

COBALT

The Mining District

Containing the richest
deposits in the world of

SILVER

AND

COBALT

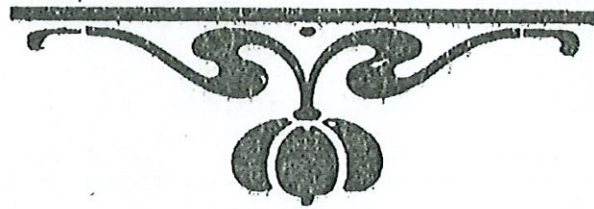
ALSO

COPPER

GOLD

NICKEL

ARSENIC



Canada Mines, Limited

Chartered by the Ontario Government

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45 Adelaide St. East, Toronto, Ont.
and Cobalt, New Ontario

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P R E F A C E.

I, the writer, may say that I am a practical mining man, having had experience in most of the mining fields of the world. I was one of the first in the Cobalt field, and the first man in Cobalt to do an active business in mining properties and stocks. This Spring my business had increased to such an extent that I found it necessary to open Toronto offices in addition to those I had already established in Cobalt. Soon after that my business had gained so much in magnitude that, following what seemed to me to be the next step to take under the circumstances and at the earnest wish of some of my friends who desired to be associated with me, I obtained a Government charter for my business to be conducted under the name of CANADA MINES, LTD.

I wish my clients to understand, however, that the policy of the business is in no way changed and that the CANADA MINES, LTD., will, under my management, continue to follow those same lines on which I have built up a valuable and esteemed connection.

The CANADA MINES, LTD., does not bias its judgment by owning or operating mines or trading in stocks on its own account. **The business of the Company is to render faithful and efficient service to its clients in buying or selling, undertaking the management of and reporting upon mining properties in Canada—and in executing commissions for the sale and purchase of mining stocks.**

It is hardly necessary for me to say very much concerning my associates—the names of this Company's directors on the opposite page speak for themselves. The services of the foremost mining engineers in Canada have been retained by the Company and, in short, no stone has been left unturned to afford the public a really safe and responsible medium through which they may take profitable advantage of the mineral wealth now being opened up in Canada.

Yours faithfully,

H. C. BARBER, *Man'g. Director,*
CANADA MINES, LIMITED



URING the past six months the importance of the Cobalt silver district has so much increased, the area of the mineral belt has now been shown to be so wide, and so many rich discoveries have been made that it is impossible within the limits of a booklet to do more than outline the main features of the district. This I will endeavor to do, and should the reader desire any further particulars, I shall be most happy to afford him, either personally or by letter, all the information in my power.

COBALT

is situated 300 miles north of Toronto and is on the line of the Temiskaming and Northern Ontario Railway. At this time of writing it has a population of about 4,000, with a floating population of about 10,000. Within twelve miles of Cobalt and also upon the line of the T. & N. O. Railway are the towns of Latchford, Haileybury, and New Liskeard. The first named has a population of about 600 and is the starting point for prospectors going into the Montreal River country. Many thousands have this summer embarked on the Montreal River in search of minerals, with the result already that numerous important discoveries have been made, not alone of silver, but also of copper and gold.

Haileybury, four and a half miles north of Cobalt, is beautifully situated upon the west shore of Lake Temiskaming and has a population of from 3,000 to 4,000.

New Liskeard, six miles north of Haileybury, has about the same population and is the starting point for prospectors going north into the Wendigo Lake, Long Lake and Abitibi mining districts. In all four towns there is excellent hotel accommodation, utter absence of disorder and gambling, good banking facilities, churches, schools, and business conducted in a conservative and legitimate way, unique and pleasing to those having had experience with the usual mining camp. No less unusual are the exceptional transportation facilities, there being a daily train service from Toronto, from which point through Pullman Cars are run. Leaving Toronto at 11.30 p.m., one reaches Cobalt at 1.30 p.m. the following day.

Most of the following information has been secured direct from the mines mentioned, and pains have been taken to render as accurate particulars as possible.

La Rose Mining Company.

This is locally known as the Timmins' mine, and consists of two claims of 40 acres each, JS14 and JB4. The principal parties interested are: Messrs. McMartin Bros., contractors, Cornwall; Mr. Dunlop, solicitor, Mattawa, and the Timmins Bros., merchants, Mattawa.

Up to date some twelve veins have been discovered. The principal work is being done on what is known as the First Discovery. Here two shafts have been sunk, one to a depth of 250 feet. One hundred feet of drifting has been done between these two shafts at the 90-foot level, and this drift has been extended 50 feet further north. The ore

is taken from three parallel veins, which vary in width at different points from 2 to 10 inches. The veins are well defined and are holding their own in width and richness at the bottom of the shaft. If anything, the ore is richer with depth. The returns average \$1 per pound, or \$2,000 per ton, with twenty tons to the car.

The Company is a close corporation and the property the first developed in the field.

McKinley-Darragh-Savage Mine.

The properties of the Company comprise eighty-two acres, forty acres being at the south end of Cobalt Lake and forty-two acres at Cart Lake. On the first mentioned property there are two parallel veins opened up for a distance of 500 feet and on the latter property one vein to a distance of 200 feet. There are also eight known veins not yet touched. It is estimated that about \$400,000.00 worth of ore has been blocked out. The total shipments have brought a net profit of about \$200,000.00 and forty tons shipped within the past month are expected to yield a minimum of \$1,000 per ton. There are also about sixty tons of high-grade ore on the dumps, thirty tons of second-grade and five hundred tons of milling ore. The property is capitalized at \$2,500,000, the shares being of the par value of \$1.00 each.

Abitibi and Cobalt Co.

