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ONTARIO'S METAL MINING INDUSTRY.

Northern Ontario mining districts are constantly giving evidence of the wonderful wealth that is stored up in the hinterland. From time to time new discoveries are made and the interest aroused becomes keener. On many occasions it has been our pleasure to tell in these pages of new developments that ensure the future of mining in Ontario. At no time has the outlook been so bright as now. We are devoting this number of the Journal largely to Northern Ontario mining in order to call special attention to conditions in the Province's chief metal producing districts.

There have been occasions during the past few years when we have had to record great activity at Sudbury nickel-copper mines, Poreupine and Kirkland Lake gold mines or Cobalt silver mines, but never were all in such good condition at the same time. In the early days of the war, when the bottom fell out of the metal markets and pessimism prevailed in industrial districts, we were able to point with satisfaction to the steady operation of the big mines at Poreupine, for whose product there was of course always a market at the old price. Increase in cost of supplies and shortage of labor held back the gold mining companies in 1916 and no startling production record was made; but even under adverse conditions the gold mining industry was being placed on a firmer footing by improved physical condition of several mines. Now that the labor crisis has been passed, sooner than was expected, we may properly expect greater activity in the gold districts than has yet been witnessed.

In the first days of the war the need for increased production of nickel and copper was not recognized and we have to look back at the strange spectacle of decrease in production as the first result of the war on this basic industry. Experience gained as the war has gone on has shown clearly that there should never have been decrease in output; but that, on the contrary, every effort should have been made to increase production. The mistake was made however; the market for the metals having temporarily disappeared, employees were dismissed and the output kept low. The error was not peculiar to companies operating in Ontario, for copper producers throughout North America cut their output in half. The conditions at Sudbury during the first few months of the war were distressing, for men were being thrown out of employment at a time when their services would have been of great value if the need for munitions had been recognized. Gradually, after much valuable time had been lost, the market improved, accumulated stocks were sold and production was increased. Then began

the race between demand and supply in which the latter has never caught up. During 1915 the Sudbury mines got back to normal production and then began to make new records. Then labor, which had not been fully utilized during the first few months of the war, became scarce and output was restricted to some extent. Recently the labor supply has improved and we may look forward to further increase in activity in the Sudbury district. At present production is being maintained at a maximum by the two operating companies and the third big company, which has been doing preliminary work with a few hundred men, will soon begin the construction of a smeltery and refinery. This company, the British America, can use large numbers of men as they become available. At Port Colborne the construction of the enormous refining plant of the International nickel company is progressing rapidly. The nickel-copper industry can absorb many men and will in the future be even a greater industrial factor in the Province than it is to-day.

Recently we have been recording the improved position of companies producing silver. The steady rise in price of this metal is of great importance to the Cobalt district and may well result in numerous idle properties being opened up as well as in utilization of much ore in producing mines that was hitherto regarded as too low grade to warrant mining.

Aside from the new possibilities there is the tremendous increase in profit on the regular production. Silver is to-day selling at 30 cents above the average of 1916 and 36 cents above that of 1915. The cost of production is somewhat higher; but increased cost can be easily taken care of when such prices are obtainable. Cobalt silver mines produced over 10,000,000 ounces silver during the first six months of this year and should easily produce as much during the balance of the year, if labor and supplies are available. What the great increase in selling price means to operators may be appreciated by assuming 90 cents as the average for the second half of the year. The average for the first six months was about 75 cents. The difference in selling price would be \$3,000,000.

In the early months of the war silver was selling around 50 cents. The average for 1915 was 49.69 cents. To-day silver is selling at just about double the 1915 price. That there is an enormous increase in profits is obvious. Each one cent increase in the selling price of silver means \$200,000 increase in the receipts of silver mining companies for the year 1917. If the average should be, as it may prove to be, 20 cents higher than that of 1916 the increase in receipts would be about \$4,000,000. An interesting feature of the present condition of the silver market is that it may easily result in Cobalt's production of 20,000,000 ounces in 1917 bringing a greater return than the 31,507,791 ounces produced in 1911—Cobalt's banner production year. The production in 1912 was 30,243,859 ounces; but, the price being higher than in the

previous year, the record for value of output was made in 1912, the amount being \$17,408,935. It will not be surprising if this figure is reached again this year.

The increase in price of silver means much more to Ontario than increased profit on a certain production. It means that a large tonnage of low grade ore that might never have been used can now be worked at a profit. Fortunately, excellent progress has been made in treating Cobalt ores carrying only a few ounces of silver and the experience gained will now be turned to good account. A new incentive has been given to prospecting, both surface and underground, for silver properties must now be examined in a new light.

The situation in the nickel-copper, gold and silver districts is therefore such as to assure great activity. There is ore in abundance at Sudbury and Porcupine and even though some of the Cobalt silver mines are worked out many millions of ounces of silver are now available and more will undoubtedly be found. There is a good market for all products. Given labor and supplies the mines will make an excellent showing. It is to be hoped that Canadian manufacturers who have been devoting their attention to munitions will not be slow to realize the growing market that the Canadian mining industry offers them. The men thrown out of employment at the munitions plants will do well to consider that the mining industry offers them steady work in war or peace, in good times and bad, for mining, like farming, is a basic industry.

THOSE ADVISORY COUNCILS.

In defending in the House of Commons on Sept. 3 the proposals of the Advisory Council of Industrial and Scientific Research Sir George Foster said in part:

"This Bureau of Industrial and Scientific Research is formed upon the same plan as the Advisory Council in Great Britain. At present the Advisory Council has connected with it the best talent and the best advisory committees in all these different lines of scientific and practical business and industrial knowledge that Great Britain can afford. The British Government have put behind that council £1,000,000 for expenditures along lines tending in this very same direction."

We fear that Sir George is very much mistaken as to the character of the work being done by the Advisory Council in Great Britain and we are not delighted, and yet not surprised, at the statement that the Canadian Bureau is formed upon the same plan as that in Great Britain.

In our last number we called attention to the bun-kum being published by the Advisory Council in London. We hope that Sir George does not propose to publish more such stuff in this country. Unfortunately the Department of Trade and Commerce does not seem overly particular about its publications and its recent foolish article on potash production and its fictitious reports on the value of nickel matte exported, do not

lead us to hope that the Council will publish reliable information about Canada's mineral resources. The establishment of a Bureau of Industrial and Scientific Research in Canada was undoubtedly due to the fact that it was the fad of the times. "They have one in England, you know, and really we ought to have one here," seems to have been the argument that carried the Government. If the real need of such a Bureau had been recognized, a properly qualified board would have been selected and we would have no occasion to fear that the Canadian Bureau would ape that of London.

The Canadian Advisory Council has the power to do a great deal of good in this country. Some of its members know enough about industrial research to warrant them giving advice on certain subjects. A large number of properly qualified men, many of them nominated by technical societies, have been asked to assist the Council and these men are endeavoring to make the work of the Council a success.

Their efforts will be negated if care is not taken to curb those who are making careless statements about research and resources in the House and throughout the country. Some idea of the degree of intelligence which characterized the debate on Sept. 3 is given by the following nonsense from the speech of one member: "If the money that is being expended here should result in the discovery of some process by which the nitrogen contained in the air or feldspar could be made available as a fertilizer, it would do more for this country than ten times or a hundred times the money contained in this vote." Another equally well informed member remarked that "there are many questions of practical interest which people would like to have investigated * * * * the production of nitrogen from feldspar is a very important matter, and the problem in connection with that has been very largely solved, but it might be taken hold of in a practical way." The Minister, replying to the member responsible for the above absurdity said that "one of the objects of the board's work will be to find out the problems that are troubling the industrial and productive interests of the country." One of the problems will be found to be that of giving some members of the House an elementary training in science in order that they may show some signs of knowing what they are talking about. Another is the prevention of the dissemination of false information by government departments, through incompetence or carelessness.

FOOLING THE PUBLIC.

There have been recently appearing in various publications here and in England, statements concerning wonderful new discoveries of minerals in Canada, notably of manganese and nickel. The persistency of these reports makes it appear that an organized effort

is being made to mislead someone and that Government publications are being utilized for the purpose.

In a previous number we called attention to the publication without comment in the Bulletin of the Department of Trade and Commerce of extravagant claims for a process of recovering potash from feldspar. The article was misleading enough when published in an unofficial organ; but doubly misleading when given official recognition.

In the daily press, and recently in the Bulletin of the High Commissioner for Canada, there has been published the following misinformation:

"Inexhaustible deposits of manganese dioxide which is extremely valuable as an iron toughening material and in great demand for war munition purposes have been found in Cypress Hills, Alberta. Eight hundred thousand tons worth approximately fifty four million four hundred thousand dollars have been blocked out." As a matter of fact the ore deposit is a low grade one and instead of 800,000 tons "blocked out" about 8,000 tons was indicated by surface work.

Another fairy tale that has been given wide circulation is that enormous deposits of nickel have been found at Fond du Lac, Saskatchewan. We would suggest that the Department of the Interior investigate the origin and purpose of this yarn. Perhaps the Department will discover the inventor of some of the news items being sent to England for publication in "Canada."

GOOD RESULTS POSSIBLE.

Those who read the above paragraphs and who are familiar with our earlier remarks on the same subjects may conclude that we have little hope that the Advisory Councils and Bureaus of Scientific and Industrial Research will do the mining industry any good. We are not so pessimistic as that. We still hope that they may do even more good than they have harm; and our criticism is offered with the intention of lessening the amount of harm being done, and to direct attention to the fact that no one is more in need of advice concerning the mining industry than are these Advisory Councils. This need for advice is, we believe, already recognized by the Councils, and a large number of technical men have volunteered their services to do work for the Councils which may reasonably be expected to have important results.

If these volunteers take hold and clear up the mess they will deserve our thanks. If they go further and develop an organization such as is needed by our industries, it may yet prove that the adoption of a popular fad had good results. We are convinced that these gentlemen will not be content to ape the actions of men in other countries and we hope that they will not allow disgust for Ottawa methods to prevent them from taking a keen interest in the operation of the Bureau.

CORRESPONDENCE.

CONCENTRATION OF MOLYBDENITE ORES.

To the editor of the Canadian Mining Journal:

Sir,—In an article on the treatment of molybdenum ores published in the "Canadian Chemical Journal" Mr. Geo. Mackenzie states that the modern oil flotation process was tried out laboriously and with great detail, and that this process (it should be called processes) was passed up for the water film flotation process. He states further that a Wood machine, with certain weaknesses rectified, was chosen as being best fitted for the work. Mr. Mackenzie claims that this machine works satisfactorily under almost all conditions.

It is not well that such statements should remain unchallenged at this time when a new industry is opening up and needs every possible encouragement. The Wood machine or indeed the water film flotation process has proved absolutely unreliable economically wherever used for molybdenite concentrating in Canada, and this process has been discontinued wherever used.

The Mines Branch could not have spent much time in experimenting with the oil flotation process, or maybe they knew nothing of the application of the process, or they would never have tried the Wood machine.

This letter so far would appear discouraging to anyone intending to mill molybdenite ores. However the situation with regard to concentrating molybdenite ore has been greatly simplified in the last few months by the operations of the Dominion Molybdenite Company at Quyon, Quebec, using Callow cells.

The results have been so successful that the mining of molybdenite is a far harder problem to-day than the milling. Perhaps other oil flotation processes will prove successful; but in any case the results with the Callow cells are excellent.

FLOTATION ROYALTIES.

Boston, Sept. 6.—While much has been published concerning the court struggles of the Minerals Separation Co. in its effort to validate its patents covering the so-called flotation process of treating copper and zinc ores, little has appeared in print concerning the actual operating royalties involved when final settlement is had of all disputed issues.

In this connection it may be informing to state that under the terms of an agreement entered into in 1915 between the Anaconda and Inspiration companies on the one hand, and the Minerals Separation Co. on the other, the two mining companies referred to are now paying royalties of but four cents per ton on their ores handled by flotation. It was provided that if desired the Greene-Cananea, Arizona Copper and Calumet & Arizona companies might also be included in this special agreement. The arrangement provides that the licensees shall pay upon tonnages treated by flotation upon the following basis:

	Per ton
Up to 4000 tons per day	12 cents
From 4000 to 6000 tons	10 cents
From 6000 to 10,000 tons	9 cents
From 10,000 to 30,000 tons	8 cents
Exceeding 30,000 tons	4 cents

EARLY DESCRIPTIONS OF COBALT SILVER DEPOSITS.

The four veins which had been discovered when Dr. W. G. Miller first visited the camp in November 1903 were the La Rose, McKinley-Darragh, Cobalt Hill (Nipissing) and Little Silver (Nipissing). The early descriptions of the appearance of these veins are very interesting. Dr. Miller said, in part, in his first report on the Cobalt district:

The La Rose Vein.

