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## REPORT

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# Galway Mining Location:

COUNTY OF PETERBOROUGH, ONTARIO.

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Having been instructed by the Directors of the Galway Mining Company of Peterborough to examine the mineral property of the Company, and to furnish them with an impartial Report upon the same, I visited the ground on the 23rd inst. in company with two of the Directors, Messrs. Rogers and Stephenson, whose knowledge of the locality was of much service. I avail myself of this opportunity to offer my thanks to these gentlemen for their kind assistance, and beg, at the same time, to record my conviction that the greatest reliance may be placed in Mr. Stephenson's judgment and suggestions, as regards the development of the property generally.

The Galway Mining Location comprises the west half of lot 20 in concession A of the township of Galway, county of Peterborough. It contains about 50 acres, and is held by the Company in fee simple. The Bobcaygeon Road forms the boundary of one side of the property. By this road, to the village of Bobcaygeon, on Sturgeon Lake, the distance is between 11 and 12 miles. From Bobcaygeon, freight can be shipped to Lindsay (22 miles), and from thence carried by rail to Port Hope on Lake Ontario, a station of the Grand Trunk Railway.

Another outlet is by way of Mud Lake to a point 15 miles from Bobcaygeon, to which a line of railway will shortly be carried from Peterborough. The products of the Galway mine can thus be taken to the front almost entirely by water and rail: the only teaming required, being over the portion of road (11 miles) between the mine and Bobcaygeon village. This road is in good order, and is of easy grade. As regards accessibility, therefore, the property is very favorably situated—more so, indeed, although lying in a comparatively remote township, than many mineral locations situated somewhat nearer to the front.

The country rock of the location consists essentially of mica slate interstratified with hornblendic gneiss and crystalline limestone, the whole belonging to the Laurentian or Gneissoid Series. The strike of these strata is N. 20° to 25° E., corresponding with the general direction of the ridges and narrow valleys of the district, the valleys lying chiefly along the course of the limestone bands. Several well-defined mineral veins occur upon the Company's property. Two of these, running parallel with one-another at about 100 feet apart, have been traced entirely across the location. They cut the strata almost at right angles, their course being N. 60° to 65° W., with a very slight underlie (in places imperceptible) towards the N. E. Another vein, of similar mineral character, appears to run N. 60° E., but at present it is entirely undeveloped. This is known as the "Cross vein." Well-marked indications of others are also observable on the property. These veins are very narrow at the surface, but they widen considerably at a depth of a few fathoms, and continue apparently to increase in width at greater depths. They carry galena, the common ore of lead, in a gangue of sulphate of baryta (the *cawk* of the north-country miners) and crystallized carbonate of lime (calcite).

On the more northern of the two parallel veins running N. 60° to 65° W., a shaft (10 feet × 6 feet) has been sunk to a depth of about 60 feet, and is still being carried down. An adit has also been driven, from lower ground lying towards the north-west, for some distance along the course of the vein; but being too near the surface to be of much utility, it has been

discontinued. At a depth of 58 feet from the surface this vein shews a width of 3 feet 6 inches, and consists of sulphate of baryta mixed with highly crystalline calc spar and a considerable amount of galena. It may not be amiss to state, that the latter ore contains, when pure, 86.6 per cent. of metallic lead, and 13.4 per cent. of sulphur—a portion of the lead being very generally replaced, however, by a small amount of silver. Here and there, a few specks of black and yellow blende, with traces of copper pyrites, occur in the calc spar of this vein, and thin lines of iron pyrites are seen in places. The calc spar is, in part, perfectly transparent and colorless. Large cleavable masses, available for optical purposes, and hence of some value, have been taken out of pockets in carrying down the shaft. From these pockets also, some heavy masses of galena, partly in fine crystals, have been obtained. The sulphate of baryta, if largely worked, might likewise be made a source of profit, but chemical treatment would be required to effect its purification from intermixed matters.

To arrive at an exact estimate of the amount of lead carried by the vein in question (which, for the sake of clearness, I will call the *Galway lode*, designating the parallel vein in its vicinity as the *Peterborough lode*) several tons of ore would have to be carefully sampled and examined; but, at a depth of from 50 to 60 feet from the surface, the vein, at the lowest estimate, certainly holds a fourth part (by weight) of galena. In this connexion it must be remembered that galena is about twice as heavy, bulk for bulk, as the mixture of cawk and spar of which the veinstone consists. If it be assumed (in order to keep within safe limits) that the lode would become no wider in descending, and would carry only the above amount of galena, each square fathom would contain 126 cubic feet of veinstuff (of average specific gravity equal to 5.0) and would weigh, in round numbers, about 20 Canadian tons. On this assumption, 20 tons of veinstuff would yield 5 tons of galena, or, due allowance being made for loss in the mechanical and furnace treatment of the ore, about  $3\frac{3}{4}$  tons of metallic lead. The actual yield would probably be nearer 4 tons, especially after the mill and furnaces had been brought into full work-

ing order; but I wish, in this estimate, rather to underrate, than overrate, the assumed profits of the mine.

Taking these data, the debit and credit account (exclusive of a small deduction for interest on capital, management, commission, and wear and tear of machinery) may be stated as follows:—

DEBIT ACCOUNT.	\$	CREDIT ACCOUNT.	\$ c.
Mining 20 tons ore, at \$2 50 . . . .	50	3 $\frac{3}{4}$ tons pig lead, at 4 $\frac{1}{2}$ cents	
Hauling to Mill, at 50 cents . . . .	10	per lb. . . . .	337 75
Crushing and dressing, at 50 cents, 10			
Smelting dressed ore, say 5 $\frac{1}{2}$ to 6			
tons, at \$2. . . . .	12		
Freight on 3 $\frac{3}{4}$ tons lead to front. . . .	20		
	\$102	Leaving, in round numbers, a profit of \$60 per ton of reduced lead; but, as a higher per centage of galena will probably be found in the lode, a larger profit may be fairly anticipated.	