This Company was incorporated March 12, 1906, with an authorized capital of \$2,500,000, par value of shares \$1.00. Only about one-third of the capital stock is issued, however. Starting out as a purely prospecting and development company about a dozen 20-acre claims were located in Coleman division, two in Lorrain and one in Harris. In Lot 12 concession 4, Coleman, near Gillies' Depot the Company are operating a very good looking property on which a shaft has been sunk fifty feet on the parallel veins carrying good values in silver and some

native silver. Steam machinery and about thirty men are at present employed on this property, upon which is located the Company's main camp, one of the best in the district. On other claims the Company has some forty men at work and numerous veins carrying good values in silver, copper and galena have been opened up. I am informed by the officials of the Company that they anticipate shipping from the first mentioned claim at an early date. From all appearances this Company should prove a big shipper and very successful.

The Foster Mine.

This mine is situated on the east side of Glen Lake, and comprises 40 acres of which 15 acres are covered by the Lake. Some 12 veins have been located, and the claim is not half prospected as yet. Twenty tons of ore was shipped last Summer returning about \$60,000.—\$1.50 of silver to every pound of rock.

About \$2,000,000 of very high grade ore is in sight or ready for shipments which are now taking place steadily. Up-to-date machinery is now being installed and there is no doubt that the Foster will prove one of the big dividend payers. The Company is capitalized at \$1,000,000, par value of shares \$1.00.

Kerr Lake Mining Co.

The Kerr Lake Mining Co. owns 52 acres at the southwest corner of Kerr Lake. The first discovery was by Edward Wright, in November, 1904, and the first commercial working took place in February, 1905. Since then four veins have been worked, two are now being operated, and twelve veins have been discovered, but not yet worked. There is a shaft 100 feet deep, a tunnel 200 feet long and overhead stoping for about 50 feet. From the tunnel \$250,000 worth of ore has been taken. The Kerr Lake veins vary in width from two to fourteen inches.

Several dividends have been declared. About

fifty men are working on the property and the expenses of operation are about \$3,500 per month. There is an excellent plant on the properties. A ten-stamp mill, and complete concentrating plant for treating low-grade ores have been purchased and will be installed at once.

The Company is capitalized at \$3,000,000. The stock is of the par value of \$100—was placed on the market at \$50 per share—and is now closely held at a premium.

The Lawson Mine.

The Lawson claim lies between Kerr and Giroux Lakes, and adjoins the Foster mine. This is another very rich property. The first vein was discovered June 10th. It is a well defined vein, and at the point where the work has been going on rich stringers run into the vein from all directions, forming what is called a honeycomb. One carload has been shipped. The ore was very metallic and as rich as any found in the district. A six-inch vein was found lately and another vein four inches wide was come upon later. Estimated value of the carload shipped to the smelter, \$60,000—\$3,000 to the ton.

Canada Iron and Furnace Company.

The claim consists of the northwest corner of lot 2, concession 4, Coleman, forty acres. The Company also has the southwest corner of lot 2, concession 5, forty acres. Twenty-one men are now employed. Work has been principally confined to the erection of buildings, opening roads, etc. Two carloads of ore are ready to ship. The ore runs from 3,000 to 10,000 ounces of silver to the ton, 41 per cent. arsenic and 24 per cent. cobalt. Mr. Wright the manager of the mine, thinks the ore is very rich. He never saw its equal. There are six veins already located.

This Company has probably the best showing, that is for a single opening, in the camp. At this point two veins are disclosed, running parallel to

each other, 10 feet apart. The veins are each seven inches wide, and at five feet down the ore shows up just as strong and as rich as at the surface. This is the ore that produces from three to ten thousand ounces of silver per ton. With silver at 60 cents, this means \$1,800 to \$6,000 in silver per ton, not counting the cobalt and arsenic. Estimated value of the two cars, \$200,000.

A view of these two parallel veins, with their ores of such uniform richness, cannot help but convince one of the enormous richness of this mine, and of the whole district.

University Mine.

This property, one of the finest in the field, consists of fifty acres which is known as part of lot 4, concession 4, Coleman Township, mining location JB8. The property was discovered September of last year by a party of University of Toronto students, George Glendinning being the first to make the find. Two very fine veins have been opened up to a distance of about 1,000 feet and there are seven others that have not yet been prospected. About 200 tons of high-grade ore have so far been shipped and have returned in the neighborhood of \$1,500 to the ton.

The property is capitalized at \$1,000,000, par value of the shares \$10.00 each, and the stock is now at a premium. This property is probably one of the best managed in the field and will, without doubt, continue to rank among the most valuable.

Buffalo Mine.

The property consists of 40 acres to the north of and adjoining the townsite of Cobalt. It was one of the first discovered mines and has been operated steadily since last year. Nine well defined veins have been exposed. The first shipment of 20 tons produced over \$20,000 after deducting freight, sampling and treatment charges. Since the first of May the Company has shipped five cars of ore, the

returns on one or which have just come to hand amounting to over \$7,000. About \$40,000 has been spent in development and a splendidly equipped mining camp has been established on the property.

The value of the ore on the dumps is estimated at at least \$75,000, and is now being sorted out for shipment.

The property is capitalized at \$900,000, the par value of the shares being \$1.00 each.

Temiskaming and Hudson Bay.

This Company holds over 300 acres. Numerous extremely rich and wide veins have been opened up and assay as follows:

Silver, \$7,996.33 per ton.

Cobalt, 4.78 per cent.

Nickel, 5.01 per cent.

The ore is generally admitted to be some of the richest in the district. The first shipment paid a dividend of 200 per cent. after setting aside a substantial reserve fund. This spring the Company sold part of its properties to the Silver Queen Mining Company, and has since then declared dividends aggregating 2500 per cent., the directors promising further substantial dividends. Portable machinery is now being installed for the purpose of thoroughly prospecting the 300 acres still held. Only about 7500 shares of the par value of \$1 each are issued. These could be bought last year for 40c. and to-day stand at over \$100.