"The La Rose vein lies east of the railway track, at the edge of a swamp, about one-quarter mile north of Long (Cobalt) lake. The surface of the rock is low here and little is exposed. At the widest opening the deposit has a width of over 6 ft.; but the vein matter is mixed with rock. The ore consists of niccolite (arsenide of nickel) and smaltite (arsenide of cobalt) with much silver. On weathered surfaces the vein matter is coated with the beautiful decomposition product, cobalt bloom. The green nickel stain is also seen on some surfaces, but is masked by that of the cobalt. The native silver occurs as films or leaves and fine threads, or moss-like forms, through the nickel and cobalt minerals, as well as in cracks in the rock and in the calcite veinstone. In weathered portions of the ore the silver shows distinctly. Some lumps of weathered ore weighing from 10 to 50 lbs. carry a high percentage of silver. One sheet composed chiefly of silver and attached to the rock surface had a thickness of nearly 3-8 in and a diameter of about 1 ft.

The Cobalt Hill Vein.

"The Cobalt Hill deposit is distinctly vein-like in form. The ore here is a mixture of smaltite and closely related arsenides. The orebody carries no silver in the parts so far uncovered. The massive ore has a width of 14 in. Vugs in the wall rock 2 ft. or more from the vein are filled with cobalt bloom.

The McKinley-Darragh Vein.

"This deposit, so far as could be seen, is much like the La Rose. It lies at the southern end of Long lake. The ore consists of native silver, smaltite and cobalt bloom and niccolite.

The Little Silver Vein.

"This, although having the smallest width of the four, is in many respects the most interesting of the group. Here a bare cliff of rock, 60 or 70 ft. high, faces west. The vein cuts this face at right angles and has almost a vertical dip. The vein is weathered away leaving a crack in the face of the cliff 2 ft., and in some places 4 or 5 ft., in depth. When I saw it first it had not been disturbed. Thin leaves of silver up to 2 in. in diameter were lying on the ledges, and the decomposed vein matter was cemented together with the metal, like fungus in rotten wood. It is a vein such as one reads of in text books; being so clearly defined and so rich in contents.

"It was found impossible to get a fresh sample of the ore with the prospecting pick, the vein being so much decomposed. The weathered specimens, however, in addition to the native silver, contained cobalt bloom. The unaltered ore will be found, in all probability, to consist of smaltite and niccolite, in addition to silver."

LUCKY CROSS SOLD.

The Lucky Cross mine at Swastika was auctioned in Toronto last week. It was purchased by the bondholders for about \$60,000. Mr. W. E. Smith bid \$50,000.

Early Days at Cobalt

In the year 1903 men were working in the vicinity of Cobalt lake on the construction of the T. and N. O. Ry., and Ontario Government enterprise intended to open up the agricultural area further north. Cobalt lake, then known as Long lake, was at that time one of numerous attractive forest bound lakes occasionally visited by tourists and trappers travelling between Lake Temiskaming and Temagami. The nearest settlement was at Haileybury, an old Hudson Bay post on Lake Temiskaming 4 miles away.

The plans for construction of the T. and N. O. Ry., provided that the line should touch the shore of Lake Temiskaming in the vicinity of Haileybury. It was also arranged that Lake Temagami, already known as a camping ground for tourists, should have railway facilities. Between Temagami and Haileybury the road crossed the Montreal river, at Latchford, thus giving access to a navigable stream. All along the line were forests that might be converted into pulpwood. Here and there were areas covered with pine; but there was little large timber. There was very little good agricultural land. It looked therefore as though the portion of the road between Temagami and Haileybury might derive some revenue from the pulpwood industry and tourist traffic; but the prospects for a considerable amount of business were not encouraging.

There were no experienced prospectors among the gangs engaged in grading, but apparently some of the workers noticed early in 1903 peculiar minerals in the rocks in the cuttings near Long lake.

The pink color of erythrite, or Cobalt bloom, could scarcely have escaped the attention of the workmen. It is not surprising, however, that the nature of the substance was not recognized, for at that time cobalt bloom was a rare mineral in America. The mineral was even unknown to experienced Canadian prospectors. Outside of mineralogical collections there was practically none in North America.

But while cobalt bloom was regarded as a mere curiosity, because its significance was not yet understood, the copper colored mineral which occurred with it aroused considerable interest. This mineral, peculiarly enough, contained no copper; but it was thought to be a copper ore. The mistake was a natural one for instead of being one of the common copper ores the mineral was niccolite, a comparatively rare mineral. Prospecting of the deposits containing niccolite led to a claim being staked for copper.

Apparently the first to suspect the presence of silver were Ernest Darragh and J. H. McKinley. These men, who made the first application for a mining claim on Aug. 14, 1903, were getting out ties for the railway. At the south end of Long lake they found loose pieces of rock containing a metallic mineral which they supposed to be silver. They located the claim which later became known as the McKinley-Darragh. Specimens sent to Dr. Milton Hersey of Montreal were found to be rich in silver. No work was done on the claim until the following spring.

Meanwhile at the north end of Long lake Fred La Rose, a blacksmith employed by the contractors on the railway work, found a mineralized vein on what is now known as the La Rose property. He did some work on this in his spare hours and opened up a

very rich deposit. He did not recognize the rare minerals and the native silver; but he thought he had located a valuable copper deposit. He applied for a mining claim on September 29, 1903.

Fortunately Mr. T. W. Gibson, Deputy Minister of Mines, happened to be in Haileybury about this time and he was shown a specimen of niccolite by Mr. Ferland. Mr. Gibson sent a sample to Dr. W. G. Miller, Provincial Geologist, and suggested that he visit the locality before the close of navigation.

Dr. Miller reached Haileybury early in November. He says in his report. "At the time of my arrival in the district, 4 veins, all of which were very rich, had been found. Three of these were within sight of the railway and the fourth a short distance to the south east. The blackened tarnished silver had up to that time attracted little or no attention, although it occurred in profusion in two or three of the weathered outcrops." One may well imagine the delight of La Rose on learning that his little "copper" deposit was in reality a very rich silver deposit containing native



Cobalt in 1905.

silver associated with arsenides of nickel and cobalt.

Two of the veins referred to by Dr. Miller, were the McKinley-Darragh and the La Rose. The other two were discoveries made by Thomas Hebert. One of these was found east of the lake on what is now Nipissing property. Hebert made this discovery on Oct. 21. A few days later he found the "Little Silver" vein in the hill southeast of the lake.

Soon after these four discoveries were made snow began to interfere with prospecting. During November Neil King discovered a deposit on what became known later as the O'Brien property. He staked out 160 acres. During the winter none of the claims were developed.

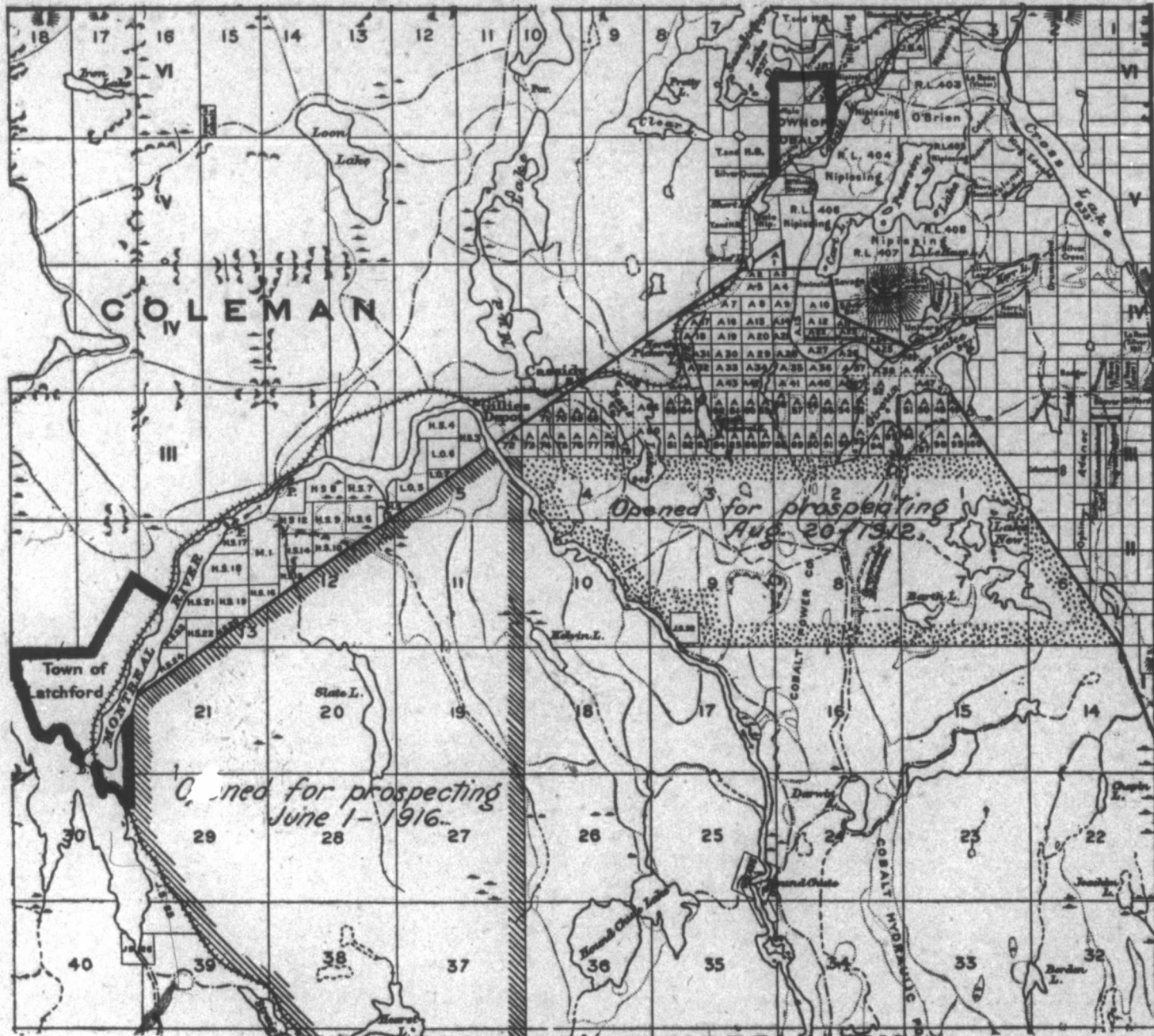
These several discoveries were made by men without mining experience or sufficient capital for development work. La Rose shared his discovery with his boss, Duncan McMartin, and later sold his interests to Henry Timmins, Noah Timmins, D. A. Dunlap, John McMartin and Duncan McMartin. McKinley and Darragh sold an interest in their discovery and a company was organized to operate the property. Hebert sold his interests to Messrs. Ferland, Galbraith, Cham-

bers and Russell who resold to E. P. Earle. Mr. Earle organized the Nipissing Mining Company in December 1904.

During November 1903 several accounts of the discoveries were published, but little interest was aroused. The rich specimens brought down by Dr. Miller were regarded as very interesting; but few realized what the discovery meant. One of the few was W. G. Trethewey. He went north as soon as the snow melted

and Hudson Bay Co., organized in 1903 by a number of New Liskeard merchants. The prospectors sent out by this company apparently did not in all cases comply with the Mines Act and failed to get titles for all the claims. They made one find at the Silver Queen south of the Buffalo, and another north of the Trethewey.

Cobalt lake was now nearly surrounded by claims and the prospectors went further afield. Soon several



Sketch map showing Cobalt and Gillies' Timber Limit.

and in a few days after reaching Haileybury had discovered and staked the claims known as the Trethewey and Coniagas. Alex. Longwell who was prospecting for R. W. Leonard helped Trethewey to stake the two claims. Leonard and Longwell acquired an interest in the Coniagas.

Longwell prospected further south and discovered a vein and staked what is now the Buffalo property.

While the first real discoveries west of Cobalt lake were made by Trethewey and Longwell, numerous claims had been staked out there by the Temiskaming

claims were staked near Kerr lake and during the following year most of the intervening ground was taken up.

Early in 1904 Dr. W. G. Miller assisted by Mr. C. W. Knight began the mapping of the Cobalt area. At Dr. Miller's suggestion the name Cobalt was adopted for the station and post office and the name Long lake was changed to Cobalt lake. Shipments of ore were made during the year and the richness of these shipments soon brought the district to the attention of the mining world.

Ontario's Metalliferous Production

Jan. 1 to July 1 1917.