The estimated cost of mining or winning the ore (\$2 50 per ton) may appear, at first sight, too low; but \$2, I believe, would be nearer the true cost. This may be verified, to some extent, by the actual cost of the work done in sinking the shaft. The cost, per foot of depth, has been, I understand about \$17. The mean sp. gr. of the rock-matter and ore removed from the shaft may be taken at about 4.0. It would be somewhat less than this for the first few fathoms, but more at lower depths. As the shaft measures about 10 feet by 6 feet, each vertical foot of stuff removed would equal 60 cubic feet, the weight of which would be about 7 $\frac{1}{2}$  tons. This amount, at \$17, equals \$2 26 per ton. It must be remembered, in this connexion, that the greater portion of the matter, removed from the shaft, consisted of very hard rock, whereas the extraction of the vein matter will be much more easily effected, and will be carried on also by drifting and stoping, in place of sinking. The above estimate will thus allow for the cost of underground timbering, where this may be required in the drifts.

A considerable amount of pay-ore has been taken out of the present shaft. A large portion has been carried off piecemeal by persons visiting the mine. Specimens of 8 or 10 lbs.' weight may be seen all over the vicinity, and probably a ton weight, if not more, has found its way in this manner to Peterborough

alone. The ore that has escaped these depredations, is partly stored in a lock-up shed near the mouth of the shaft, and partly piled in heaps upon the ground. It has been roughly hand-dressed, and in part washed on a temporary buddle fed by water from the shaft. Much of it, consequently, contains over 70 per cent. of galena; and if the whole were smelted on the spot, it ought to produce at least nine hundred or a thousand dollars worth of metal.

I have made several assays of this galena, taken from different parts of the shaft, in order to determine the amount of silver present in the lead. The average amount is equal to a little over 2 oz. Troy in the ton, or to about 1 oz. 17 dwts. per ton of galena. This amount is insufficient to defray the cost of its extraction, but the ore may prove richer at lower depths, or in other parts of the vein. I have also found a small amount of gold (3 to 4 dwts. per ton) in some samples of iron and arsenical pyrites taken from a narrow cross vein, which is cut at the shaft, and thrown 9 or 10 feet by the Galway lode. It would be advisable to have this pyrites vein occasionally tested, where cut by the drifts at different levels, as the amount of gold may be found to increase. The throw to which this cross vein has been subjected, shows the more recent origin of the baryta or galena veins; and surface indications observable in some of the surrounding lots, lead to the inference that these latter veins are not likely to be disturbed by slips or other interruptions. This, at least, may be safely predicted as far as regards the Galway and Peterborough lodes.

Drifting and stoping might be commenced at the present depth of the shaft on the Galway lode, but this can scarcely be recommended. If the uncontrolled management of the works were under my charge, I would continue the sinking to another level of ten fathoms, and commence at the same time a second shaft about two hundred feet to the south-east of the present one. Owing to the fall of the ground, the new shaft at about 10 fathoms would reach the 20-fathom level of the other. The ore taken from these shafts ought to be at least sufficient to defray the cost of sinking. This second shaft would also fairly test the strength and richness of the lode: °

points known to us, at present, only by the 10-foot exposure in the shaft now being carried down. Until these works were completed, I would not think of erecting a dressing mill or putting up furnaces. A certain accumulation of ore, to feed these, should be on hand before starting, and also a certain amount of stoping ground under excavation, otherwise it will not be possible to keep the furnaces in constant blast.

The mill and furnaces ought to be near each other. A suitable spot for their erection might be found on the Company's ground; but a particularly desirable site, for works of this kind, occurs on a lot, adjacent to the Bobcaygeon Road, within a short distance of the Company's property. The necessary ground, I understand, might be rented or easily secured. It is contiguous to a small creek issuing from Silver Lake. A dam could be placed on this creek at little expense, and a good supply of water thus obtained. Timber for fuel and mining purposes occurs abundantly on the Company's location.

Notwithstanding the loss of metal entailed by its use, the Improved American, or Rossie Hearth, giving a blast heated by the combustion of the ore and fuel, will be found the most suitable furnace for the reduction of this ore. Pine or other wood is employed as fuel, and very little is required, the heat being derived, in great part, from the combustion of the sulphur in the ore. An ordinary furnace of this kind will give about three and a-half to three and three quarter tons of reduced metal in three eight-hour shifts, the ore being previously dressed to an average richness of 70 or 75 per cent. At the present time, in consequence of the stoppage of several mining works at no very distant localities, mill machinery, steam engines, and furnace materials may, probably, be obtained at a comparatively low cost. With judicious management, a sum of \$5,000 or \$6,000 would be sufficient to start the mine fairly, but a larger working capital will be eventually required in order to achieve a permanent success. Disappointment is very commonly caused, especially in new countries, by an attempt to work mining property on *too small a scale*. The ore may yield a fair profit, but the production is insufficient to render the aggregate profit of much account. Hence, if a lode

begin to run poor for a time, or heavier machinery be required, or other difficulties arise to cause a temporary stoppage, the works are too frequently abandoned altogether. I urge these points more particularly, feeling confident that, under patient and liberal management, no fear of failure need be apprehended as regards the Galway Mine.

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TORONTO,

*September 30, 1868.*



