00	
Cartage, . . . . .	0 50	
Freight to Montreal, . . . . .	2 50	
Loading, . . . . .	0 25	
Wharfage at Montreal, . . . . .	0 25	
Handling, . . . . .	0 25	
Freight to Liverpool, . . . . .	10 00	
Charges, Management and Commission	1 50	
Allowance for Extras, . . . . .	0 50	
Interest on Capital, . . . . .	0 25	
	<hr/>	
Total Expenditure, . . . . .	\$20 00	*
Value in Britain, France and Germany,		
£6 10s. stg. ; at 9½ per ct. = \$31.63, say	\$30 00	
Margin for profit per ton, . . . . .	\$10 00	

\* See page 12 for details.

\* proves by Noach in mining for English  
 Coy to be \$ 14 75

These charges have been intentionally estimated at a high rate, and may be much reduced by careful management.

By working gangs of men continuously on the several lots, from 100 to 500 tons per week may be obtained.

Assuming, however, 100 tons per week;  $100 \times 52 = 5,200$  tons at \$10 profit, \$52,000 per annum.

The property has been secured at a cost of one-tenth free stock, = \$10,000; and cash \$10,000, payable one-quarter down, and the balance in three equal quarterly payments, without interest.

It is proposed to allot the stock in blocks of 1000 shares, of \$5 each, and to call in 25c. of \$1, thus:—

Cash, . . . . .	\$500
Three months, . . . . .	250
Six " . . . . .	250
Nine, " . . . . .	250
	<hr/>
	\$1,250
Multiplied by 18 assessable blocks, . . . . .	22,500
From which deducting the cash payment on the property, . . . . .	10,000
	<hr/>
Leaves a working balance of . . . . .	12,500

A sum ample to develop and carry out the mining and shipping contemplated under the present organization. The return thus anticipated is over 230 per cent. per annum on the proposed investment.

The mining enterprises of Canada are in their infancy, and may be called experimental, but it only requires the judicious investment of the limited means of her people to open up a new and vast field for the development of her resources, the employment of her population, and the advancement of the commercial prosperity of the country.

The following extracts bear on the subject and explain the views of the Geological Commission of Canada, page 759, *Geology of Canada* :—

“Of late years the increasing demand for Phosphates as fertilizers, has drawn attention to the use of the crystalline mineral, Phosphate of Lime or Apatite, of which large quantities have been imported from Norway into England, and attention has recently been turned to the abundant supplies of this substance existing in Canada. According to a letter received in September 1862, from one of the largest manufacturers of Superphosphate in England, he a few years since imported several thousand tons of Apatite from Sweden, and only abandoned its use, because the English Phosphates of Lime could be furnished at lower rates than the Swedish. He writes that the following prices may be expected for Phosphate of Lime in England :—For a mineral containing 90 per cent. of Phosphate of Lime about £6 10s. stg. per ton ; for one containing 80 per cent, £5 10s. stg., and for one 70 per cent. £4 10s. A mineral with a

lower per centage than this, would not, it is said, be merchantable.”

As to the Assay of Phosphate from an adjoining lot, it is stated :—“What was regarded as an average specimen from one of the beds on the fourth lot gave by analysis, Phosphate of Lime 91.20, fluorid of calcium 7.60, chlorid of Calcium 0.78, insoluble 0.90 ; 100.48. This mineral Phosphate contains only traces of oxyd of iron ; and from its purity it might perhaps be used instead of bone ash on the manufacture of English porcelain.”

Mr. Robb, a man of practical experience in Canada, of professional ability and of reliability, states in his Essay on the Mineral Resources of British North America :—

“MINERAL MANURES—PHOSPHATE OF LIME—GYPSUM  
—SHELL MARL.

“*Apatite or Phosphate of Lime.*—This mineral, the constituent elements of which form the base of animal bones, is found in great abundance in the Laurentian rocks of Canada ; and although not hitherto brought into very general use as an artificial manure, is plentifully distributed by the hand of nature from the debris of the rocks among the soils, contributing no doubt very materially to their fertility and value. Its occurrence in rocks of such primitive geological age, points to the existence of animal life at a period

vastly earlier than the received geological theories admit.