Returns received by the Ontario Bureau of Mines from the smelters, refining works and metalliferous mines of the Province for the six months ending June 30th, 1917, are summarized in the table below, which gives comparative figures for the corresponding period in 1916.

ada (Cobalt Lake and Townsite-City mines) shipped over 2,000,000 ounces in the half year.

Shippers of 500,000 ounces or more were as follows: Nipissing, Kerr Lake, O'Brien, Beaver and Coniagas mines. Silver recovered from gold ores totalled 38,492 ounces and from copper ores 646 ounces.

SUMMARY OF METALLIFEROUS PRODUCTION, FIRST SIX MONTHS, 1917

Product	Quantity		Value	
	First Six Months 1916	First Six Months 1917	First Six Months 1916	First Six Months 1917
Gold.....Ounces	235,060	228,673	\$4,822,740	\$4,586,941
Silver....."	10,267,743	10,073,787	6,188,268	7,584,439
Cobalt (metallic).....lb.	121,817	162,250	103,677	237,004
Nickel (metallic)....."	13,933	45,864	5,899	19,073
Nickel (oxide)....."		5,495		1,648
Cobalt (oxide)....."	410,408	153,498	204,638	175,308
Other Cobalt and Nickel Compounds....."		122,076		15,879
Molybdenite....."	12,631	36,777	13,075	47,492
Lead....."		912,934		114,953
Copper Ore.....Tons	922	1,543	14,368	45,688
Nickel in matte....."	20,651	20,230	10,325,766	10,115,000
Copper in matte....."	11,426	10,381	4,207,620	4,152,400
Iron Ore (exported)....."		24,332		85,135
Pig Iron....."		40,968		715,912
			\$25,886,052	\$27,897,322

It will be noted that above figures are for pig iron produced from Ontario ore only. Export figures for 1916 are not available for iron ore. Nickel and copper in matte have been valued at 25 and 20 cents per pound, respectively, whereas copper was valued at 18½ cents per pound in 1916.

GOLD: It was anticipated that the production for the half year would show a decline as compared with the same period in 1916, owing to labor troubles and labor shortage at the Porcupine camp. Nearly all the mines, including the Hollinger and Dome, have been developing their orebodies and increasing milling capacity in preparation for the time after the war when labor will be more plentiful and operating costs decreased. In the meantime production and dividends have been curtailed.

New producers are Gold Reef and Tommy Burns at Porcupine, Teck-Hughes at Kirkland Lake and Miller-Independent at Boston Creek. A single stamp is dropping at the Rognon on Wabigoon lake, District of Kenora.

Mines, in order, producing 5000 ounces or more gold were Hollinger, McIntyre, Dome, Porcupine Crown, Tough-Oakes, Schumacher and Porcupine V. N. T.

SILVER: High prices for silver, which averaged 75.44 cents for the half year as compared with 62.53 cents for the same period in 1916, have stimulated production from the Cobalt camp. The lowest New York price was 71.75 cents on March 27th, and highest 78.64 on February 15th. This advance in value has offset increased mining costs.

If the Miller-Lake O'Brien continues shipping at the same rate throughout the year, Gowganda will show a record production for 1917. The increase is attributed to the high grade vein discovered in the summer of 1916.

The Hargrave mine is now shipping regularly. A new shipper this year is the National, formerly the King Edward mine. The Mining Corporation of Can-

NICKEL-COPPER: The production of nickel copper matte at Copper Cliff and Coniston shows a small decrease as compared with the same period in 1916, due to shortage of labor.

Assays of samples of nickel-copper matte for their precious metal contents were made for the Royal Ontario Nickel Commission by Ledoux and Company of New York. Platinum and palladium were found in quantities varying from 0.32 ounces to 1.97 ounces per ton of matte. These metals are quoted at \$100 per ounce.

The British America Nickel Corporation has announced that their new electrolytic refinery will be located at Murray Mine, and will have an initial capacity of 5,000 tons of nickel per annum.

The Port Colborne refinery of the International Nickel Company will produce 7,500 tons of nickel, and provision is made for quadrupling the capacity.

COPPER: Shipments for the half year came from three sources. The Tip Top mine near Kashabowie, the Hudson Copper Company at Havilah, and the Kenyon Copper Company of Massey. The last mentioned operates the Massey mine, where a 100-ton Callow flotation mill is producing 20 per cent. concentrates. Shipments from Bruce Mines are included under nickel copper.

The Port Arthur Copper Company at Mine Centre is erecting a concentrator and will be shipping soon.

IRON ORE AND PIG IRON: Shipments of ore were from the Helen and Magpie mines of the Algoma Steel Corporation, and a small shipment from Moose Mountain. Helen ore is shipped to the Magpie mine for treatment. In all 61,796 tons worth \$231,937 was marketed, of which 24,322 tons was exported to the United States.

Pig iron produced at Sault Ste. Marie, Hamilton, Port Colborne and Deseronto totalled 347,190 tons worth \$6,067,050. Out of a total of 577,773 tons of ore smelted only 77,202 tons came from Ontario, and in the table the quantity of pig iron produced and value of the same is figured on a pro rata basis.

MOLYBDENITE: The production of this ore is increasing rapidly. Concentrators are now in operation at Renfrew, Mt. St. Patrick and Ottawa, and in the half year treated ore from 13 different mines. At Orillia and Belleville 80,334 pounds of ferro-molybdenum worth \$200,835 was produced.

LEAD: Smelters at Galetta and Kingston produced 912,934 pounds of pig lead worth \$114,953 from Ontario ores. The Kingston Smelting Company also treated 1,895 tons of lead ore from the United States. Ontario ore came from the Galetta and Frontenac mines.

ONTARIO'S GOLD PRODUCERS.

In 1916 Ontario gold mines produced 497,833 ounces of gold, worth \$10,339,259, an increase over 1915 of 86,245 ounces, or \$1,837,868. The production according to localities or source was as follows:

	Ore Milled. Tons	Gold	Value	Recovery per ton
Porcupine	1,330,562	452,097	9,397,536	7 06
Kirkland Lake ..	39,865	33,991	702,761	17 06
Munro township ..	477	2,495	51,578	108 13
Long Lake	26,847	9,230	187,003	6 97
Miscellaneous ...		20	381	
Total	1,397,751	497,833	10,339,259	

In addition to the gold production, 91,873 ounces of silver worth \$60,118 was recovered.

The aggregate value of gold produced in Ontario to December 31st, 1916, was \$33,663,648.

The chief gold producers in 1916 were:

Mine.	Tons Ore Milled.	Ounces Gold.	Value.
Hollinger Consolidated ..	601,854	244,139	\$5,046,652
Dome Mines	444,900	103,809	2,142,939
*Porcupine-McIntyre ...	136,489	55,756	1,209,276
Tough-Oakes	39,865	33,991	702,761
Porcupine-Crown	51,273	27,877	575,725
Schumacher	46,463	10,844	244,157
Long Lake	26,846	9,230	187,003
Porcupine-Vipond	43,041	8,508	175,874
Croesus	1,477	2,495	51,578

*Includes McIntyre-Jupiter and McIntyre-Extension.

The Hollinger Consolidated is an amalgamation of the Hollinger, Acme and Millerton mines and Claim 13147 of the Canadian and Mining Finance Company. A merger of the McIntyre, McIntyre-Extension and McIntyre-Jupiter was consummated at the close of 1916, under the name Porcupine McIntyre Mines Limited, the capitalization of the new company being \$4,000,000. Operating cost at Porcupine increased materially during the year, due to labor shortage and high prices of supplies. Although the milling capacity was increased 35 per cent., the increase in production was not as great as it would have been under more favorable conditions.

At Kirkland lake, development has been impeded by a shortage of power. A 65-mile electric transmission line from Cobalt was completed in March, 1917. For some time past the Tough-Oakes mine has obtained an insufficient supply from Charlton, but the Teck-Hughes, Wright-Hargrave, Sylvanite, Lake Shore, and other properties are now supplied, the immediate requirements of the camp being about 2,000 horse power.

The new gold camps at Boston Creek and Kowkash are giving good promise under the development now proceeding. Gold has also been found in Cairo, Powell and Alma townships, an area lying about twenty miles to the north of Elk Lake. The pre-Cambrian formations of northern Ontario offer prospectors as good inducements as any part of the continent, especially for gold.

ONTARIO SILVER PRODUCTION.

During 1916 the total shipments of silver from Ontario mines amounted to 20,007,367 fine ounces of which 91,872 ounces was recovered from auriferous ores, 299 ounces from copper ores and 106 ounces from lead ores. As compared with 1915, the output shows a decrease of 4,816,293 ounces, or nearly 20 per cent. Notwithstanding this, the valuation exceeds that of 1915.

The return to the mining companies was \$12,789,955, or an average of 63.512 cents per ounce. High prices for the metal stimulated production, despite the labor shortage and high cost of materials incident to the war. The average New York price for the year was 65.661 cents per ounce, as compared with 49.69 cents in 1915. The lowest figure in 1916 was 55 7-8 cents, and the highest 77 1-4 cents. The enhanced price of the metal is due chiefly to the great demand from belligerent countries, where silver is being coined at an increased rate to replace gold withdrawn from circulation.

The silver production in 1916 according to camps was as follows:

Casey township	445,900 oz.
Cobalt proper	19,008,517 oz.
South Lorrain	77,280 oz.
Gowganda	383,393 oz.
Silver recovered from gold, copper and lead ores	92,277 oz.
Total	20,007,367 oz.

Since the discovery of silver at Cobalt in 1903 shipments from the camp and outlying silver areas have been as follows:

	Average price, cents per ounce.	Ounces.	Value \$
1904	57.2	206,875	111,887
1905	60.4	2,451,356	1,360,503
1906	66.8	5,401,766	3,667,551
1907	67.5	10,023,311	6,155,391
1908	52.9	19,437,875	9,133,378
1909	51.5	25,897,825	12,461,576
1910	53.5	30,645,181	15,478,047
1911	53.3	31,507,791	15,953,847
1912	60.8	30,243,859	17,408,935
1913	57.8	29,681,975	16,553,981
1914	54.8	25,162,841	12,765,461
1915	49.69	24,746,534	12,135,816
1916	65.661	19,915,090	12,643,175
Total		255,322,279	\$135,829,548

It will be noted from the above figures that the decline in silver production since 1911 has been much less rapid than the rise prior to that date.

OPTION TAKEN ON GRASSY RIVER CLAIMS.

The Pas, Man. Aug. 31.—Walter Neal has taken a two months' option on Grassy River claims situated several miles beyond the McCafferty properties. The claims optioned are five, owned by Burton and Salter, and A. C. Wright, of The Pas, who receive \$15,000 cash, and a quarter interest in the company when formed. The gold vein is said to be 30 to 60 feet wide, and about 2,000 feet in length.

Mr. Neal will put a force of men on immediately to strip and sample. This deal is similar to that of the Rex, owned by the Mines Exploration Co., which company Mr. Neal represents. If the sampling proves satisfactory, a working mine will be established within two years. The property is an ideal one, being situated between two rapids, that will furnish all the power required by the mine, and the Rex Mine could also be electrified from there.—The Pas Herald.

THE BRITISH AMERICA CORPORATION'S SMELTERY.

As announced in our last issue the power problem of the British America Corporation has at last been solved and work is to proceed forthwith on the construction of smelting and refining works at Murray mine. The announcement lends new interest to an article recently written by Mr. E. P. Mathewson, general manager of the Corporation for the "Engineering and Mining Journal." Mr. Mathewson writes in part:

"At first it was thought advisable by the new board of directors to build the smeltery near the mine and the refinery on the Niagara Peninsula, but when the present management investigated data, it was found expedient to change this plan and build the smeltery and refinery adjacent to each other on the site chosen for the smeltery in the first place. Preliminary work has been done, and a force of about 250 men is now at work putting in trackage and building foundations. The machine shop and warehouse are already up and in use. The site is connected by rail to the Canadian Pacific Ry. and the Algoma Eastern systems. The principal ore supply will be from the Murray mine, about one mile distant from the smeltery and connected therewith by standard-gauge railway.

"The ore coming from the mine will be picked on picking belts and screened over 3-4-in. grizzlies. The coarse ore will be smelted in blast furnaces to a 10 per cent. copper-nickel matte; the fines will be added to converter charge.

"The blast furnaces will be four in number, 25 ft. in length by 50 in. wide at tuyeres, but so arranged that if necessary they can be coupled together to give nearly double the hearth area. These furnaces are to be charged from both sides and will tap into the usual settlers, the slag being drawn off into slag cars and transported to the dump by electric locomotives.

