

REPORT

ON THE

MINERALOGICAL CHARACTER

OF THE

SEIGNIORY OF RIGAUD VAUDREUIL,

DISTRICT OF QUEBEC, LOWER CANADA.

Directed to the Proprietors

Charles & Alexander De Léry, Esqs.

BY JOHN P. CUNINGHAM, Esq.

QUEBEC.

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—
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MONTREAL, 3rd December 1847.

GENTLEMEN,

In accordance with the promise made to you last winter, I proceeded to your Seigniorship of Rigaud-Vaudreuil, parish of St. François Beauce, on the opening of the past season, for the purpose of making a more complete exploration therein, to determine as far as it was practicable the extent of the Deposit of Gold, already alluded to in my report to you, dated 22nd March last.

The following observations on my late exploration, I beg leave respectfully to hand you for your information, by which you will perceive, that the surmises heretofore hazarded by me, as to its probable value, have been fully confirmed, and will I trust prove satisfactory.

The objects of the exploration were, to establish the limits and consequences of a certain locality. These desiderata may now be considered as obtained, and would be enhanced materially, if the laws of Geology, particularly those which have an immediate bearing upon auriferous formations, had established the Rocks of the section, as Gold bearing rocks ; creating a system, and proving, that the present Deposit is not local or accidental, but immediately connected with formations, which are extensive, and which give a character to the Country.

The details of a geological exploration of a country, relate not only to the earth or rocks in which the metalliferous beds exist, but to certain parts or portions of the same, which indicate by invariable signs, greater chances of the metals being found abundantly. For instance—It has been established, that

the zones of contact of metamorphic with igneous rocks, Gneiss and argillaceous schist, with the porphyries, and certain argillaceous or calcareous rocks, in contact with serpentine, form with few exceptions, the true planes of concentration of metallic substances.

In examining the bed of a stream, you frequently find proofs of the existence of minerals in situ, in the adjacent rocks, and the fragments and boulders, which are found of various sizes in the bed of the stream, present in effect, the résumé of the metalliferous character of the rocks, from which they have been broken off, by the action of water or other causes; by washing the sand, particles of metal from their greater specific gravity are easily separated, and frequently pièces of the original vein stone, are found disseminated with the metal. An exact knowledge of the mineralogical character of gangues is also of the greatest utility, where the geological constituents of a country are well defined, Spathic Iron, Iron pyrites, Magnetic Oxyde of Iron, Chromate of Iron and Oxyde of Titanium, are precursors of Gold, and these characteristic minerals, associated with the Gold, have been found under a systematic arrangement, throughout the extent of my explorations on the Seigniory.

A very extensive bed or dyke of serpentine forms one of the most interesting features of the Country, and its longitudinal direction has been traced, for nearly forty miles; in a North Easterly direction, it is cut through in many places, by the streams in which the auriferous deposits are found, and the rock of the Country being a metamorphic rock, possibly an altered, sandstone, containing large crystals of Feldspar, resembling granite in structure—although stratified and alternating, with argillaceous schists, is in immediate contact with the serpentine, the planes of which are represented by veins of quartz—very ferruginous—with seams of Tremolite, Actinolite, and sometimes, Rutile or Oxyde of Titanium.

Some of the peculiarities of this Country, bear a striking analogy to the auriferous formations of Russia, and the Southern States, which required only an

investigation in the former, to open one of the most valuable mining regions in the world.

I can safely assert, that the Deposit on your Seigniority will bear comparison with many of the richest Deposits of the South I have examined, many of them, and ascertained carefully the results of the washings, and although our operations were conducted upon a very limited scale, being as it were simply an assay, I have no doubt when the mine is regularly opened and a system adopted, that the average proceeds of a year's labour, will fully equal those of the Carolinas or Virginia.

The Gold found is remarkably large and easily collected, and there will consequently be no loss, by the process of washing.

The extent of the Deposit is the next important consideration, the limits of which are not yet determined; if the Gold exists in the Gravel of the Country, it will be found wherever the characteristic formations extend, but if it has originated from some local cause, having an immediate bearing upon the rocks in the vicinity of the stream, the Deposit will probably be confined to the Country, embraced within the drainage of its tributaries.