"The mineral phosphate of lime has for some years back attracted considerable attention both in England and the United States, as a substitute for guano and bone dust. So important is the substance deemed, that the British Government sent commissioners to Estremadura in Spain, where the mineral is found, for the purpose of arranging for its importation into England; but the result was that it did not appear to exist in sufficient quantity; so that the only mineral phosphate now used by the agriculturists in England is obtained from the *crag* on the coast of Suffolk. This, however, is very impure, containing much carbonate of lime and other earthy matters; while the mineral phosphate found in Canada is nearly in a pure, and much of it in a crystalized state. Although it has not yet been mined to any considerable extent, sufficient has been ascertained with regard to its mode of occurrence to render it certain that it can be obtained in very great quantities, and it may be hoped that it will supersede the use of bones, of which probably not less than £400,000 or £500,000 worth are annually imported into England. Besides the use of bone-dust for agricultural purposes, several thousand tons of it are annually used in England for the manufacture of china ware, at a cost of from seven pound to ten pound per ton. Probably the mineral phosphate might be successfully applied

as a substitute for this purpose also. As a manure it has been actually applied to the land with great success; but a good and cheap method of decomposing it, previous to applying it to the soil, is still a desideratum. The usual mode of applying it as a manure, is to grind the mineral to powder, and treat with coarse sulphuric acid; about two-thirds of the phosphate is thus at once liberated, and enters into combination with the soil, while the remaining third will act upon the ground the ensuing year, by becoming soluble by natural agencies.

“This mineral is found very extensively distributed among the Laurentian rocks, both in detached nodules and in crystals; but the most important locality of its occurrence, hitherto discovered, is in the township of North Burgess, where it forms a massive bed of unknown though evidently very great dimensions, which has been quarried to a small extent. Another deposit in the adjoining township of Elmsley, but which, from the direction of the beds, seems to be in the same bed, has also been worked a little, and apparently forms an irregular bed in the Laurentian limestone. This bed has been traced upwards of a mile, and seems to be about ten feet wide, of which three feet are nearly pure crystalline apatite, containing about ninety per cent of phosphate of lime, the remainder being mixed with the limestone rock, in which, however, the phosphate greatly predominates. The deposit in North Burgess has the great advantage of

being very easily quarried, and of being situated immediately upon one of the reaches of the Rideau Canal. The mineral is stated to be worth from twenty to thirty dollars per ton in England, the value, of course, varying according to the percentage of phosphoric acid. When we consider the bearing of the phosphate of lime upon the animal and vegetable economy, we must regard the discovery of this substance in such abundance, and so easily accessible, as one of the most valuable of the sources of wealth which has been added to the country during the last few years."

Specimens of the mineral and all information as to the Company may be obtained from the undersigned, at whose office the stock books are opened.