"The converter plant will be larger than usual and will consist of seven of the latest type of Pierce-Smith converters, with shells 13 ft. in diameter by 30 ft. long, outside measurements. These will be fitted with the Garr silica gun. A portion of the converter slag will be cast on the converter floor, broken up and used in the blast furnaces as flux. The remainder will be poured into the blast-furnace forehearth for settlement. The converter matte produced will contain about 80 per cent. copper and nickel, approximately 1 per cent. iron, the remainder being mostly sulphur. This will be granulated and taken to the refinery, where it will be roasted in mechanical furnaces of the Wedge type, then leached to extract the bulk of the copper, which will be recovered electrolytically using insoluble anodes. The residue from the leaching will be melted down and cast into anodes which will be electrolyzed by the Hybinette process.

"The smeltery building proper will be 160 ft. wide and 360 ft. long; the refinery building, 225 ft. wide by 400 ft. long. In addition to these buildings there will be provided shops, changehouse, clubhouse, laboratory, general office, warehouse, power house, substation, etc. The capacity of the plant to be installed will be about 2500 tons of ore per day, or a nickel production of 10,000 tons per annum.

"Power will be secured from the Hydro-Electric Commission of Ontario, and all machinery will be operated

by electricity. However, a steam plant of about 1000 h.p. will be required to heat the various buildings and solutions. Steam-generator sets will be used as pressure reducers, the electricity to be used in connection with the main power plant and also for emergency purposes. The main power plant will consist of steam-generator sets, turbo-blowers, electrically driven for both converters and blast furnaces, air compressors, motor generator sets, etc. About 10,000 e. h.p. will be necessary for the operation of the plant.

"Owing to war conditions, causing great scarcity of labor and making it extremely difficult to obtain supplies, it will probably be two years from the date of this publication before the plant will be in full operation. In the meantime a great deal of development work has to be undertaken at the Murray mine to insure a sufficient supply of ore for the smeltery."

BRITISH AMERICA NICKEL COMPANY'S DISCOVERY.

During the past few weeks several papers have printed the following under a Christiania date line:

"The Christiania office of the British America Nickel Corporation received a telegram from a representative of the British Government on the board of directors in Canada to the effect that an important discovery had been made in the Murray mine, the chief mine of the company. It is said a layer 80 feet thick, rich in nickel and copper ore has been discovered."

Evidently this refers to the discovery made in diamond drilling this summer at Murray mine. A hole located 400 ft. south of the known orebody was sunk for the purpose of locating a shaft. The drill encountered excellent ore, in fact better grade than that previously developed. It is not unlikely that this



Murray Mine, where smeltery is to be built.

is an extension of the Murray orebody. If so a very large increase in tonnage has been indicated. In any case an orebody of considerable importance has been found.

An important feature of the new discovery is the fact that the drilling was done between two known orebodies,—the Murray and the Elsie. It may prove that the Elsie is a continuation of the Murray.

The Corporation is controlled by the British Government which hold \$14,500,000 of the \$20,000,000 capital stock and one-half the \$3,000,000 bond issues.

HIGH PRICE OF SILVER EXTENDS LIFE TO COBALT MINES.

The phenomenal rise in quotations for commercial bar silver to a level unprecedented in the history of mining in Cobalt is a factor that is going far to urge the mine operators to force production at the maximum. During the first half of the current year the total output from the Cobalt camp approximated 10,000,000 ounces. The average value of the product was 75.4 cents an ounce thus lending a value of approximately \$7,500,000 to the product. This fine record, in point of ounces produced, is on a par with that during the first half of 1916 and for the time being puts a stopper on the reduction in output that has taken place since the banner year 1911. The value of the production during the first half of the current year shows an increase of nearly fourteen hundred thousand dollars as compared with a similar period in 1916, and with the price having risen above 95 cents an ounce in the early days of the current month there would appear to be every reason to anticipate a still greater record during the last half of the present year.

By usually well informed authorities on world markets and finance, it is frequently predicted that a re-monitization of silver is not improbable. Such a development, having the effect as it would of placing a valuation of upwards of \$1.20 an ounce on the white metal, would serve to make it possible to mine large bodies of low-grade ores and probably serve to make possible the maintenance of an output of around fifteen million dollars annually for some years. Therefore, although the most highly productive days of the camp were those of the past decade, the next may possibly be attended with even greater prosperity.

It is interesting to note that although silver was first mined from Cobalt in 1904, during which year the value of the output was only a little more than one hundred thousand dollars, and the value of the 1905 output was less than one and a half million, there has been mined to date ore worth upwards of one hundred and fifty million dollars. From these actually demonstrated facts it at once becomes evident that Cobalt camp will for considerable time longer hold a prominent place and be a big factor in the silver markets of the world.

The current year's production will perhaps be more valuable than that of either of the three preceding years. During 1915 the price of silver averaged 49.6 cents an ounce. During 1917 it bids fair to average 80 cents or more an ounce. Basing the output at 20,000,000 ounces, every one cent increase per ounce adds just \$200,000 annually to the value of the output. Thirty cents increase therefore means an added value of approximately \$5,400,000 to the value of the year's production.

September 1st, the official quotation for commercial bar silver was 90 3-4 cents an ounce or about 40 cents an ounce above the average for 1915. It is now 95 5-8 cents an ounce. In the order named, the following are the four leading producers in Cobalt:

Nipissing, Mining Corporation, Kerr Lake, and Coniagas. The following performances of Nipissing shows clearly the manner in which production during the current year is being maintained by the Nipissing:

January	\$172,983
February	271,527
March	256,953
April	259,082
May	261,663
June	269,469
July	272,490

The following is a summary of the dividend record of Cobalt silver mining companies to June 30th, 1917:

Summary of total dividends paid to June 30th, 1917 by gold and silver mines of Northern Ontario:

SILVER			
Company	Dividends 1st Half 1917	Total Dividends	Capital Authorized
Nipissing.....	\$900,000.00	\$16,240,000.00	\$6,000,000
Coniagas.....	200,000.00	8,640,000.00	4,000,000
La Rose.....	149,862.70	7,041,571.29	7,500,000
Kerr Lake.....	300,000.00	6,870,000.00	3,000,000
Crown Reserve.....	88,440.70	6,190,840.00	2,000,000
McKinley-Darragh.....	134,861.52	5,011,335.82	2,500,000
Private Corporations.....		3,824,983.30	
Buffalo.....		2,787,000.00	1,000,000
Mining Corporation.....	900,000.00	2,248,750.00	
T. & H. B. (Hudson Bay)...		1,940,250.00	25,000
Temiskaming.....	150,000.00	1,834,156.25	2,500,000
Seneca Superior.....		1,579,817.20	
Trethewey.....		1,111,998.50	1,000,000
Cobalt Townsite.....		966,726.31	
Beaver.....		650,000.00	2,000,000
Wettlaufer.....		637,465.50	1,500,000
Cobalt Lake.....		465,000.00	
Peterson Lake.....	42,031.85	462,350.35	3,000,000
Right of Way Mg. Co.....		324,643.93	
Cobalt Silver Queen.....		315,000.00	1,500,000
Right of Way Mines.....	8,427.50	244,392.50	2,500,000
Caribou Cobalt (Drummond)		225,000.00	
Casey Cobalt.....		202,249.33	
Cobalt Central.....		192,845.00	
City of Cobalt.....		139,321.42	
Aladdin Cobalt.....	50,000.00	50,000.00	
Foster.....		45,774.00	1,000,000
Total.....	\$2,923,624.27	\$70,242,470.70	

PORCUPINE			
Hollinger Consolidated.....	738,000.00	8,034,000.00	25,000,000
Dome Mines.....	300,000.00	1,500,000.00	5,000,000
Porcupine Crown.....	120,000.00	780,000.00	2,000,000
McIntyre-Porcupine.....	361,029.80	361,029.80	4,000,000
Rea Mines.....		12,000.00	
Total.....			

KIRKLAND LAKE			
Tough-Oakes.....	\$65,187.50	\$391,125.00	3,000,000

Summary of total dividends paid to June 30th 1917 by gold and silver mines of Northern Ontario:

Totals	
Cobalt.....	\$70,242,470.70
Porcupine.....	10,687,029.00
Kirkland Lake.....	391,125.00
Grand Total.....	\$81,320,625.50

In addition to the foregoing record, it might be mentioned that the Croesus mine in the township of Munro is understood to be yielding handsome profits, but, as the mine is privately owned, financial statements are not available. The Miller Lake O'Brien mine of Gowganda is another privately owned property now understood to be on a profit yielding basis.

BRIGHT FUTURE FOR GOLD MINES OF NORTHERN ONTARIO.

Due to the high cost of supplies, shortage and inefficiency of labor, high wages and slow delivery of material, the gold mine operators of Northern Ontario have labored under conditions heretofore never experienced in the history of the country. Although the uphill pull has made itself seriously felt for a year or more, the more important mines have been kept in operation. Production, of course, has been permitted to fall off and energy has been largely directed toward aggressive development work putting the various mines in shape to launch out into heavy production campaigns during the post-war era when the expected decline in costs commences.

Taking into consideration facilities for handling and treating ore together with the official estimate of ore reserves, the seven leading mines of the Porcupine camp are in the following order:

Hollinger Consolidated, Dome Mines, McIntyre-Porcupine, Porcupine-Crown, Schumacher, Porcupine V. N. T., and Dome Lake.

In the Kirkland Lake gold area there are two producing gold mines, namely: the Tough-Oakes, and the Teck Hughes. Two others will probably be producing by early next summer, namely: Lake Shore, and Kirkland Lake Gold. In addition to the four mines mentioned, there are two other properties which are on a fair way to qualify for the producing class: they are Wright-Hargraves and La Belle Kirkland. In the Boston Creek gold area there is one producer, the famous Croesus. In Boston Creek field, the Miller Independence is, as yet, the only producer. The following table is an estimate of the grade of ore and probable output based on operations conducted under normal conditions:

Summary of probable production with present milling facilities operating at capacity:

PORCUPINE

Mine	Daily Tonnage	Daily Grade	Daily Production	Monthly Production	Annual Production
Hollinger Con.....	2800	\$8.00	\$22,400	\$672,000	\$8,064,000
Dome Mines.....	1500	5.00	7,500	225,000	2,700,000
McIntyre-Porcupine.	600	12.50	7,500	225,000	2,700,000
Schumacher.....	300	7.00	2,100	63,000	756,000
Porcupine Crown....	180	19.00	1,800	54,000	648,000
Porcupine V. N. T....	120	10.00	1,200	36,000	432,000
Dome Lake.....	100	7.00	700	21,000	252,000
Totals.....	5,600		\$43,200	1,296,000	\$15,552,000

KIRKLAND LAKE

Tough-Oakes.....	120	\$20.00	\$2,400	\$72,000	\$864,000
Teck-Hughes.....	80	10.00	800	24,000	288,000
Totals.....	200		\$3,200	\$96,000	\$1,152,000

MUNRO

Croesus.....	50	\$50.00	\$2,500	\$75,000	\$900,000
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BOSTON CREEK

Miller Independence.	30	\$10.00	\$300	\$9,000	\$108,000
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District	Daily Tonnage	Daily Output	Monthly Output	Annual Production
Porcupine.....	5,600	\$43,200	\$1,296,000	\$15,552,000
Kirkland Lake.....	200	3,200	96,000	1,152,000
Munro.....	50	2,500	75,000	900,000
Boston Creek.....	30	300	9,000	108,000
Totals.....	5,880	\$49,200	\$1,476,000	\$17,712,000

Thus, with the foregoing record of past operations, not forgetting the increased facilities for treating exceedingly large tonnages of ore, and with the official estimate of ore reserves at the gold mines of this district ranging upwards of seventy-five million dollars and with probabilities of this figure being multiplied, the future of gold mining in this district would indeed appear to be fraught with exceptional opportunities.

During the first half of 1916 the production of gold from the mines of Ontario, principally Porcupine and Kirkland Lake was as follows:

	Ounces	Value
For the first half of 1917 it was.....	235,060	\$4,822,740
	228,673	4,586,941
Decrease.....	6,387oz.	\$235,799

The fact that, despite extremely adverse conditions, production was so well maintained, would appear to offer reason for anticipating exceptionally favorable developments as conditions at the mines improve. With the expected improvement in labor supply and reasonable costs of material the production of gold will far surpass all previous records in the history of gold mining in Ontario. The gold mining industry of Northern Ontario is less than ten years old. The next decade will witness wonderful development for there is much ore already proved and the chances of finding more ore are excellent.

At the present time there is a shortage of nearly one thousand men in the gold camps of the north and with this fact in mind it would appear unfair to compare the estimate of the current year's output with that of 1916 during the latter year of which the laboring forces were comparatively satisfactory. Of course, taking into account the ore reserves at the end of 1916 and the probable ore reserves at the end of the current year, the comparison would be altogether quite satisfactory. At the present rate of operation the total ore reserves of Porcupine alone will by the end of 1917 approximate seventy-five million dollars, something like one-half or more of which belongs to Hollinger Consolidated.