Silver Queen.

The Silver Queen Mining Company is capitalized at \$1,500,000, shares of the par value of \$1 each. The Company secured last spring 58 acres from the Temiskaming and Hudson Bay Company and are probably mining the richest veins of the district—one, fourteen inches wide, being at the 300 foot level almost solid silver. Large shipments are now being made to the New Jersey Smelter and the Com-

pany expects to commence regular dividends Dec. 1st. Up-to-date machinery is in operation and a large force of men are at work.

Cleveland-Cobalt Silver Mines.

This Company has just been formed with an authorized capital of \$1,000,000 (par value of shares \$1.00) for the purpose of taking over the properties of the Hudson Bay Extended Mining Co. and the Clear Lake holdings of the Clear Lake Mining Co. The Company will own 114 acres of land, the same being just north of the Temiskaming and Hudson Bay, and comprising part of the bed of Clear Lake just west of the townsite of Cobalt. Some 30 veins have been opened up, one of which has been proved by means of extensive diamond drilling to be 16 feet wide and to be rich in native silver. This is by far the widest vein in the field and carrying native silver it should make immense returns as soon as tapped by a shaft. On the north side of the lake there is a fine showing of argentite. Development work has been carried on for the past year and a considerable amount spent in proving the properties. The Company starts out with a cash working capital of \$150,000 (by far the largest of any Cobalt company) and with such ample capital, large acreage, many veins and high values, should prove one of the biggest dividend payers in the field.

Nipissing Mining Company.

This is what is locally known as the Earle property. It includes 846 acres and on account of its extent and number of rich veins is undoubtedly the most valuable property in the district. About fifty-five veins have been discovered, some of them being very rich, one in particular being quite 80 per cent. silver, and from two to five feet wide. Over \$1,000,000 of ore has been shipped. This was taken from surface developments from only a small fraction of the property. The Company

continues to be the largest shipper in the camp. Seventy men are employed, many of them being engaged in the work of prospecting the Company's big property. The policy of the Company at present is to prospect rather than mine. The production of ore is incidental to the work of prospecting, but even under these conditions the Company is paying three per cent. quarterly, besides bonus dividends, on stock issued to the amount of \$6,000,000. The stock was just lately placed on the market at par (\$5.00.) The capitalization of the Company is \$12,000,000. Only half of this is issued, however, and the Company is considering cancelling the unissued half, so it may be considered to be a \$6,000,000 Company, a moderate enough capitalization when the extent and richness of the property is considered.

It is said that the large shareholders of Nipissing Mines are desirous of increasing the capital stock of the company to several times the present figure. The idea is to give shareholders several shares of new stock in lieu of every share of old. Such a move would greatly facilitate trading in the stock.

Prof. Hidden, the Nipissing Company's expert, is quoted as saying: "Our Company ships the ore in ordinary coal oil barrels. Taking what we call bonanza ore, we put about 1,800 pounds in each barrel, and many of these each bring us from \$5,000 to \$6,000. On Friday we shipped \$60,000 worth of this bonanza ore, and there are now 38 barrels ready to be sent away. Last month our shipments went about a quarter of a million dollars, and this month they will double that, I am sure, from Vein No. 49 alone. I may also say that on Saturday we had a pile of ore in conical form about ten feet in diameter and four feet high. It would go six cubic feet to the ton, and was worth \$100,000."

The Trethewey.

This consists of two claims, JB6 and JB7, eighty acres in all. The former is on the town site of Cobalt and the mine is within seven or eight

minutes' walk from the station and post-office. Ninety per cent. of the property is covered with vegetation, and only ten per cent. is exposed rock, or about eight acres on the two claims. These eight acres have been fairly well prospected, but none of the remaining property has been stripped and consequently nothing definite is known about it. The veins already discovered are as follows:

Vein No. 1—This is the vein from which ore shipments are being made. The work done consists of a stope averaging thirty-five feet in depth and extending to a distance of fifty feet. The stope will average ten feet in width and the vein of ore eight inches. In some places it divides into two branches, which together make up the same width as the undivided vein. From this stope and from a shaft made at one end of it extending to a depth of seventy feet over \$250,000 worth of ore has been taken. The vein is as strong at seventy feet down as at the surface, although it is not as rich at the lower point.

Vein No. 2—One hundred feet to the north of No. 1. About two inches wide at the surface and very rich in silver. No work at all has been done on this vein.

Vein No. 3—About fifty feet to the south of No. 1. A small amount of work has been done here. Over \$25,000 worth of ore has been produced from the vein, but no machinery has been installed to work it.

Other veins—Six other veins have been located, but practically nothing has been done to prove their value. These are on J.B. 6. Two of them are known to extend for 140 feet at least on the surface.

Asked as to the value of the Trethewey mine, Mr. Redington said it was a conundrum. He knew there was at least two million dollars' worth of ore in sight. That was all he knew for certain, but he would not be surprised if it should turn out that the mine produced 50 to 100 millions. He was speaking of one property of eighty acres.

The 40 acres known as J B 6 has been capitalized for \$1,000,000, par value of shares \$5, and is known as the Trethewey Silver Cobalt Mines Ltd. At this time of writing the shares stand at about \$9. A movement is on foot to split the \$5 shares into \$1 shares which will no doubt greatly facilitate trading.

The Violet Mine.