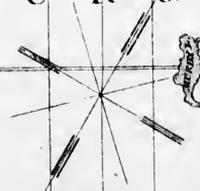
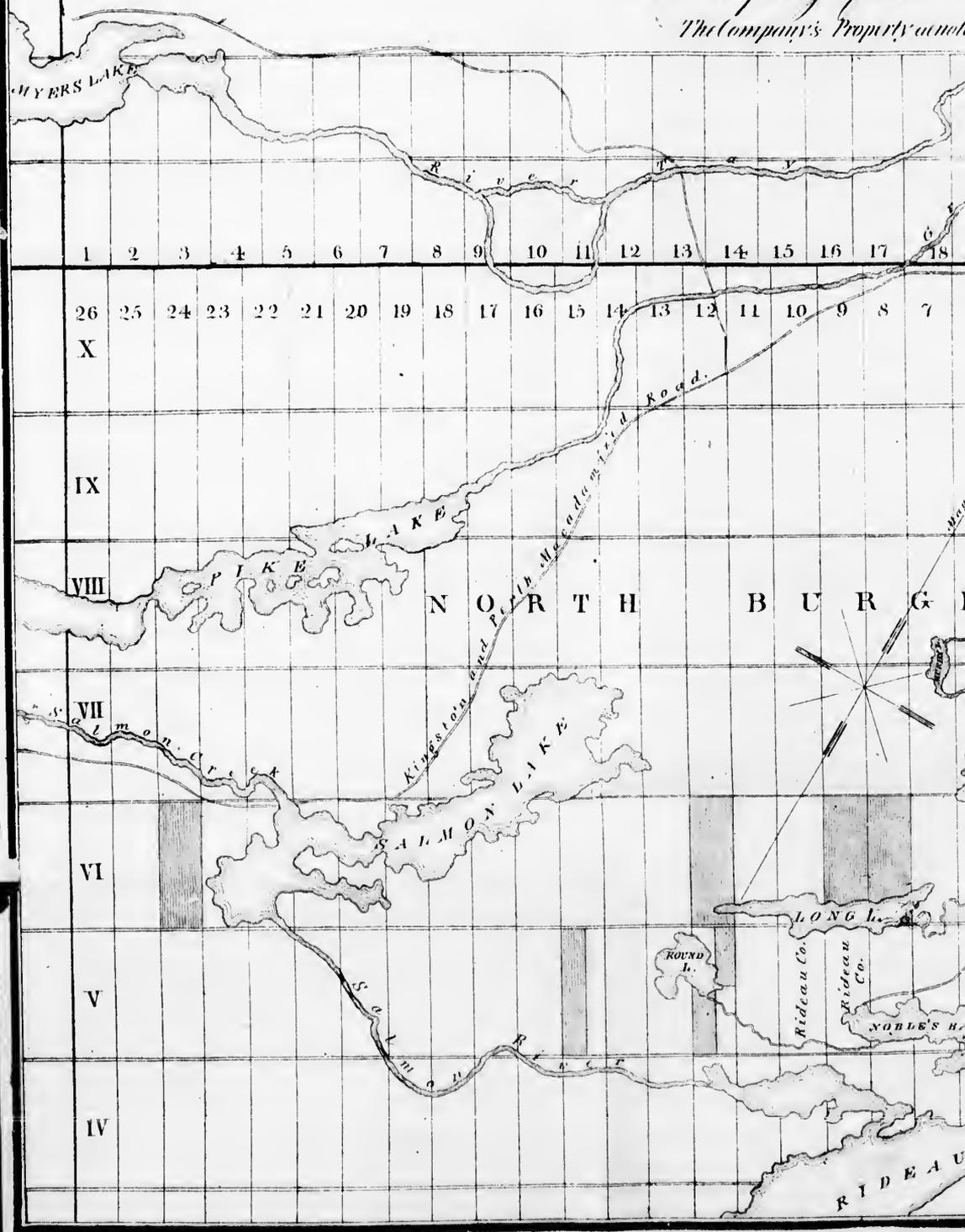
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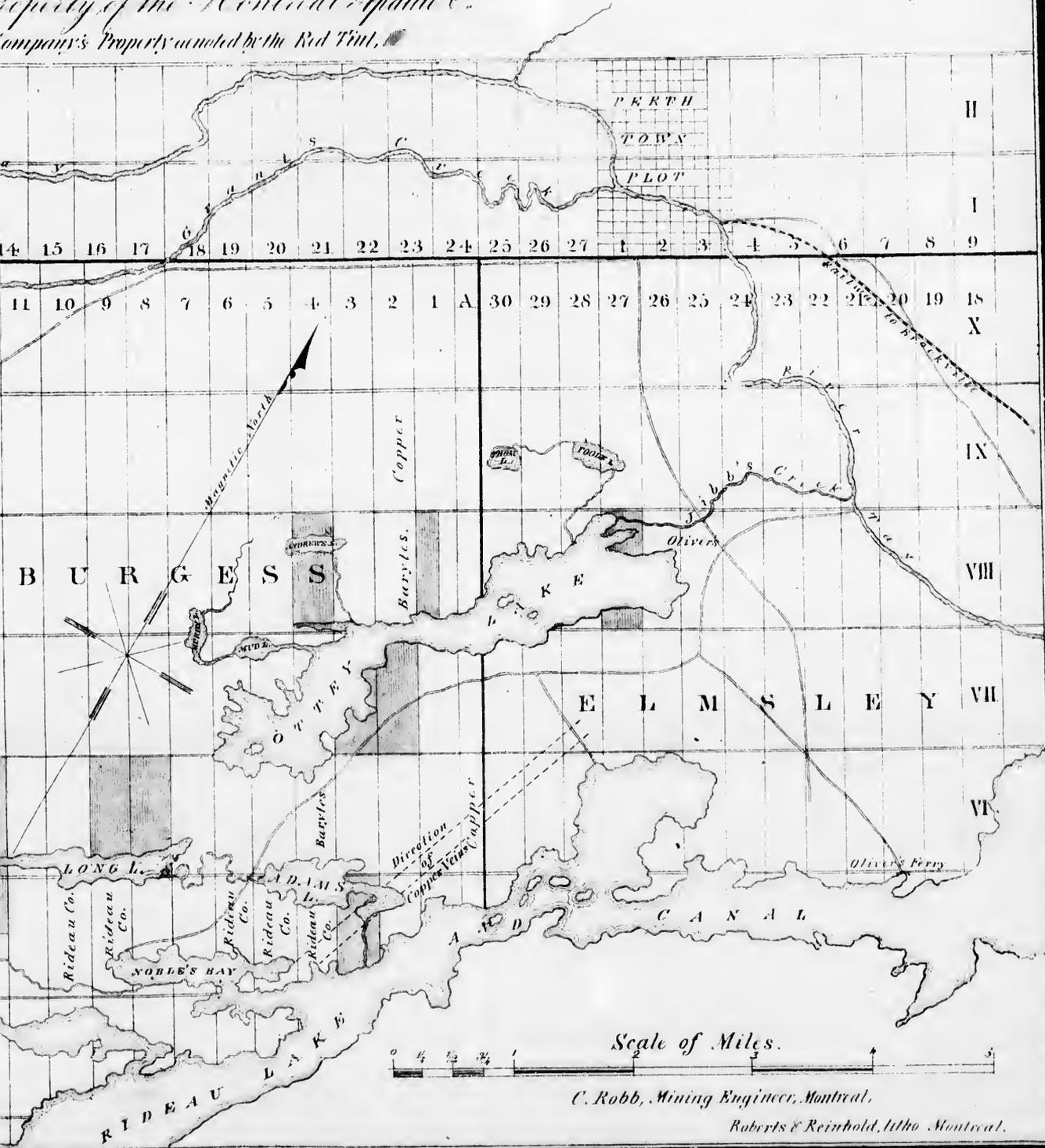
MAP