A Gold Quartz Outcrop, Hollinger Mine.

MOND EMPLOYEES' PATRIOTIC CONTRIBUTION.

The second year of the united efforts of the employees of the Mond Nickel Company, Ltd., to assist in a methodical way, Patriotic and Red Cross endeavors, came to a close July 31st. The total contributions for the year amounted to the handsome sum of \$17,282, a decrease as compared with last year, when the amount was \$21,880. The total systematic contributions at Coniston show a substantial increase. Local committees at each mine, etc., direct to what objects the contributions shall be paid.

THE FLOTATION LITIGATION.

Boston—In reply to inquiries of the Boston News Bureau concerning various phases of the litigation which the Minerals Separation Co. has brought against prominent mining companies, Counsel Henry D. Williams for the Separation Co. says:

"As to the importance of flotation to these companies the best evidence is the fact that they have extensively used it at the risk of being held as trustees for the patent owners and compelled to pay all their profits from flotation to the patent owners. They have no legal right to continue such use and there is no escape from their liability for the past, even should they now discontinue the highly profitable use of flotation.

"As to your suggestion that the Supreme Court decision of last December limited the patent to the use of a fraction of 1 per cent. of oil, the fact is that the Supreme Court very carefully avoided such a limitation. Instead of saying that the patent must be confined to the use of oil within proportions amounting to a fraction of 1 per cent. on the ore the Supreme Court said: 'The patent must be confined to the results obtained by the use of oil within such proportions, and Judge Bourquin has interpreted this as meaning the results obtained by the beneficial use of a fraction of 1 per cent. of oil and has held that all of the operations with 1 per cent. or more of oil which were proved at the Butte trial involved the wasteful, useless and even injurious addition of inert or ineffective amounts of oil in excess of a fraction of 1 per cent. Judge Bourquin says:

"Patent law is not concerned with the useless, and a valuable result sought is not 'obtained' by the use of an excess of an essential ingredient, which excess renders no or ill-service. From the evidence it appears the larger part of the oil used by defendant and all in excess of a fraction of 1 per cent. on the ore, if not inert is ineffective, wasted, and injurious to the process and results."

Judge Bourquin further says that the Butte & Superior Mining Co. on its own reports shows a loss of \$1.75 per ton of ore on 45,000 tons monthly in its operations employing 1 per cent. or more of oil as contrasted with its operations using 1.43 pounds of oil to the ton of ore (less than one-tenth of one).

Judge Bourquin says in conclusion (and this has been partly and not quite accurately published from telegraphic reports):

"Defendant uses the patent process, uses plaintiffs' invention of ore concentration by air bubble flotation, uses the same elements in the same combination in the same way with the same function to the same but poorer results; and exceeding the patent claims in reference to one ingredient (oil), uselessly, wastefully and injuriously and merely with intent to avoid the letter of the patent, does not avoid infringement. The addition of the excess oil no more adds to or changes the process, no more avoids infringement than would the addition of milk or other useless substance not a part of the process. The excess oil exercises either no function or less efficiently exercises the same function in the same way as the limited oil, and to the same but poorer results. To secure to patentees their invention, the law looks quite through mere devices and forms to the substance of things. And if in substance the invention is taken, if the thing that does the work is taken, all devices to evade the letter of the patent avail nothing to escape the consequences of infringement. Neither principle nor au-

thority to the contrary is cited or known to the court."

Judge Bourquin's decision was reached after most careful and elaborate arguments as to the meaning of the decision of the Supreme Court in the Hyde case, and it applies the findings of law by the Supreme Court in the Hyde case to the facts as proved in the Butte & Superior case.—Boston News Bureau.

MIAMI WILL NOT APPEAL.

Wilmington, Del.—A mandate was filed in United States District Court here Monday afternoon by United States Circuit Court of Appeals for third circuit, in suit of Minerals Separation, Ltd., of Great Britain, vs. Miami Copper Co., a Delaware corporation. The mandate directs the District Court to enter a decree in accordance with opinion of the Circuit Court.

The suit, begun in the District Court here several months ago, was based on alleged infringement by defendants of three patents on flotation process for mining copper, lead and zinc. The devices of English origin are patented in America, hence the suit.

Opinion of District Court held that the first two patents were infringed, but considered the third patent invalid. The Circuit Court sustained the lower court as to the first two patents and also held that the third was valid and was infringed, making a complete victory for the plaintiff.

Notice was given of appeal to Supreme Court of the United States, but recently the Circuit Court was informed it had been decided not to take an appeal; hence the mandate to the District Court. A decree will be entered accordingly, and the case will proceed to an accounting to ascertain damages and profits.

While amount immediately involved is probably not more than \$2,000,000 or \$2,500,000, many more millions are indirectly concerned, as the same device, it is understood, is or has been in use by a large number of other mining concerns, though they are not defendants in this suit.

Effect on Companies Using Flotation Process.

The "Boston News Bureau" quotes Henry D. Williams, New York counsel for the Separation Co., concerning various phases of this all important litigation, in part as follows:

"The effort of the Miami Copper Co. to reach the Supreme Court having been abandoned, two proceedings follow as mere matters of form and inevitably. One is a permanent injunction against the Miami Copper Co. restraining further infringement of the three patents in suit, the first patent for flotation with the use of a small quantity of oil, the second patent for flotation with the use of a solution frothing agent dissolved in the ore pulp, and the third patent for flotation with the use of phenol or cresol in the cold and without acid.

"In my opinion this will absolutely prevent the use of the flotation process in any form, with Callow cells now installed, or with any other contrivances. The comfort which Mr. Callow has derived from the opinion of the Philadelphia court has been solely based upon what that court said as to the oil patent. That court said as to the solution patent that the claims "are not confined to a particular device or a particular degree of agitation" and that the means for bringing about the agitation are "described in terms that are wide and inclusive," and then, quoting the specification itself:

"The air or other gas is to be "liberated in, generated in, or effectively introduced into the mixture," in order that the ore particles may come into contact with the gas and as a result may float to the surface in the form of a froth or scum which can be separated afterwards by any well known means. The object of introducing the air or other gas into the mixture is such agitation of the pulp as will produce the desired froth, but the claims are not confined to a particular device or a particular degree of agitation."

"I may further add that the difficulties which the Philadelphia Court experienced as to the limitation of the first or oil patent to some particular degree of agitation were all swept aside in the Butte case and shown to be directly contradicted by the very terms of the patent itself.

"As to the accounting, the plaintiff is entitled to all of the profits attributable to the infringing acts. The Miami Copper Co. added flotation at the tail end of its plant to recover metal from material formerly thrown away. All of that recovery is therefore due to flotation, and Minerals Separation, Ltd., is entitled to all of the profits of that recovery.

"The Miami Co. has filed in court sworn reports covering the period from Oct. 5, 1916, to the first of August and showing that the total value of the concentrates recovered by flotation during that period was \$2,765,672. They commenced to use flotation in December, 1913, and thereafter put in their pneumatic or Callow plant, and commenced to operate this in August, 1914. We roughly estimate that their total recoveries in flotation amount to \$5,000,000, that the costs of flotation were very small indeed, and the difference between the actual cost and the value constitutes the profits due to infringement to which Minerals Separation are entitled.

"The accounting will proceed before William H. Mahaffy, the clerk of the court, who has been appointed master by consent of parties to conduct these proceedings. He will summon the defendant before him and proceed to a complete examination of their accounts for the purpose of determining the profits due to infringement. He will have full access to all of their accounts, and can call before him any of their officers and employees to obtain the necessary information. The accounting will be comparatively simple.

"The master's report will be filed, and after approval by Judge Bradford an appeal can be taken to the Court of Appeals, which will, however, only consider questions involved in the accounting. This decision will be final and unappealable, although the losing party will have the right to ask the Supreme Court to call the case up for review.

"In the meantime, however, the Miami Co. will be under injunction, and the most that it can do is to pile up in dumps, subject to deterioration, the valuable tailings from its water concentration plant now treated by flotation and go back to the conditions which prevailed in the plant before flotation was adopted. The patents in suit expire respectively Nov. 6, 1923, June 28, 1927, and June 9, 1931. Until these patents expire the Miami Co. will be absolutely bound by the injunction and can use flotation only with the consent of the owners of the patents.

"In the Butte and Superior suit the sworn reports filed in court by the defendant covering the period from Nov. 1, 1913, to date, show profits of about \$20,000,000 due to flotation. In this instance, the costs of operating the flotation plant appear in the statements and show that they are considerably less than 6 per cent. of the value of the concentrates.

"The Utah, the Chino and the Ray proved their flotation operations with complete tabulated statements in their efforts to help the Butte & Superior Co., so they have supplied evidence of their infringement and its extent. The monetary values have not yet appeared, but will undoubtedly be very large. The fact that the Nevada Consolidated has also infringed was also proved although here the details have not appeared.

"Under the patent laws the patentee is entitled to all of the profits due to the infringement. If, for any reason, the profits cannot be determined, then he is entitled to damages, and the best measure of damages is the royalty usually charged to licensees. Obviously a court will not compel a patentee to take from an infringer merely the compensation willingly given to him by licensees except as a last resort in the event that the profits due to infringement cannot be determined. Had the Jackling group of mines taken licensees, as have the Anaconda, the Inspiration, Senator Clark's and many other mines, they would merely have had to pay reasonable royalties, but as it is, they are faced with a heavy liability for their unlawful acts, as well as the prospect of being deprived of the benefits of flotation during the terms of the controlling patents."

ANOTHER VICTORY FOR MINERALS SEPARATION CO.

A decision in favor of the plaintiffs has just been rendered in the case of Minerals Separation, Ltd., and others against Butte & Superior Mining Co., which was tried at Butte, Montana, during April and May last before Judge Bourquin in the United States District Court. The trial lasted five weeks.

The patent had already been sustained in the Supreme Court of the United States and covers the well known flotation or bubbles process of concentrating ores with the use of a small quantity of oil. The principal contention of the defendant was that infringement of the patent was avoided by using an amount of oil greater than a fraction of 1 per cent. of the ore, to wit, 20 pounds or more of oil to the ton of ore.

Testimony was given in behalf of the defendant of operations by the defendant and by other companies of the Jackling group of mines, to wit, Utah Copper Co. at its Arthur and Magma plants, Chino Copper Co. and Ray Consolidated Copper Co., these operations having been carried on with a fraction of 1 per cent. of oil before the decision of the Supreme Court in December last sustaining the patent, and with 1 per cent. or more of oil after that decision.

These operations involved the treatment of great tonnage. The court finds the patent was just as much infringed by the operations employing more than 1 per cent. of oil as by those employing less than 1 per cent. of oil. The opinion is in part as follows:

"The defendant uses the patent process, uses the plaintiff's invention, uses the same elements in the same combination in the same way with the same furniture to the same but poorer results and exceeds the patent claims in reference to oil uselessly, wastefully and injuriously, merely with intent to avoid infringement. To secure to patentees their invention the law looks quite through mere devices and forms to the substance of things, and if in substance the invention is taken, all devices to evade the letter of the patent avail nothing to escape the consequences of infringement."

The opinion directs an injunction, and the recovery of damages and profits to be determined by an accounting.—Boston News Bureau.

THE CROESUS GOLD MINE.

Mr. E. L. Steindler, in the Sept. 1 number of the Engineering and Mining Journal says concerning development of the Croesus property:

On the Dobie claim there existed a spectacular high-grade outcrop, which the owners of the claim had covered with a steel plate, which they kept bolted down and locked, to prevent "high-grading." The initial operations consisted of sinking a prospecting shaft on the vein, and about 30 ft. from the high-grade showing. After sinking 14 ft., ore was encountered equally as rich as the surface showing; this continued down to the 200-ft. level, the shaft alone producing approximately \$1000 to the foot. The vein is a quartz vein with an average width of 2½ ft., and lies comparatively flat, the dip being only about 20 degrees from the horizontal.

The gold in the vein is free and coarse. In the first 200 ft. of the mine, no gold occurs that is not visible to the naked eye. Unless free gold can be seen, the vein rock is practically barren. The gold occurs like plums in a pudding, but in sufficient quantity to make the average grade extremely high.

During the time the mine was being opened, the high-grade ore was picked out by hand and crushed in a mortar, and the resulting gold amalgamated directly and melted. This produced bullion 910 fine in gold, with about 60 points in silver. The richness of the ore can be best described by saying that of 746 lb. of rock hoisted at one particular time, approximately \$47,000 in gold was produced. All the ore is practically specimen ore. For example, one piece weighing 1 lb. 15 oz., avoirdupois, contained \$292.68 worth of gold, the value having been determined by submersion in water, taking account of the differences in specific gravity. The Ontario Government purchased five pieces of this ore which contained \$10,000 in gold.