I have found it in variable quantities in the valley of the stream commencing at its outlet and ascending two miles; and although our principal operations were confined to a very small section, I feel confident the same successful results will obtain wherever the Deposit is tried in that distance.

Having thus given a general idea of the region, I shall now enter more minutely, into the detail of the exploration.

On the first day of June last, the waters having subsided sufficiently, to allow of the exploration of the bed of the creek, on which my former investigations were conducted, I proceeded to define as far as possible, the extent of the Deposit, and found that for a distance of two miles, beginning from the River Chaudière, and ascending the creek, Gold existed in the bed of the stream, and that within the first mile of that distance — nearest the river mentioned — a rich auriferous Deposit became manifest.

My explorations were also directed to the branch of the stream flowing from the South, to the upper parts of the main branch, the other streams falling into the River Chaudière, and in fact to the entire North Eastern portion of your Seigniorie including the steatite beds.

During my examination of the adjacent hills, on the Southern side of the Creek, I discovered indications of Gold, nearly one hundred yards from the water, and at an elevation of sixty or seventy feet above the level of the stream ; this would go far to prove that this Deposit is not confined to the creek ; but without a further and more minute exploration, its extent or value cannot be estimated, on account of the quantity of drift, which covers the entire face of this portion of the Country.

It will be necessary, in order that you may fully understand what I wish to convey, that I should describe in detail, that part of the stream, and the valley and hills, which confine it, in which the greatest auriferous indications were observed ; this comprises an extent of about two miles, bounded on each side by hills, of comparatively similar elevation, enclosing a valley, varying from Fifty to Three hundred yards in width, its general direction is from East to West, and the stream itself falls from sixty to seventy feet per mile, consequently there is little sinuosity in its course. The lower section of the valley, about half a mile in extent, consists of flats, and varies from one hundred to three hundred yards in breadth, those flats are composed of gravel, and the debris of the surrounding rocks, covered with two or three feet of sand or clay, and may be from six to twelve feet in depth, resting on the rock in place : from this to the Falls of the Creek, a distance of half a mile, the stream has cut a channel through the shales and sandstones, which are everywhere exposed, and the remainder of the distance for a mile or more, consists of beds of gravel, where the rocks are seldom seen " in situ. "

The first portion described, consisting of that part nearest the River Chaudière, was that to which

my attention was most particularly directed, where I had sunk a number of pits, and from which I obtained such satisfactory results.

I am however much gratified in being able to state, that even above this section, very favourable indications were developed in the bed of the stream, and I entertain no doubt, that a further exploration will bear me out, when I say, that it also is rich in auriferous materials.

This assertion is made, from facts elicited from actual observation, for wherever I searched in the exposed portions of the valley of the stream, I found not only indications, but Gold of large size, and in considerable quantities, far exceeding any similar experiment, which I had seen tried in many of the *richest mines* of the Southern States.

Having had a machine constructed, which is used in all the Gold mines of the South, called a "Burke rocker," which is a very simple and cheap contrivance, and used with great success in washing for Gold, by amalgamation with quick-silver, in order that I might prove the value of the Deposit, by a simple calculation, I found the following to result from the gravel and slates washed.

I would however in the first place state, that with ten men the amount of gravel washed, by such a machine, averages from three to three hundred and fifty bushels per day.

The first gravel tried, was from the surface, and about fifteen feet above the level of the waters, it yielded twenty pennyweights of Gold to three hundred bushels of gravel, the last trial was made from the gravel above the slates, with the debris of the slates themselves, this yielded, eighteen pennyweights, eighteen grains of Gold, from sixty bushels.

In the Deposit mines of the Southern States, one pennyweight of Gold to each hand employed per day, is considered good work, and the mine yielding such results a rich one. Their calculation is, if one hundred men are employed, they will have five of those machines in operation, these at an average of three hundred bushels per day, will give

a return of 1 3-5 grains per bushel or one penny-weight to the hand.

The average of the washings from our experiments, as given, amounts to 2 7-12 grains per bushel being very nearly one hundred per cent, more than the mines I have instanced above.

When you take into consideration the very unfavourable circumstances under which I operated without one experienced hand and almost totally obstructed by water, by which means the material washed, could not be taken from where the most favourable indications appeared, you cannot but feel satisfied with the complete success of the exploration.