of  
Mining Locations  
The Property of the  
The Company's Property and



# MAP

*of*  
*Locations in Canada West,*  
*Property of the Montreal & Pacific C<sup>o</sup>*  
*Company's Property marked by the Red Tint.*



C. Robb, Mining Engineer, Montreal.

Roberts & Reinhold, litho. Montreal.



# SPECIAL REPORT

ON PROPERTY OF

THE MONTREAL APATITE COMPANY

BY

CHARLES ROBB, Esq.,

*Mining Engineer.*

96 St. Francois Xavier Street,  
MONTREAL, 28th June, 1865.

WM. B. LAMBE, Esq., Montreal.

DEAR SIR:

Having been honored with your instructions to visit and report upon certain lots of land in the townships of Burgess and Elmsley, in Canada West, which had been selected for the mining of apatite, or the mineral phosphate of lime I proceeded thither on the 20th instant, and devoted the remainder of the week to a superficial examination of the property, in so far as it was practicable to do so.

As the lots in question had been but very partially explored by blasting and uncovering the rocks, I considered it necessary, in order to arrive at any definite conclusions as to the probable quantity, mode of occurrence of the mineral, and general prospects of the undertaking, to inspect also some of the lots adjacent to your own, upon which exploratory works had been carried on to a considerable extent.