Geologically, the high concentration of the gold seems to have been influenced by a shear zone. Aside from this property, none of the surrounding claims has as yet shown any likelihood of being productive. Development has now been carried to the 300-ft. level, at which point the vein has dipped under the shaft, and a crosscut to the vein is being driven. The length of the oreshoot is approximately 80 ft. A small mill has just been completed, consisting only of a picking belt, a 4½-ft. Hardinge mill and amalgamating plates. The high-grade and oversize waste is picked off the belt, the fines being crushed and passed over the amalgamating plates. On the dumps are several thousand tons of rejects from the earlier development, which will undoubtedly run \$40 per ton.

The occurrence of this high-grade ore has been misstated in previous descriptions, when described as nuggets, as it is really free-gold in the quartz, but highly concentrated as herein described.

KERR LAKE.

Kerr Lake Mining Co. produced 200,855 ounces of silver in August, against 189,392 in July, 251,367 in June and an average of 215,500 for 12 months ended Aug. 31.

ONTARIO SMELTING CO.

Ontario Smelting Co. has just been organized and a site purchased near Joplin, Missouri, for immediate construction of a lead smelter of 600 tons weekly capacity, which is about half the weekly lead production of the district.

TEMISKAMING ORE RESERVES.

Mr. Balmer Neilly of Cobalt recently examined the Temiskaming mine to estimate ore reserves. He summarizes the positive ore as of Aug. 6, 1917 as follows:

Broken ore.—Assuming 20 cub. ft. broken ore—one ton and assuming mean widths of stopes just above ore and at timbers as the average cross section width.

Vein	tons	tons
No. 19—400-ft level	2,156	
No. 19—500-ft level	6,461	
No. 21—500-ft. level	1,246	9,863
<hr/>		
No. 2—300-ft. level	50	
No. 8—575-ft. level	25	
No. 3—500-ft. level	800	
No. 6—650-ft. level	150	
No. 8—575-ft. level	180	
No. 10—835-ft. level	50	
No. 15—400-ft. level	150	1,405
<hr/>		
No. 19—530-ft. level	150	
No. 19—575-ft. level	30	180
<hr/>		
		11,448
Ore in place—		
No. 19 Pillar above 400-ft. level.....	80	
Pillar above 500-ft. level.....	44	124
<hr/>		
Total		11,572

"Since the silver is almost wholly contained in vein matter scattered in coarse pieces throughout the stopes it is manifestly impossible to give anything more than an approximate estimate of ounces contained. In my judgment, based upon sampling and a mill run where we used about 2 per cent. of the first 9,863 tons listed, the whole tonnage shown should produce between 400,000 and 450,000 ounces."

With the exception of a very small pillar standing on the North boundary the present positive ore reserves are all broken. The silver contained is for all practical purposes confined to the vein matter, coarsely distributed through the stopes.

In submitting his estimate Mr. Neilly emphasizes that he refers only to 'positive' ore. He says further:

"The first work undertaken was that of measuring up the stopes and such ore in place as was apparent. Appreciating fully that I must be in a position at the time this report was presented to state that nothing had been overlooked in the way of reserves, a thorough examination of the mine was forthwith begun, careful sampling being undertaken wherever the slightest possibility of ore was apparent. In the course of this work practically every vein and stringer in the mine was examined. The veins were broken along the backs of the drifts, in the walls and wherever exposed. In places samples were taken at regular intervals and, where the vein matter looked particularly barren, at such places as were in any way mineralized. In this manner between 600 and 700 samples were taken and the results obtained are shown in detail on the sample plan. Nothing that approached the significance of ore was found. Those cases where assays are high represent a small portion of the vein left in a small pillar or arch, or an isolated sample that has probably had consideration from your staff."

"Attempting to sample the top of No. 19 stope above the 400-ft. level we found that the muck exposed was



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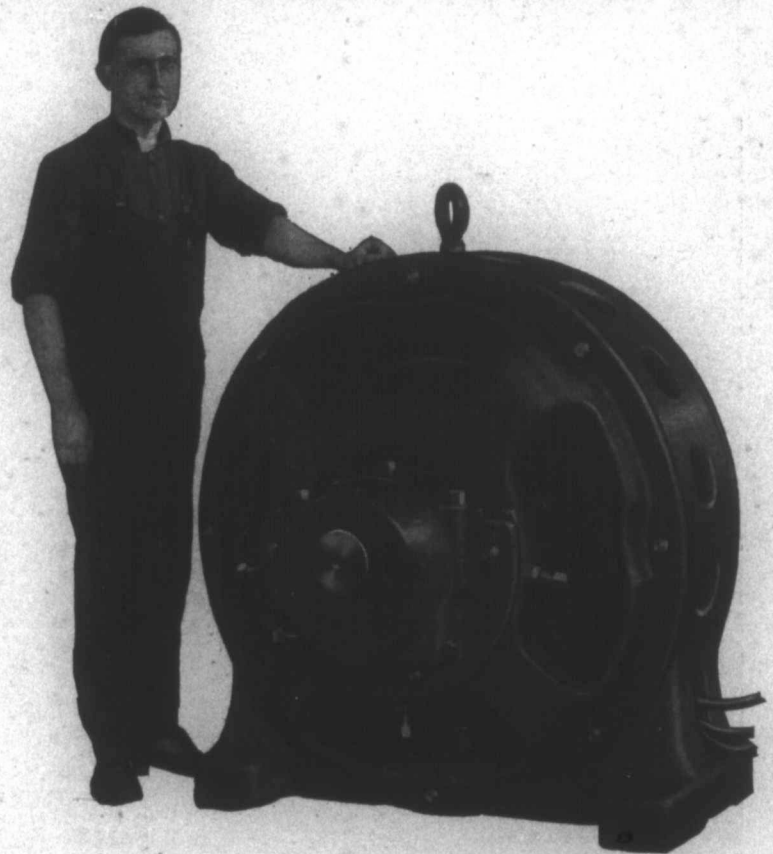
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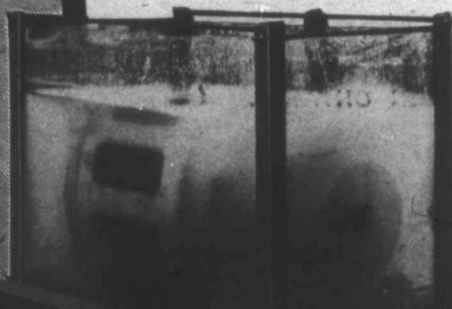


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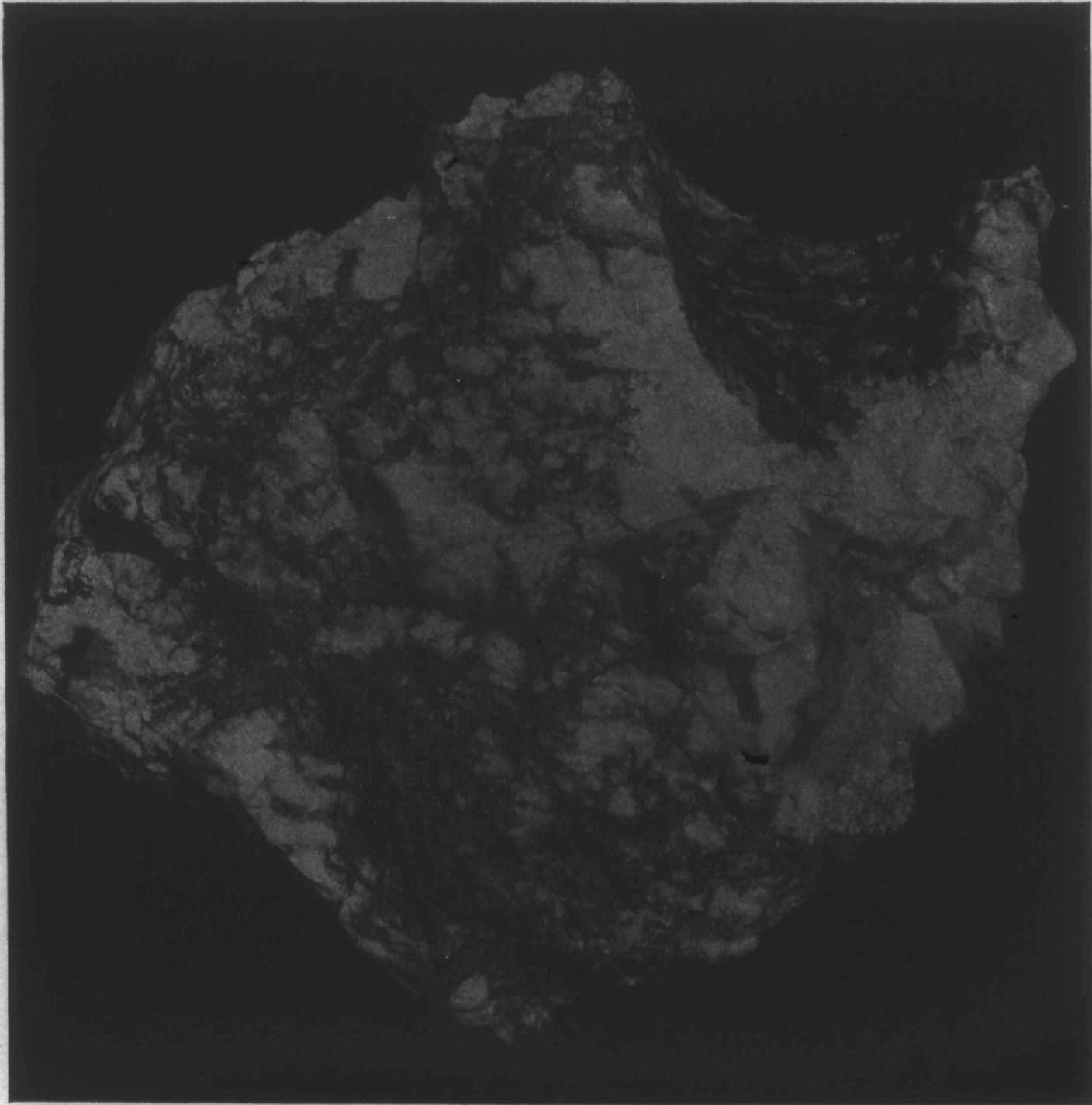


RICH GOLD ORE FROM AN ONTARIO MINE.

During the past few years Ontario has, thanks to the Porcupine and Kirkland Lake districts, become an important producer of gold. In the Hollinger, Dome and McIntyre mines the province has three of the largest gold producers in America.

natural size. The drill mark in the upper right corner shows how the drill holes are in places almost lined with gold. The specimen is, by weight, over one-third gold.

On the opposite page we reproduce photographs of five pieces of Croesus ore. These are shown considerably reduced in size. These five pieces of ore have been



GOLD ORE FROM CROESUS MINE, NORTHERN ONTARIO.

(Actual Size.)

This ore is over one-third gold.

Less well known outside of Northern Ontario is the wonderful Croesus mine in Munro Township, twelve miles from Matheson on the T. & N. O. Railway. Here some of the richest ore ever mined is being taken out.