This consists of the northwest quarter of the south half of lot 3, concession 6, Coleman. One vein has been stripped for seventy feet and varies in width from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. It is very rich in silver and at a depth of twenty feet is just as rich as at the surface. Another vein very rich in cobalt has been opened up. Only from five to ten per cent. of the property is exposed and little or no prospecting has been done on the rest. The property lately changed hands for \$150,000.

The above are but a few of the representative Cobalt mines—for limited space does not permit me to describe more.

When it is considered that ore returning \$100 per ton pays handsomely it is only necessary to note the foregoing figures to understand the really phenomenal wealth of the Cobalt field.

Following are some extracts from the Press:

"Rossland was a theory, Rat Portage and the Seine River Country a delusion, Cobalt is a fact—an incontrovertible, stupendous fact."—Toronto Globe.

(Frank G. Carpenter, in the Buffalo Express, Dec. 3, 1905.)

"Cobalt, New Ontario, Dec. 1.—Three years ago the land about Cobalt would not have sold for ten cents an acre. To-day some of it would bring \$100 a square inch. There is one tract of 40 acres within a stone's throw of where I am writing that you could not buy for \$1,000,000 in cash, and all about

here are other 40 acre tracts which their owners estimate at from hundreds of thousands to millions of dollars. Nevertheless, the land lies in the heart of the wildest woods on this continent. It is rocky and swampy, and it would take a quarter section of it to feed a goat.

"Its value lies in the enormous silver deposits which have been recently discovered. The rock is streaked with great veins of almost pure silver ore. Three or four million dollars' worth of this ore has already been shipped, and loads of it are now on the way to New York, which are worth \$25,000 to \$30,000 a car. A carload of the best picked specimens from a certain mine is said to have sold for \$90,000, another carload for \$50,000, and another for \$40,000.

"I have visited the chief silver regions of the world, but nowhere have I seen silver which crops out of the top of the ground as it does here in Cobalt. The whole region seems to be one vast rock covered with a thin skin of earth, upon which trees and grass grow. The surface of the rock is irregular. It rises and falls, with water in the hollows and here and there a lake. In places the rock crops out of the top of the ground, and in this rock a silver vein may sometimes be seen. These veins run for hundreds of feet across the country, and everywhere they show up on the surface.

"In the Timmins mine, for instance, the earth has been stripped off to the width of a narrow pavement for a distance of 1,000 feet. The rock has been ground smooth by glaciers. When cleaned it looks like a flagged sidewalk. Running through it in a winding way is a vein of almost pure silver, so rich that you can see the metal shine as though the rock were plated with it. You can rub the vein with your feet and polish it. Indeed it makes me think of melted silver spoons mixed with a little sand poured down in the crevices of the rock. I walked over this silver street, scouring the precious metal with my shoes as I did so.

"This is some of the richest of the Cobalt ore so far discovered. Nuggets of silver, which are 80 and 90 per cent pure have been taken out of the Timmins mine, and some of the nuggets weigh 300 and 400 pounds each. I saw chunks of silver and rock the size of a paving brick which I could not lift. Indeed, much of the ore makes me think of the almost pure copper nuggets which one finds in the Lake Superior mines. These veins of silver are not regular in width nor do they even run throughout. Here and there branch veins jut out from the main one like veins of a leaf and the ore has everywhere soaked into the adjoining rocks.

"Joseph C. Houston, the manager of the O'Brien mine, tells me he believes the ore to be a primary rather than a secondary formation, and that it will grow richer as the excavation goes down. Major Morrison of The Ottawa Citizen, who has mining properties here, has the same belief as to richness in regard to depth. He considers the camp one of the richest mineral fields in the world. When he came here last Spring he published a statement that there was from \$25,000,000 to \$50,000,000 worth of silver practically in sight. He now thinks that his estimate might have been trebled and still been under the truth.

"At present there are about twenty mines working. Some are owned by Buffalo people, some by New York parties and more by Canadians. The field as far as defined is about three miles square, with the very richest mines within a radius of two miles. It embraces Lake Cobalt, and there has been a proposition to drain the lake in order to mine the veins that run under it. This has not been permitted by the government. There are now men digging out quantities of ore within ten feet of the banks of the lake, and the veins there are so plainly marked that the refuse is carried out in wheelbarrows and dumped on the shores.

"Prospecting is now going on far outside this three-mile radius, and some mineral is being discovered. Silver mixed with cobalt has been found 20

or 30 miles from here, and another camp is springing up to the northward.

"Indeed, there seems no telling what minerals may be found in this region, which seems to be part of the great mineral belt running around Lake Superior and extending on northward towards Hudson's Bay. There is a great deal of iron on the Canadian side of Lake Superior, and some of our richest mines of iron and copper are found on the southern side of that lake. A little more than 100 miles from Cobalt lies Sudbury, which contains the richest nickel deposits of the whole world, and the miners tell me that minerals exist all the way north to James Bay. Prospecting is now just beginning in this region, and there is no telling what may be found.

"This cobalt silver field was discovered about two years ago, but the mines have been kept, as far as possible, a secret. This was for two reasons; one was that new prospects might be made by the present holders, and the other, the chief one, was to blind the eyes of the Ontario Government, and thus circumvent a movement proposed for demanding a royalty to be paid to the government on all ore mined. The mining laws at present are very liberal, but if a royalty should be paid on the value of the silver taken out the state would have enormous receipts therefrom."—Buffalo Express.

Most Wonderful Camp on Earth.

"It is the most wonderful camp on earth. Up to date the history of the camp has been a series of surprises, and these all in the right direction. Let me emphasize this by a single reference. In April last a certain property was offered at twenty-five thousand dollars, but the prospective buyer would not close. To-day there is over a million dollars' worth of ore in sight on that property, and all the wealth has been disclosed at an expenditure of probably less than \$400.00 in development."—Toronto Globe.