On the accompanying map, which represents the portions of the townships of Burgess and Elmsley in which the phosphate of lime has been found in available quantity, I have distinguished by the red tint the lots selected by you; and have also marked the lots on which mining operations for apatite are now, and have been during last

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season, successfully carried on by the Rideau Mining Company. The following is a list of the various lots selected by you :

1.	Lot 27 in the 8th Concession N. Elmsley, about	50	acres.
2.	S.W. $\frac{1}{2}$ " 1 " 8th " N. Burgess,	"	100 " "
3.	" " 4 " 8th " " "	"	190 " *
4.	" " 2 and 3 " 7th " " "	"	295 " "
5.	" " 8 and 9 " 6th " " "	"	335 " "
6.	" " 12 " 6th " " "	"	192 $\frac{1}{2}$ " "
7.	" " 24 " 6th " " "	"	200 " "
8.	" " 3 " 5th " " "	"	120 " "
9.	N.E. $\frac{1}{4}$ & S.W. $\frac{1}{4}$ 12 in 5th " " "	"	100 " "
10.	SW $\frac{1}{2}$ " 15 " 5th " " "	"	100 " "

Comprising in all 1,682 $\frac{1}{2}$  acres

more or less.

The geological horizon to which the deposits of apatite found in this region belong, lies towards the base of the Lower Silurian system of rocks, appearing to occupy a position between the Laurentian limestone and overlying Potsdam sandstone. These formations are here, however, extremely irregular and difficult to trace; such irregularities being indicative of a period of convulsion, and probably attended by powerful chemical reactions. Patches of Laurentian gneiss, granite, and limestone are distributed in a somewhat confused and capricious manner, associated with masses of diorite or greenstone. The deposits of apatite occur at or near the junction of these several descriptions of rock, and appear to me, for the most part, to partake of the character of *segregated veins*, occupying fissures generally (though not always) parallel to the stratification of the rocks, the mineral substances of which they are composed having been gradually eliminated from the surrounding rocks while in a plastic state. Such deposits, although not generally considered so regular or reliable as *true veins*, are frequently found of vast dimensions and amply remunerative in working; and even although exhausted in one place, generally leave sufficient indications in the rock by which to trace the locality of similar adjacent deposits. In some instances the deposits assume the appearance of true veins cutting the rocks, but their real character has not yet been thoroughly tested. The mineral occurs both in the crystallized and compact form, both being, however, equally pure.

So far as yet known, the tract of country in which these great deposits of apatite for the most part occur, occupies a breadth of

\* This lot under offer of sale.

about  $3\frac{1}{2}$  miles, commencing a little beyond the eastern end of Otty Lake, and running in a direction South  $20^{\circ}$  West, coinciding with the general strike, and extending a little to the south of the Rideau Canal and Lake, or a distance of 8 or 9 miles. The lands acquired by you all lie within the designated area, with the exception of one lot, (the 24th of the 6th Concession, N. Burgess,) upon which, however, phosphate of lime has also been found in promising quantity. The mineral is almost invariably associated with pyroxenic rock, and with more or less black mica, which, as it usually extends to the surface of the soil, forms a useful practical guide to the discovery of the more valuable mineral. The apatite veins are in most instances partially concealed, or pinched up at the surface by a capping of barren rock, which on being removed, or the deposit worked into, generally shows a rapid improvement, both in thickness and quality.

Although regular mining operations for the production of the material for market have hitherto only been carried on to a very limited extent, sufficient exploratory work has been done, within the area above specified, to establish the fact that the mineral phosphate of lime exists here in vast abundance; probably more so than in any other region in the world hitherto examined for mining purposes. On two lots belonging to the Rideau Mining Company, I learn that during last season, with a force of about 30 men, including those employed in clearing and stripping the land, making roads, wharves, buildings, &c., upwards of 400 tons of *pure* phosphate were obtained, although their works may be regarded as chiefly of a preliminary or exploratory character. Your lots, as I have before remarked, are comparatively unexplored; in fact, on most of them no blasting or picking has been done; and some are covered with a dense growth of forest and underbrush, rendering examination of the rocks almost impossible. Nevertheless, the surface indications and developments made so far, lead to the belief that some, if not all of them, will prove as rich and productive as any of those tested.