On this page we reproduce in colors a specimen of rich ore from the Croesus. This specimen is shown

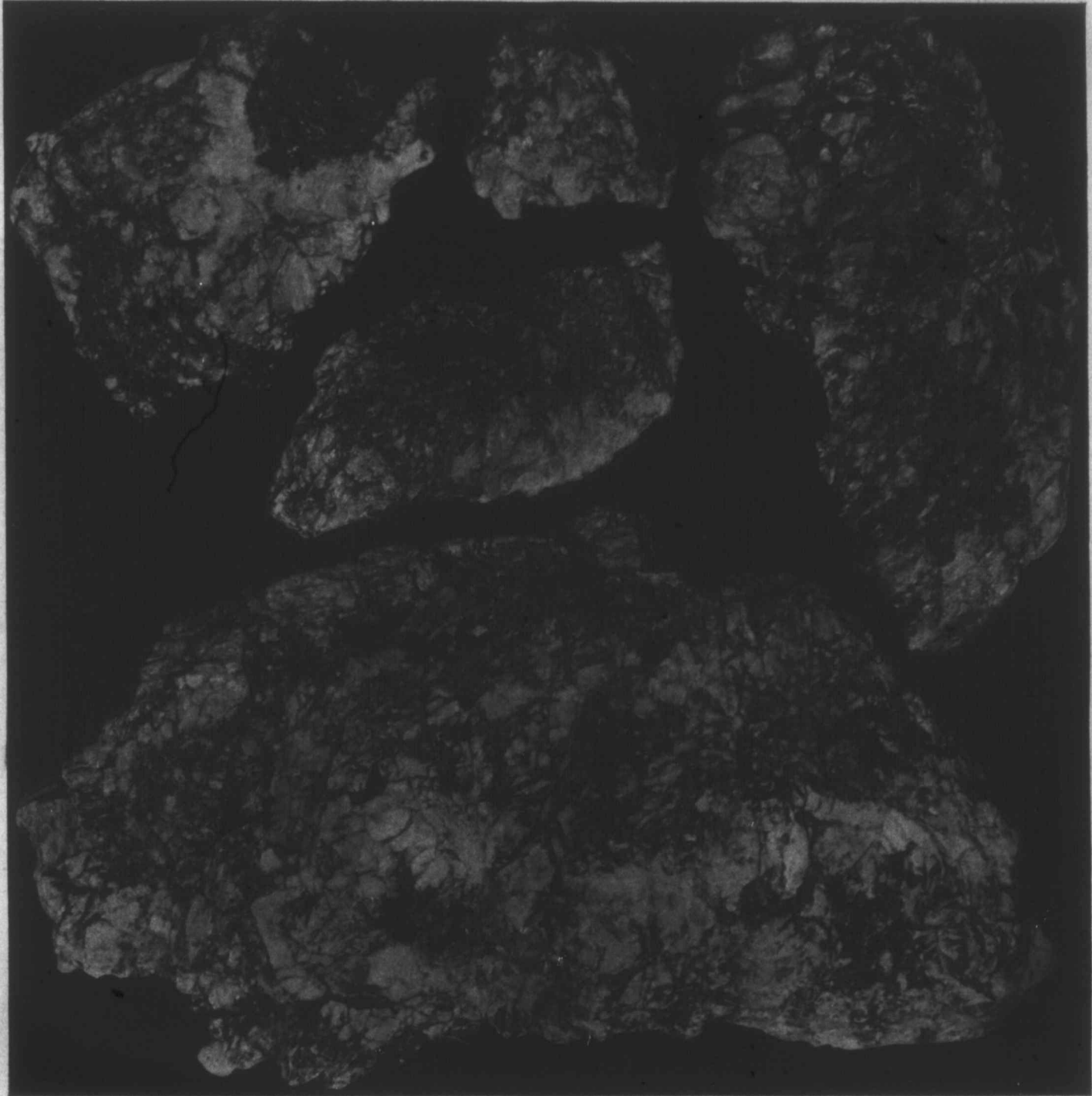
purchased by the Ontario Bureau of Mines and have been carefully weighed. They together weigh 38,689 grams and contain 16,431 grams gold and silver. This is equivalent to 528.28 oz. gold and silver, of which 480.7 oz. is gold and 47.5 oz. is silver. The value of the gold and silver in the five pieces, which together weigh about 85 lb., is therefore about \$9,966.

It is not to be imagined that all of the Croesus ore is like these specimens, for the deposits are very pockety. There is, however, a considerable quantity of such rich ore in the vein.

The vein has an average width of 3 ft., and there are values in the wall rock for one foot on each side of the vein. In places serpentine bands cross the vein,

the property and began development work in 1915. The results were phenomenal. A shaft was sunk on the vein and from this shaft above the 100-ft. level \$120,000 in gold was taken out in sinking operations. In a few months about \$1,000,000 worth of ore was partially developed with a small prospecting outfit.

On July 29th, 1916, the plant was totally destroyed



GOLD ORE FROM CROESUS MINE, NORTHERN ONTARIO.

The specimens are much larger than here shown. One of the smaller pieces is shown actual size on the opposite page.

The 5 pieces together weigh about 85 lbs. and contain gold and silver valued at \$9,966.

which strikes north and south and dips to the east at an angle of 26 degrees.

The property now known as the Croesus was for some time known as the Dobie-Leyson claim. It was considered a good prospect; but little work was done on it until the Dominion Reduction Company acquired

in a disastrous forest fire. It has since been rebuilt and mining and milling have been resumed.

The high-grade ore mined is reduced to bullion in an oil-burning furnace. The quartz remaining after the high-grade is picked out runs quite high. Mill tests on the decantation process show a 99 per cent. extraction.

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practically all wall rock scaled from the walls, and sampling under these conditions was out of the question. However, we were able to sample the top of the stope on the same vein above the 500 ft. level and results so obtained would indicate an average value per ton of 67.1 (sixty-seven one-tenth) ounces. Next we sampled No. 21 stope above the fifth level getting an average grade of 16.9 (sixteen and nine-tenths) ounces.

"The second item listed of 1,405 tons is distributed throughout the mine in small quantities and derived mostly in the work of prospecting old pillars and relatively small shoots of ore. The low grade and quantity of this ore is such as would not warrant the expense of sampling and to it we have attached a nominal value of 8 (eight) ounces per ton.

"The vein matter in the pillar was sampled and results thus obtained, assuming a stope width of 5 ft. would indicate 112 (one hundred and twelve- ounces to the ton of rock broken.

"This work completed, we calculated the tonnage resting above each chute in the first three stopes listed and drew from each chute a proportionate amount of that tonnage (roughly 2 per cent.) thus getting a calculated amount of 194.6 tons. This ore was drawn and hoisted under my supervision. It was first passed over the bumping table, where the crude ore was recovered, and after crushing trammed to the mill and concentrated in the usual manner. The crude ore and dry concentrates were sampled and assayed with the following results:

From Rock House.	High Grade.....	1,691 lbs. at 7,233.3 ozs. per ton	6,115.7
From the Mill.	Jigs.....	408 lbs. at 5,500.0 ozs. per ton	1,122.0
	Sands	2,778 lbs. at 2,128.4 ozs. per ton	2,956.3
		736 lbs. at 369.5 ozs. per ton	135.9
	Slimes		
	Total recovery. Gross ounces.....		10,329.9
Tons treated—194.6			
Average ozs. per ton recovered 53.			
	Crude		31.4
	Concentrates		21.6
			53.

"Assuming for the time being that this figure of 53 represents the average ounces per ton in the first 9,863 tons and that the values of the other reserves listed are as outlined above, we tabulate as follows:

	ozs.
9,863 tons at 53 ozs. per ton	522,739
1,405 tons at 8 ozs. per ton	11,240
180 tons at 15 ozs. per ton	2,700
124 tons at 112 ozs. per ton	13,888
11,572 tons containing.....	550,567

"Before, however, accepting these figures as final, certain important factors must be noted and given due consideration.

I. Scaling operations have diluted No. 19 stope above the 400 ft. level to an extent impossible to determine.

II. The ounces per ton in crude ore recovered stands at 7,233 whereas the average of crude ore actually sorted out and shipped from this stope approximates 5,000 ozs. per ton. Moreover, of the crude ore recovered (1,691 lbs.) about one-third was contained in three large pieces of very rich vein matter that should possibly be considered as erratic.

III. Information supplied by the management is to the effect that "the No. 19 stope above the 500 ft.

level containing most of the high grade ore was mined the greater part of the way up as a back stope and the high grade ore thus broken, sorted out and shipped. Later, the balance of the stope, possibly 20 per cent. was broken as a breast stope and from this little or none of the high grade vein matter has yet been extracted."

"Under these circumstances the ore now running from the chutes is probably higher in grade by reason of the crude ore contained than the average for the whole stope.

"Hence I believe that the recovery from the crude ore as indicated by mill run is excessive, and could not be safely applied to the whole 9,863 tons. The final recovery from the crude may not exceed 50 per cent. of the figure so indicated, consequently I estimate the probable recovery from the 11,572 tons at from 400,000 to 450,000 ounces gross."

TEMISKAMING.

There was a fair gathering of shareholders at the special meeting of the Temiskaming Mining Company in Toronto on Sept. 6, and it was evident that the dissentients were of sufficient strength with their accumulated proxies to carry any resolution which appealed to them. The power was not exercised, however, except to amend certain by-laws relating to the registration of proxies and the length of notice required for an annual meeting, which some critics of the administration were inclined to think unduly favored the existing board.

The wishes of the holders of the proxies were also met in the appointment of Douglas Mutch of the Hudson Bay Mine, who will make a third analysis of the property for the benefit of those who desire more information than that provided by the Balmer-Neilly report. Another outcome of the meeting was the declaration of a three per cent. dividend payable on October 3.

CANADA COPPER CORPORATION.

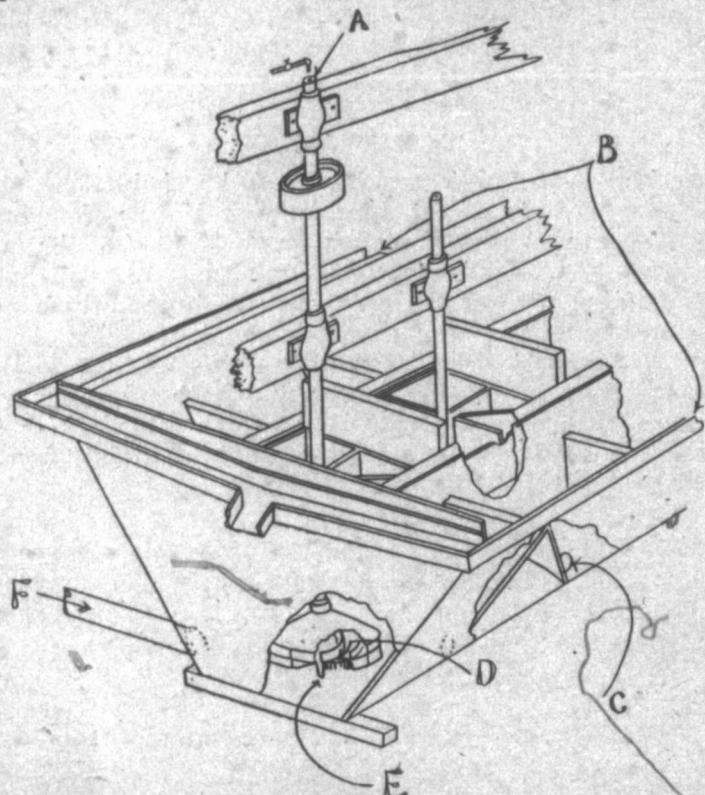
Canada Copper Corporation has developed 10,000,000 tons of ore with 2,000,000 tons additional probable ore, all averaging 1.74 per cent. copper and carrying 35 cents per ton in gold and silver.

President Mayer estimates that with the treatment of 1,000,000 tons of ore annually the production should approximate 27,000,000 pounds of copper, resulting in earnings of \$1.62 a share on 20-cent copper and assuming all bonds converted. 15-cent copper, on the same basis, should yield earnings of 85 cents a share. He further states that a recovery of 90 per cent. is expected in regular operations through the use of flotation. Actual savings very close to this figure have been made on experimental runs. With operations conducted on the basis of 3000 tons of ore daily the management estimates a cost of 9½ cents a pound.—Boston News Bureau.

THE GROCH FLOTATION MACHINE.

Mr. Frank Groch, of Cobalt, has been demonstrating at the Toronto Exhibition the operation of the Groch Centrifugal flotation machines, several of which are in use at Cobalt.

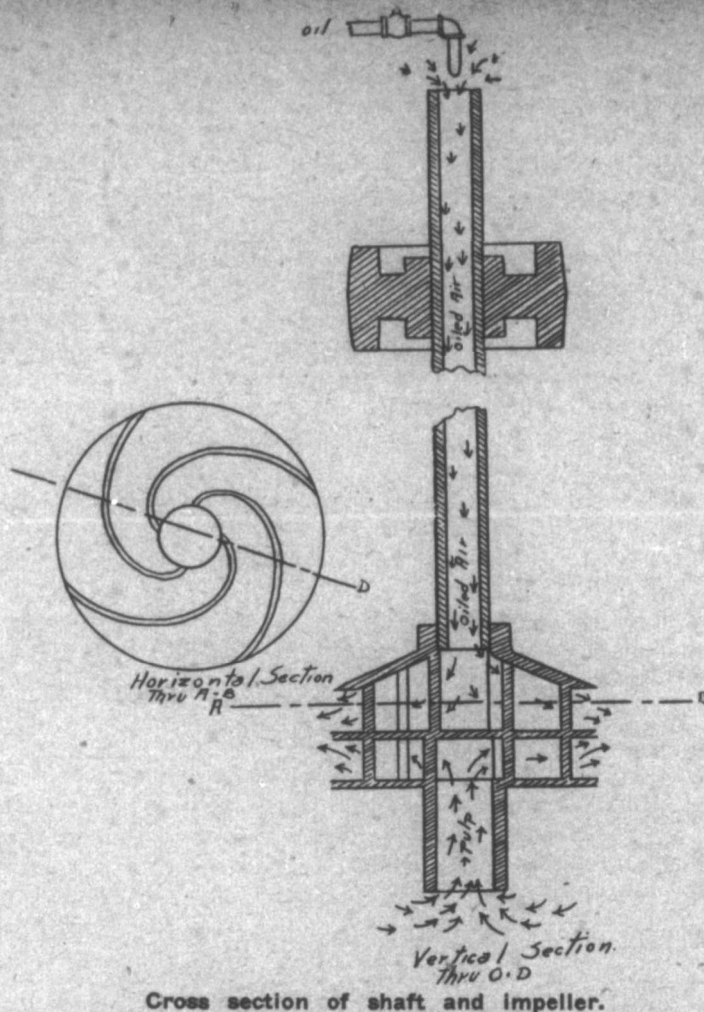
The Groch flotation plant consists of a tube mill for grinding ore and an oil flotation machine for recovering the valuable minerals. The ore is fed into the tube-mill, along with a small quantity of water, by means of a revolving scoop. The actual grinding is performed by steel balls or hard flint pebbles in the cylindrical body.