Cobalt Ores Richest in the World.

MINING LAWS SO STRICT NO "WILD CAT" SCHEMES CAN
FLOURISH.

"Exactly 330 miles north of Toronto you will find the wonderful mining town of Cobalt. Unlike all other mining camps, it is easy of access, being located on the Temiskaming and Northern Ontario Railroad and can be reached from New York in 36 hours. Discovered in 1903, during the building of the Government Railroad, little work was done in the way of development until 1905, but even in that short time, the discoveries already made and the extreme richness of the ore go to show that Cobalt is destined to become the centre of perhaps the greatest mining district in the world. The fame of Cobalt is spreading and every train is crowded with miners, adventurers, and capitalists, from all over the world, and, before the Summer is passed the greatest of mining booms will be fairly under way.

"Cobalt is called 'the poor man's camp' for the reason that the values are very near the surface,-- "from the grass roots down" and require little in the way of expensive machinery or equipment to get them out.

"The ores of Cobalt are justly claimed to be the richest in the world and consist mainly of silver and cobalt, with arsenic, nickel and, occasionally, gold. Think of shipping 100 carloads of ore averaging over \$30,000 per car, and all this ore taken from a depth of not over 50 feet! Selected car lots have gone as high as \$60,000 to \$129,000 per car, and the average ore runs from \$1,000 to \$8,000 per ton. Geologists, experts and mining men generally were loath to accept Cobalt as a permanency, but to-day no class of men are more enthusiastic, for it is now proven that the deeper the shafts are sunk the richer the ore becomes.

"Captain Harris, a man of world-wide experience as a mining engineer, says: "If you had asked me what I thought of Cobalt a year ago, I would have told you that it was altogether beyond all precedent

that such enormously rich values as we find here at Cobalt could last to any depth. To-day every indication from the entire section points to the strong probability of generally increasing values in depth throughout the field. I came here very much of a pessimist, but to-day I am an optimist—made so by close observation of actual conditions. Cobalt will last for years and make many fortunes.

“Up to the present time all the proven properties are located in Coleman Township, and, though the work has been carried on in the crudest way, many millions of ore have already been shipped and large dividends have been paid, in some cases as high as 200 per cent. To the investor, the Cobalt Mining Camp should prove particularly interesting; for, so far, no mine has been sunk to a depth of 30 feet without finding shipping ore, and the Mining Laws of Ontario are so strict that no “wildcat” schemes can flourish there.”—Business and Finance.

Expert Opinion of Prof. Miller.

“Prof. W. G. Miller, geologist in the provincial crown lands department, who has come back to Toronto after three weeks in the Cobalt region, asserts that the deposits are unique for the continent. Only in Saxony and Bohemia are their like to be found. The main findings had been about three miles east of Cobalt Station, on the shores of the small Kerr and Glen Lakes, although in the district running between a number of deposits were being worked. New and valuable ones were being found almost every day on the older as well as the more newly owned properties. There were few sales, as the owners were content to do their own working, and were asking almost prohibitive prices.

Second only to Klondike.

“As to the value of the find to Ontario, Prof. Miller did not care to make an estimate. The deposits thus far found were very rich, so rich in fact that only the great “placer” strikes in the Klondike would bear comparison. A number of individuals

would undoubtedly become wealthy. There were signs of cobalt 30 miles to the north of Cobalt Lake and 15 miles to the southwest in Ingram Township, also to the forest reserve south of the Montreal River, which gave a hint of a wide deposit area, extending 75 miles to the north and south and a long way west.

"There was a busy inrush from the Western States, and if the find had been there, Prof. Miller is of the opinion that a mining town of 10,000 would have mushroomed up."—Toronto World.

SEEING IS BELIEVING. A Comparison.

I have seen gold-mining on the Rand, writes the editor of the *Monetary Times* of Toronto. I went down the Robinson Deep—the second richest mine, I think, in all the Johannesburg group. At twelve hundred feet the Kaffirs were taking the gold quartz out of seams two and three feet wide. The very best of the quartz yielded an ounce of gold to the ton. The gross return was, therefore, about \$18.90 per ton of 2,240 pounds. Some Cobalt ores have yielded over 4,000 ounces of silver to the ton of 2,000 pounds, worth about \$2,400.

The comparison is incomplete for the Cobalt veins are not twenty-four or thirty-six inches wide. Still one ounce of gold is about all the British investor in the Kaffir mines gets out of his ore. The by-products are insignificant. You see great heaps of almost white powder—the leavings of the stamps and chemical processes employed at each mine. They are worthless. To look into an open cut at Cobalt I stood on a pile of rock that had been blasted from beside the vein and thrown aside, the ores having been sorted by hand. This refuse was waiting for a smelter to be started in the vicinity. A sample of it had been assayed and proved to be worth \$70.00 a ton—nearly four times the value of the best gold quartz in South Africa.

In the same place I picked up a chunk of rock, brilliant with pieces of unsullied bismuth. Scattered around were portions of rock covered with the bloom which denotes the plenteous presence of cobalt. After examining an average dump, the waste of another open cut, a friend, experienced and skilled in mining practice in Montana and Idaho, said the dumps of Cobalt were richer than the best output of Western mines, and that the miners of his country would not believe that ores existed in large quantities of such worth as those reported have been mined in Cobalt. But seeing is believing.

The Following Statements are Extracts taken from the
Report of the Bureau of Mines, 1905,
Part II.

THOMAS W. GIBSON, Director.
The Bureau of Mines of Ontario, Canada.

Cobalt-Nickel Arsenides and Silver Deposits of Temiskaming.
By Willet G. Miller, Provincial Geologist.

Printed by Order of the Legislative Assembly of Ontario.