No. 1.—This lot is divided into two parts by Otty Lake; containing about 30 acres on the North side, and about twenty on the South side of the lake. It is entirely in a wild state, and so overgrown with timber and brush as to render even a superficial examination extremely difficult. However, I inspected the Southern portion somewhat minutely, and observed out-crops of phosphate at four different places, and under highly promising conditions. No data were afforded, how-

ever, by which to determine the precise nature or extent of the deposits. At one point, where a rocky cliff abuts upon the shore of the lake, there is a bed of flesh-colored, crystalline limestone, richly charged with crystals of apatite; one crystal was observed here, measuring upwards of three inches thick; and the whole mass of rock would probably yield phosphate in the proportion of one to three. The separation of the phosphate from the carbonate of lime would probably be readily effected by simply calcining. From the existence of the more valuable mineral in such abundance here in the crystallized form, it may be reasonably inferred from experience on other similar places that it will also be found abundantly in the compact form. On the North side of the lot, the mineral is also found in a vein running from the lake shore inland for some considerable distance; but here also the lot is too rugged to admit of minute examination without the expenditure of some labor. I was credibly informed that a great bed of good steatite or soap-stone had also been observed to exist on this part of the lot, and which may prove most valuable. This lot is in the immediate vicinity of one of Oliver's (25 in the 8th) on which much work has been done, and which is regarded as one of the choicest and most valuable phosphate lots in the country.

No. 2.—This lot is unexplored, except by merely walking over. Small crystals of apatite are found abundantly diffused, indicating the probable existence of the mineral in quantity in the rocks below. On a lot immediately adjoining, several openings have been made, which show the mineral in such abundance as to establish the value of this lot also.

No. 3.—This is one of the lots on which phosphate was first observed by Dr. J. Wilson, of Perth, and subsequently examined and described by Dr. T. Sterry Hunt in his Report to Sir William Logan in 1847. I also learn that the fine specimens of phosphate of lime sent to the London Exhibition of 1851 were obtained from this lot. Dr. Hunt reports having found large crystals of apatite in abundance on the lot. I had not an opportunity of inspecting it, being given to understand that nothing now could be learned by a personal examination.

No. 4.—This block of land is also but little explored, being covered with impenetrable brush and thickets. Fine specimens of apatite, in the crystalline form, have been obtained at many points, chiefly on the shore of Otty Lake; and there can be no doubt that, for an undeveloped property, it presents equally favorable promise with any of

the others. If found in abundance here, as there is reason to believe, the facilities for shipment are very favorable.

No. 5.—This large block of land, which has been mostly cleared in front, has been explored to a considerable extent, by blasting, digging and picking, and holds out the most encouraging prospects for successful mining. I examined twelve or fourteen openings (in four of which the rock had been blasted) and found more or less phosphate in all; and in some, obviously important deposits, although too little had been done to enable me to specify dimensions, &c. The veins, of which there are at least four, traceable over the whole width of the block, or nearly two thirds of a mile, seem here to run with the stratification, which is somewhat less disturbed than at most of the other locations examined, the general direction being North, 40° East. The apatite occurs here both in the crystallized and massive form, and everywhere marked by the presence of the black mica and pyroxenic rocks. At one opening, a vein which showed only about two inches at surface widened out to fourteen inches of solid apatite of the best quality, on putting in a few blasts. The openings referred to are all in the front or cleared part of the property, but other discoveries of phosphate have been made towards the rear, though undeveloped; and there is reason to believe that when the land is cleared and explored discoveries of greater importance than heretofore will be made.