It must be borne in mind, that the first discoveries made, before mine were confined to a small space in the bed of the Creek, not more than 40 or 50 feet square, the Gold found amounted to 300 penny-weights, the principal part of which was found in the open crevices of the slates. — This yield is unprecedented.

It has been observed in the opening of the Southern mines, that where pieces of 30, 40 or 50 penny-weights have been found, that invariably pieces of much larger weight have followed, you succeeded in finding pieces of the above weights, and there is every reason to suppose the same rule will hold good here as well as elsewhere.

The largest pieces of Gold found by me, were embedded in the crevices of the slates, and very possibly will be so discovered to as great a depth as those crevices extend, the breaking up of those slates, will therefore be necessary, and to do so, the bed of the creek and the entire valley must be completely freed from water.

When the Gold is found in the undisturbed alluvium, it is associated with a decomposed magnesian mineral, apparently serpentine, and present detritic and arborescent forms, an evidence that this substance was its original matrix, and from its appearance would go far to prove that it had not been much subjected to the action of water.

If this detritus originated from the serpentine in the vicinity, a careful examination along the flanks

thereof, may lead to the discovery of a bed or vein, which I do not think improbable.

Having thus described the results of the exploration, I beg leave to offer a few suggestions relative to future operations.

I would recommend them to be commenced, as soon as the season will permit, on that section of the discovery comprised within the limits marked by dotted lines, in the accompanying plan, this includes that portion of the valley consisting of the Flats composed of Gravel, found to be very auriferous, and within which the experiments detailed herein have been made.

To do this with effect, the creek must be turned from its bed, through a race along the base of the hill, on the southern side of the valley, as far down, as where the works would be commenced, and also a drain should be cut through the slates, the entire length of the section, in the center of the bed of the creek, at least four feet by three, to more completely drain off the water, and allow the slates to be broken up and washed with the gravel.

The creek being subject to summer floods, the dam should be of such a height, as to permit the water during freshets to flow over it, into the drain cut in the bed of the creek, otherwise the race would be injured or destroyed by the excess of water at certain times. The drain proposed in the bed of the creek, for the purpose of drawing off the surface water, percolating through the slates, would also be sufficient for conveying the surplus flowing over the dam, and thus the work would not be retarded, except at periods of extreme floods.

The working season being very short, no time should be lost in collecting the materials for building the dam, and the necessary houses for the men, and offices, provisions also and tools etc., ought to be provided, and on the spot, before the opening of the navigation, for at least two months use, in order that a day may not be lost, when the time for working arrives. The amount of these preparations, must of course depend upon the number of hands employed.

The foregoing would be the principal outlay for working this portion of the Deposit, and as near as I can estimate it, including machinery, labour, tools, etc., would amount to about two thousand pounds currency.

It is generally the conceived opinion, that Gold mines are ruinous to the proprietors, and detrimental to all other industrial pursuits, which might be necessary for the furtherance of the prospects of the country within which they are situated. This I think experience has proved to be fallacious, much depends upon the method of working the mines, and the necessary prudence in regulating the monetary department, of the business, less capital being required in opening them, and the metallurgic process is more simple than that required in the separation or reduction of any other metal.

A few years ago the Country within which the Russian mines are situated, was a barren waste, now there are cities and villages, and a large population, all resulting from the astonishing developments, which have arisen there. The same might be said of the Southern States, a great portion of the mining region there, was unfitted for any agricultural purpose, but the mines have brought population, settlements have been formed, the aspect of the country has become changed, and everything looks prosperous.

During the year 1846, \$1,139,357 worth of Gold, was coined at the mint and branches of the United States from the mines of that region—comment on this would be superfluous—and I therefore state without hesitation, that the developments resulting from this exploration, will perfectly justify you, in making even a much greater outlay than I have named, should it be required.

In conclusion, I beg leave to bring under your notice, the valuable services I have derived, from Mr. W. M. Steers, who accompanied me throughout the entire exploration, through his industry, ability and skill, I was enabled to examine the greater portion of the seigniory, and by him, I have been assisted in collating the materials of the report, which I now

beg respectfully to submit to you, for your consideration.

I have the honor to be,

Gentlemen,

Your most obedient,

Humble servant,

JOHN P. CUNINGHAM.

To

CHS. & ALEX. DE LÉRY, Esquires,
Quebec.