Cobalt-Nickel Arsenides and Silver.
By Willet G. Miller.

Introduction.

What is known as the Archaen protaxis, or that rugged, rocky region which stretches away from the St. Lawrence River, expanding to the northwestward, and occupying a large part of Northern Ontario, a group of what may be called unique economic minerals. Probably as great a variety of minerals is produced here in proportion to the number of inhabitants as is derived from any other country. Among these economic deposits are:

Auriferous arsenic-ores of Temagami, recently there made known, and lastly a discovery has been made of the series of Cobalt-Nickel Arsenides and Silver, which are unique, so far as known on this continent, and are paralleled by deposits only in Saxony and adjacent regions of Continental Europe.

Situation and Discovery.

A brief description of the character and modes of occurrence of the Cobalt-Silver ores of the area examined during 1904 was made by the department.

It may be well to repeat briefly some of the information given in the report.

These ore bodies which carry values in Silver, Cobalt-Nickel and Arsenic were discovered during the building of the Temiskaming and Northern Ontario Railway. In fact, it may be said, that the Railway discovered the deposits, as it runs almost over the top of what is probably the most important vein yet found. The finding of such rich ore within a short distance of the shore of Lake Temiskaming, a stretch of water which has been a well travelled route to the north by white men for two hundred years or more, and these deposits being only about four miles from the town of Haileybury, show the possibilities there are for the discovery of important mineral bearing areas in the vast hinterland of Ontario, much of which is little known. The chief of these ore bodies lie within a half mile of what is known as Cobalt Station, distant by rail about 103 miles from North Bay Junction on the Trans-Continental line of the Canadian Pacific, and 330 miles almost north of the City of Toronto. It may also be added, that one of the oldest known ore bodies in North America, the argentiferous galena of east side of Lake Temiskaming, is distant only eight or nine miles from Cobalt Station. This galena deposit was discovered over 150 years ago. A map of this lake, published about 1778 has marked on it the name "Anse a la Mine," thus showing that the deposit was known at that date and probably much earlier, owing to the fact that the ore outcrops at the water's edge and is of such a character as to attract attention.

Some of these veins in the vicinity of Cobalt Station were apparently noticed by men employed in the railway construction in the Spring of 1903, but there being no miners or prospectors among them, little interest was aroused and nothing was heard of the discovery until October of the same year. At that time, Mr. T. W. Gibson, Director of the Bureau of Mines of Ontario, Canada, who was then in that

part of the Province, was given a sample of niccolite which the donor thought was copper ore. Mr. Gibson, however, recognized the value of the sample and forwarded it to the writer, who was then in an eastern part of the Province, and asked him to make a report on the occurrence as soon as possible. The writer, although he knew the specimen represented high-class ore, hardly expected to find the ores of the character and quantity which he saw on his arrival.

This mineral, niccolite, had been found some years before in association with the lower grade nickel ores of some of the Sudbury deposits, but no great quantity of it has up to the present time been discovered in the Sudbury field, the town of which name lies about 90 miles southwest of Cobalt Station. It may, however, be stated that the Sudbury ore deposits are quite different in character, and in origin from those at Cobalt, although the metal nickel is an economic constituent in each. The Sudbury deposits have received a great deal of attention during the last fifteen years or more, and two important reports have recently been published on them. These are by Dr. A. E. Barlow, of the Geological Survey, and Prof. A. P. Coleman, of this Bureau. Nearly all the writers agree the ores are essentially of igneous origin—that is, that the nickeliferous magnetic pyrites or pyrrhotite and copper pyrites have separated from a molten mass of rock. The deposits at Cobalt on the other hand, occupy narrow, practically vertical fissures or joints which cut through a series of unusually slightly inclined metamorphosed fragmental rocks of Lower Huronian ages. A few veins of similar form have also been found in the adjacent diabase. Some of the recently discovered veins near the centre of location appear to be partly or wholly in the Kewatin which is here in contact with Lower Huronian.

The material in these veins has, in all likelihood, been deposited from highly heated and impure waters which circulated through the cracks and fissures of the crust and were probably associated with the

post-Middle Huronian and gabbro eruption. It is rather difficult to predicate the original source of the metals—silver, cobalt, nickel, arsenic and others—now found in these veins. They may have come up from a considerable depth with the waters or they may have been leached out of what are now the folded and disturbed greenstones and other rocks of the Kewatin. Analysis of the various rocks of the area have not given a clue as to the origin of the ores. As these ore bodies in the vicinity of Cobalt Station may be said to be unique among those known in North America we have a chance of instituting comparisons on this continent. Some European veins, however, such as those of Annabery, Joachimsthal and other localities which will be again referred to, show a similar association of minerals. The origin of these has been explained by some authors by the supposition that the metals were leached from the surrounding rocks. The writer has found, however, from the descriptions which have been published of most of these European occurrences that there are usually basic dikes in the vicinity of the veins. These dikes appear to have, in some cases, the same relation to the ore bodies that those of diabase and gabbro have in the Ontario Cobalt region.

Notes on Minerals.

The five or six veins, with one exception, which have been producers during the last few months, all carry high values in silver, as do those discovered more recently. The outcrop of the non-silver bearing vein was about 14 inches in width of practically solid ore, which had a gray color.

Much of the surface of this ore shows the decomposition product, cobalt bloom, the arsenide having been changed by atmospheric agencies to the arsenate, the oxidized form.

This is characteristic of all hydrated salts of cobalt.

In most of the veins where silver is found in important amounts a uniform massive structure, like

that of the vein just referred to, is not exhibited. There is more or less calcite and at times a little quartz. The veins sometimes show a crudely banded structure. The ores frequently go together. Arsenides of cobalt and nickel for example have native silver immediately mixed with them. At other times there is almost massive smallite of niccolite. Some of the veinlets which form junctions with the larger veins contain much silver in various forms.