These lots lie about the centre of the mineral range, the boundaries of which I have indicated; and directly in the run of some of the best discoveries yet made; and I regard them as likely to turn out equally important with any of the others in the district. The land abuts upon Long Lake, which is navigable for barges, and which, with very trifling expense, could be connected with one of the reaches of Rideau Lake, by means of half a mile of cutting through low land, and one rude lock, thus establishing water communication close to the mines.

No. 6.—This lot, which appears to be about one-fourth cleared, also holds out excellent promise, phosphate having been found in considerable abundance wherever openings have been made, which has been done by the spade and pick only, in five or six places, and in the same small field or clearing. The deposits here also obviously run with the rocks (N. 40° E.), but too little work has been done to enable me to enter into further details. From one of these small

openings I obtained a very perfect crystal, about 4 inches thick, which I have handed to you. This lot I consider as most valuable for the purpose in question, and being penetrated by a bay of Long Lake, the method of outlet already specified would be available.

No. 7.—This lot being at a considerable distance from the rest, and the time at my disposal not admitting of it, was not visited by me on this occasion. I was informed, however, on the most reliable authority, that very fine specimens of apatite had been obtained from it, and that the deposits promise an abundant yield.

No. 8.—This lot lies immediately adjoining, to the East, one of the most important of the Rideau Mining Co's locations, from which lot the large crystal of 60 lbs. was sent to you, being that on which most work has been done by them last season; and the developments made by them have amply proved the value of the lot in question. Being entirely in a wild state, no positive discovery had previously been made, so far as I am aware. In traversing the lot, however, I found a good show of phosphate in two places upon it; and I entertain not the least doubt that it will prove as important as No. 4 on the same range, on which true veins undoubtedly exist. The front of the lot abuts upon Rideau Lake, the water being of great depth close to the shore, and the rear upon Adams' Lake, which is also navigable for scows, and connected with Rideau Lake by a navigable channel; so that this lot possesses unequalled advantages for shipping the produce of the mines. From facts within my knowledge, I think it highly probable that a workable vein or veins of copper ore will be found towards the rear of this lot.

Nos. 9 and 10.—No exploratory work done on these lots, which are very rough, rocky and tangled. With the exception of a single instance occurring on the rear of lot 15 in the 5th, I am not aware of any positive discovery of apatite upon any of these lots, but it has been found in promising conditions on properties immediately adjoining; from which circumstance and from their position in the heart of the phosphate range or belt of rocks, their value may be safely inferred.

As regards the quantity of phosphate which may be obtained on these properties, it is obviously impossible to form any exact estimate. Considering, however, the extensive diffusion of the mineral, and the results which have been attained on adjacent and apparently not more favorably situated properties, I should judge it quite safe to calculate upon obtaining, with a moderate force, at least 12,000 or 15,000

tous annually, after the lots are cleared and the cap rock removed at several points. Supposing the deposits to prove moderately extensive, the cost of extraction, including stripping, &c., should not exceed \$2 per ton—that is, for open quarrying,—but as a mining operation, that is in case shafts and underground work should be required, the cost may be two or three times this amount. The average cost of teaming by winter roads to the Rideau Lake may be estimated at 50 cents per ton.

The apatite found in this locality is extremely pure, yielding, both in the compact and crystalline form, over 90 per cent of phosphate of lime. When mixed with the carbonate of lime, the separation would appear to be simply and readily accomplished.

This mineral has been found by experience to be perfectly adapted as a substitute for animal bones in the manufacture of super-phosphate manures, &c., for which purpose there is a very large and increasing demand, both in England and on the European continent.

The value of the mineral in Canada, both for home consumption and for exportation, would be very greatly enhanced, if it could be ground and manufactured at or near the points where it is produced; for which purpose the abundant water-power on the Rideau Canal, the extensive beds of iron pyrites existing at no great distance, admirably adapted for the manufacture of sulphuric acid, and the abundant supply of firewood everywhere, might in combination be rendered profitably available, and add a most important new branch to the industrial resources and commercial prosperity of the Province.

I have the honor to be,

Dear Sir,

Yours most respectfully,

CHARLES ROBB,

*Mining Engineer.*