The native silver is in masses and also occurs in films, flakes, and wire-like forms, especially in calcite. The dyscrasite is usually closely associated with native silver.

SHIPMENTS.

High-Grade Ore accumulating,

The production for the first quarter year ending March 31, '05, was 354 tons of ore valued at \$293,552. The ore thus averaged \$829 a ton. During the second quarter, March 31 to June 30, shipments were 537 tons valued at \$394,552, or an average of \$734 a ton. The metals in the ore were sold at the following prices: Silver, 55c. to 60c. an oz. Troy, for 90 per cent. of the contents, cobalt 65c., nickel 12c. to 15c a pound.

In the third quarter there will probably be 14 or more shippers and the production will probably be greatly increased. The ore shipped up to the present time has been sorted by hand. Much ore that would be considered high grade in most mining camps is accumulating on the dumps. This will no doubt be milled in the not distant future and will add materially to the output.

ORE FROM THE TRETHEWEY MINE.

Worth nearly \$6 per lb.

Through the courtesy of Mr. W. G. Trethewey, the Bureau of Mines has obtained a sample, for preservation in its collection, of the richer ore from his vein on location J.B. 7. The sample weighs 79 lbs. Drillings, obtained by boring into the sample,

show it to have the following composition: Calcium, magnesium, carbonate, represent the veinstone; the cobalt and nickel exist as arsenides and the silver is essentially in the metallic form.

The value of the silver in this 79 lb. sample at 58⅞c. an oz. Troy, is \$451.16.

The Cobalt Silver Veins.

It is not considered necessary to give a detailed description of each vein in the district, the character of the one being usually so much like that of another. The character and distribution of those found up to June, 1905, are shown on the plan which accompanies this report. Many veins have since been discovered, especially on the older properties. Scarcely any of the mines have been stripped for their full length. Most of those worked have been developed in the form of open cuts. The vein first discovered on the La Rose claim on which several others have since been found, has been developed more systematically than any other in the district. A shaft has been sunk and about 250 feet of drifting has been done at the 80-foot level, following the vein in both directions from the shaft. The drifts prove that the vein is at least as large and rich at this depth as it has ever been. In the 250 feet the drifts have passed through comparatively little barren ground. **Approximately \$1,000,000 worth of ore has been blocked out of this vein.** As the ore body here is probably the largest yet found in the area it would not be correct to infer that smaller veins can be followed as persistently. The La Rose ore differs somewhat from that of the other veins in that it contains a higher percentage of niccolite, the nickel averaging about 10 per cent.

To give an idea of the character of the ore of one of the other veins, it may be said that an open cut, about 50 feet long and 25 feet deep, on the Trethewey vein, location J.B. 7, has produced approximately \$200,000 of ore, the maximum width of the

vein being not more than 8 inches. The amount received for one carload of 30 tons of ore from this mine, at the prices of the contained metals mentioned elsewhere in this analysis, was between \$75,000 and \$80,000. A shipment of 50 tons of the ore gave on analysis approximately the following percentages of metals: Arsenic, 38; cobalt, 12; nickel, 3.5 and 190,000 ounces of silver. Pay was received for cobalt and silver only.

Distribution of Ores.

A peculiar occurrence of cobalt and nickel with gold has recently been discovered on Rabbit Lake, east of Temagami and about 30 miles south of Cobalt Station. The outcrop is at the water's edge, and the deposit has not yet been uncovered back from the shore. The rocks here have been disturbed and are much more highly metamorphosed than are those in the vicinity of Cobalt Station. They appear, however, to belong to the Lower Huronian conglomerate—greywacke series. The ore body, about 18 inches wide, is in a zone of fracture. This unique deposit is of interest since it shows that cobalt-nickel ores are to be looked for so far south of the Cobalt Station. The Rabbit Lake occurrence is about the same distance south of Cobalt Station as those of the township of Ingram are north of it, thus showing that the cobalt-nickel ores are distributed over a distance of at least 60 miles in a north and south direction.

A tract of country 75 miles or more in length, stretching from the vicinity of Lake Temagami, northward to the height of land and beyond, contains outcrops similar to those of the area under consideration. In some parts of the area the conglomerate outcrops are much larger than they are in others. In a few of the areas the conglomerates and other members of the Lower Huronian have been practically all removed by erosion, leaving the surface composed of the Kewatin, Laurentian or later diabase. Areas of considerable size are occupied by the arkose

and quartzite of what we have called the Middle Huronian, in which no veins have been found. In any of the Lower Huronian, it is possible that cobalt-silver veins, similar to those in the vicinity of Cobalt Station, may be discovered.

A Buried Iron Range.

It is thus seen that we have here a portion of a buried iron range. The strike of the interbanded material in the exposure is somewhat north of west. In the outcrops of conglomerate which are shown on the map in the township of Hudson are found large blocks of this iron formation in the direction from the outcrop at Sharp's Landing represented by the strike of the interbanded material at the Landing. We have thus good evidence that the iron range or formation lies at no great distance from the surface in this part of Hudson. Between these outcrops of conglomerate and Sharp's Landing the range is cut through by diabase and it is overlain by Niagara limestone and recent clay deposits in addition to the Lower Huronian. This iron range no doubt extends farther west than Hudson. It has been covered up since Lower Huronian times, as shown by the fact that it is overlain by rocks of this series, and has therefore not been subjected to glaciation, which is supposed to have produced injurious effects on the iron deposits of Ontario, it having been held by some writers, for instance, that the soft ores in these deposits have been gouged out and carried to the southward. Near the southwest corner of Cross Lake in the township of Coleman there is a small exposure on the shore which also carries large angular blocks of the iron formation. There is, in all probability, a portion of a buried iron range in this vicinity. Much of the conglomerate in various parts of the area contains jasper pebbles and other material derived from the iron formation.

In addition to the iron ranges which are found

in the vicinity of Lake Temagami, 25 miles to the south of Cobalt, there are outcrops of similar material in the township of Boston to the northward. The outcrops in this township are described in another paper in this report.

Arsenic.

Near the railway track, a short distance north of Lake Temagami, two deposits of auriferous mispickel are being worked in the Kewatin. These are known as the "Big Dan" and "Little Dan" prospects, respectively. It may also be added that the pyrite, especially in the vicinity of Lake Temagami, practically always carries some gold, frequently from one to two dollars per ton. Gold has, however, been found in Lower Huronian ore. That of the Benn mine, lot 15 in the first concession of Bucke, showed \$5.20 to the ton in one sample, the ore being cobaltite, a compound related to mispickel, and that from Rabbit Lake is also gold-bearing.

The ores of Temagami and Cobalt Station, both being rich in arsenic, would seem to warrant the erection of an arsenic refining plant somewhere along the railroad between these two points. In so far as the writer knows there is not another site as promising for a plant of this character in North America. Water power is available.

White arsenic contains theoretically 75.8 per cent. of arsenic and 24.2 of oxygen. One pound of arsenic in the ore if roasted, will therefore produce, theoretically, about one and one-quarter pounds of white arsenic.

During recent years white arsenic has been worth about \$60.00 a ton or three cents a pound. In the year 1903 the United States imported \$256,097 worth of white arsenic, metallic arsenic and arsenic sulphide.

The greater part of the white arsenic produced at the Deloro works was consumed in the plate glass

industry of the United States. It is said that if the glass manufacturers were assured of a constant supply at satisfactory prices they would use white arsenic in place of the oxide of antimony which they commonly employ as an oxidizer.

Other uses of white arsenic are in Paris green and various paints, in sheep dips, insecticides, aniline dye works, etc.

Character and Strike of Veins.

It would appear that there was more uniformity in strike among the veins which lie to the westward of Cobalt Lake than in any other part of the area. The vein on which the Trethewey mine is situated has a strike of about N. 85° W. A narrow stringer immediately north of this has a similar strike, as have also the seven veins on J.B. 6. On the Dennison location, immediately southwest of J.B. 6 two narrow veins have a strike similar to that mentioned, as has also the vein worked on the claim to the southwest of Dennison's. The strike of these veins, on J.B. 6 at least, is parallel with the dip of the enclosing rocks. The dip can be determined here in but few places. On J.B. 6 at one point it was seen to be about 20 degrees to the eastward.

"It is not always possible, in a shattered rock, to discriminate between joints and those lines of division to which the term fissures is more usually restricted. Many so-called fissures may be merely enlarged joints." This holds true in the cobalt-silver area. While the openings occupied by some veins, or part of a vein, can be called fissures, there are many more to which the writer is inclined to apply the term joint.

Silver Islet Mine.

This deposit, which occurs on an islet less than 80 feet in diameter about a mile out in the lake off Thunder Cape, was discovered in the Summer of 1868. It is the most famous silver mine yet worked

in Canada, the silver produced from it amounting in value to \$3,250,000. The vein on this islet intersects what is called a chloritic diorite dike in its course through the sedimentary beds of the animikie. The producing part of the vein was practically confined to that portion between the walls formed of the dike material. Two very rich bunches or bonanzas of ore were found in the vein, one of these yielding over \$2,000,000. The shape of this bonanza was that of an irregular pear, and throughout its extent in both veins, that is the main branch vein, it was accompanied by a strong impregnation of graphite. The bulk of this bonanza was arborescent silver more or less mixed with macfarlanite, a rich ore of silver carrying 78 per cent, of that metal, along with arsenic, cobalt and nickel. Its physical structure resembles niccolite.

In drifting south on the third level in 1879 strong impregnations of graphite were met on the hanging wall which were soon followed by the second bonanza. This deposit of silver was remarkable for its great width, five feet solid across the breast, and the occurrence in great quantity of the two previously unknown compounds of silver, animikite and muntilite. The shape of this bonanza was that of an inverted cone with a base of about 50 feet on the third level, with the apex down as far as the fifth level. This deposit was phenomenal in its structure, and a winze in the middle of the deposit to the fourth level, 60 feet, was sunk literally through native silver, the metal standing out boldly from the four walls of the winze. In the breast of the drift it stood out in great arborescent masses in the shape of hooks and spikes, in gnarled, drawn out and twisted bunches, followed by arborescent silver with intercalated bands of animikite and muntilite. The width of the vein was over 10 feet, and the entire deposit yielded about 800,000 ounces of silver. **To give an idea of the richness of the ore produced from this vein in the earlier part of its history, it may be said**

that the 1,154,537 pounds of ore produced up to the season of 1872 averaged \$1,322.44 per ton.

Since the foregoing appeared much has happened—so much that it would be impossible within the limits of this booklet to treat the subject fully. There are some thirty shipping mines, scores of others developed far beyond the experimental stage, and numerous rich discoveries have been made, and are constantly coming to light, showing the mineral field to be of immensely larger area than was before thought. Smelters are in course of erection and many thousands of experienced prospectors are at work exploring the country. There is now no doubt that the mineral deposits will prove of permanent value and that New Ontario will rank among the great mining fields of the world.

We shall be happy to afford all the information in our power to those applying for it.

Yours faithfully,

H. C. BARBER, *Man'g. Director*,
CANADA MINES, LIMITED.