- A. Suction intake through hollow shaft for air and oil.
- B. Overflow launders to cleaners.
- C. Settled pulp discharged into next compartment.
- E. Pulp drawn through hollow shaft and discharged through impeller.
- D. Oiled air discharged into pulp through upper impeller.
- F. Pulp intake pipe.

From the tube-mill the ground ore in the form of flowing pulp is fed into the first compartment of the Groch Centrifugal Flotation Machine by means of a pipe. Here it is sucked into the lower part of the first impeller. A minute quantity of a light oil is dropped through the hollow shaft of this same impeller and, falling into the upper part of the impeller, is atomized and dispersed through the large volume of air which is sucked down simultaneously through the same channel.

The pulp, and oiled air are ejected together through the impeller at its periphery. During the process, the most easily floated minerals become smeared with oil while the air performs an action similar to that of blowing soap bubbles. The combination of oil, air and mineral then floats to the surface in the form of a scum and overflows to a suitable receptacle. The residue from this first operation is sucked into the second compartment of the Groch Centrifugal Flotation Machine. The system of treatment is repeated in the second impeller using the same or a different class of oil depending on the ease or difficulty with which the remaining minerals may be recovered.



Cross section of shaft and impeller.

By the Groch system of oil flotation it is possible to recover, by preferential selection, various minerals, each in turn, from a complex ore by using different oils or oil mixtures during treatment.

INTERNATIONAL NICKEL CO.

Preferred and common stockholders of International Nickel Co. are in receipt of notice from voting trustees that voting trust agreement under which preferred and common stock has been deposited since Sept. 6, 1912, has expired. Stockholders are requested to deposit with Bankers Trust Co. their voting trust certificates, for which certificates of stock will be issued.

A publication which should prove of considerable interest to the prospective settler to Western Canada has just been issued by the Natural Resources Intelligence Branch of the Department of the Interior. It is known as the "Homestead" Map and shows graphically the exact location of each quarter-section which is still available for entry under the free Government offer of 160 acres.

GRANBY IS PROSPERING.

Boston, Sept. 11.—Results of the Granby Consolidated Copper Co. for the past fiscal year will be known to stockholders during the coming month when the annual report for the year ended June 30 last will have been prepared for presentation at the annual meeting in October. It will show earnings of about \$35 per share, against \$9 paid in dividends, as compared with \$25 earned in the previous fiscal period.

Construction and improvement expenditures were heavy during the past year, and these will be continued during the present year. It is not improbable that the fiscal year will be changed to end December 31.

PERSONAL

Mr. Chas. Boyle, resident manager for the Canadian Klondike Company, has returned to Dawson, Yukon Territory, after having spent the winter "on the outside."

Mr. John Cannon, formerly superintendent of the Consolidated Mining and Smelting Co's No. 1 mine, in Ainsworth camp, British Columbia, is now directing operations in connection with the development of the Lavinia property, situated near the head of Kootenay lake, which the company recently acquired under option of purchase.

Mr. Trevor W. Starkey, of Nelson, B. C., lately contributed to a western mining publication, an article descriptive of parts of the Kamloops-Ashcroft-Nicola country, in British Columbia.

Mr. J. B. Tyrrell, was in the Hazelton region of the Omineca mining division of British Columbia last month. He has returned to Toronto.

Mr. Dudley Mitchell, of Victoria, B. C., instructor in First-Aid and Mine-Rescue work for the Provincial Department of Mines, recently examined six men at Anyox, B. C., who had taken the mine-rescue training course and will now be available for service in the Granby Co's. Hidden-Creek mine.

Mr. J. D. Galloway, of Hazelton, resident mining engineer for the northeastern District of British Columbia under the Mineral Survey and Development Act, recently examined quartz properties on Prosperine mountain, in the neighborhood of Barkerville, Cariboo district.

Mr. T. Briggs has been elected president of District No. 18, United Mine Workers of America, in place of Mr. Wm. Graham, last years president. District 18 comprises the larger part of the coalfields of Alberta and the Crowsnest district of British Columbia.

Mr. Geo. O'Brien and Mr. T. H. Williams, two district mine inspectors for the British Columbia Department of Mines, who have been stationed at Fernie, Crowsnest district, have resigned to take other positions. Mr. O'Brien has been appointed superintendent of the No. 4 mine of the Canadian Collieries (Dunsmuir) Ltd., Cumberland, Vancouver island, and Mr. Williams superintendent for the Crow's Nest Pass Coal Company at its Michel colliery, in southeast Kootenay, British Columbia.

Mr. John A. Dawson is in Vancouver, where he has charge of the laboratory of the Inland Revenue Department. An article by Mr. Dawson on the recovery of potash from feldspar, was published in a recent number of the "Canadian Chemical Journal."

Mr. Wm. Green who returned to Toronto last year after being for some time at Ironwood, Michigan, is now on the staff of the Provincial Analyst, Queens Park.

Dr. R. B. Stewart who was for some years connected with the Mining Department, University of Toronto, and who reported on some mining areas for the Ontario Bureau of Mines, has been doing post graduate work at Johns Hopkins University.

Dr. W. G. Miller is visiting mining districts in Northern Ontario. Recent discoveries in Rickard and Thackeray townships, near lake Abitibi will be among the properties examined by Dr. Miller and Mr. P. E. Hopkins of the Bureau of Mines.

Dr. Robert H. Clark, professor of chemistry in the University of British Columbia, was in Toronto last week. Prof. Clark is a graduate of the University of Toronto. He had been in the United States for some years before going to British Columbia.

Mr. H. S. Robinson, manager of the Trethewey Silver-Cobalt mine has been given a three months leave of absence and has left for Washington to enter the training camp for the Officers Reserve Corps.

Mr. J. B. Tyrrell left Toronto on Sept. 5 for Newfoundland. He will examine some mining properties on the island.

Mr. H. W. Baker is visiting mines in Northern Ontario.

Mr. W. E. Simpson is in Toronto.

Mr. W. H. Yeandle is visiting mines in Northern Ontario.

Mr. W. R. Rogers was in charge of the Ontario Bureau of Mines exhibit at the Toronto Exhibition.

Dr. Victor C. Alderson has accepted the presidency of the Colorado School of Mines. Dr. Alderson resigned the position a few years ago.

Mr. Balmer Neilly has completed an examination of the Temiskaming mine.

Lieut. Gwynn G. Gibbons who is reported to have died at Saloniki was, prior to enlistment, on the staff of the Huronian Belt Co. During 1914 he was in charge of an exploration party in the Great Slave Lake district and our readers will recall an account of his trip published in the "Canadian Mining Journal" in March 1915.

Lieut. W. M. Goodwin of Kingston has been awarded the Military Cross.

Lieut. R. R. Rose has been severely wounded.

Mr. Douglas Mutch of Cobalt is to make an examination of the Temiskaming mine.

Mr. R. G. McConnell, Deputy Minister of Mines, is in England.

Mr. C. W. Knight is making geological examinations in the vicinity of lake Wahnapiatae, Ontario.

Mr. Francis A. Thomson has resigned from the faculty of the State College at Washington to accept the Deanship of the School of Mines at the University of Idaho, Moscow, Idaho.

Mr. George O'Brien has been appointed manager for the Canadian Collieries Ltd., Cumberland, B. C.

Mr. W. W. Mein has returned east after examining the great sulphide deposit at Flin Flon lake, Manitoba. Mr. Mein is consulting engineer for the great sulphide company.

Mr. J. H. Black and Mr. Jack Hammel have returned to Toronto from The Pas.

Mr. W. L. Uglow has returned to Canada from Peru.

Mr. H. Webb, purchasing agent at the Hollinger mine, is in Toronto.

Mr. A. R. Globe, assistant manager of Hollinger Consolidated has returned to the mine after a vacation.

Manager Trethewey of the West Dome mine is in Toronto.

Mr. R. Sloan, manager of the Burton-Muaro mine, and Miss Anna Anchor, daughter of Capt. Anchor, were married in South Porcupine on Sept. 1.

Mr. H. C. Perkins of Washington, D. C., recently visited the Great Sulphide property at Flin Flon, Manitoba.

Mr. "Karrie" Davies of San Francisco has returned to New York from Northern Manitoba.

Special Correspondence

NORTHERN ONTARIO.

Trethewey.

The shaft on the property in the township of Cane, which was being opened up by the Trethewey Mining Company of Cobalt has reached a depth of forty feet. The vein on the surface was composed of aplite and contained considerable leaf silver over a width of several inches; but it narrowed down to only a seam and the values are considerably lower than at the surface. On the south claim of the group there is a shaft some fifty feet in depth, which was sunk on a strong vein which carried good silver values. At the forty foot level this vein dipped out of the shaft. The Trethewey management drove a short crosscut at the present level of the shaft and tapped the vein to determine its value. Results were not encouraging and it is understood operations have been discontinued.

Big Profits for Kerr Lake Co.

Indications are that the past year will show the highest profits in the history of the Kerr Lake mining company. The production of silver during the past year was in the neighborhood of 2,600,000 ounces, which will constitute a new high record since 1910. When the high price of silver is taken into consideration the profits will show a considerable increase over those of that year.

West Dome Ore Reserves.

The statement of the management of the West Dome Consolidated is a very gratifying one. The item of most importance is that of ore reserves the total estimate of which has an estimated gross value of over \$2,000,000 blocked out. The possibilities of adding greatly to this ore reserve as development progresses is considered to be good. The grade of ore varies between \$6.17 and \$8.00 per ton.

Kirkland Lake.

The downward continuation of the Kirkland Lake Gold vein has been encountered at the 700-foot level, and the general appearance of the vein matter leads to the belief that the average gold content will prove similar to that opened up on the upper levels of this property. The determining of good ore at this depth, which is the deepest working in the Kirkland Lake camp, verifies the convictions of mining men that the area will ultimately prove to carry values to a great depth. Developments at this property have a more or less definite bearing on the whole camp.

Fidelity Mining Co.

Encouraging results are being met with on the claims owned by the Fidelity Mining Company in the Goodfish Lake portion of the Kirkland Lake Gold area. Work was started only a short time ago and is being pushed ahead vigorously.

Activity in Many Gold Areas.

Active gold mining operations are being conducted at a greater number of points throughout the North Country than ever before in its history. In order of importance these districts may be mentioned as follows: Porcupine, Kirkland Lake, Munro, Boston Creek, Larder Lake, Tashota, Bourkes' Siding, Seseikinika, Fort Matachewan, West Shining Tree, Kamiskotia, Kowkash, Thackeray, etc. The Goodfish Lake District and the township of Gauthier are generally referred to as being in the Kirkland Lake belt and are looked upon as very promising fields, although slightly removed from the Kirkland Lake field proper.

Improving Roads in Deloro Township.

The road from the Dome Mines south to the Ankerite property has been graded and the transportation of machinery and supplies will be greatly facilitated to properties in the township of Deloro. From South Porcupine to the Dome Mines, one of the best roads in the north country is to be found, and with the addition of this new portion to that road the district around and south of the Dome Lake is now reasonably accessible.

Good Ore on Wright Hargraves.

The main shaft of the Wright-Hargraves at Kirkland Lake has reached the 300-foot level. Where cut at the 300-foot level the vein is running very consistently and the ore is of a good grade. Lateral work will be undertaken as soon as the 300-foot level station is completed and it will then be possible to estimate on the value of the ore reserves. This property is considered to be one of the most promising in the Kirkland Lake district, and in the near future the management will be able to deal with ore reserves in their relation to the intrinsic value of the mine, instead of probabilities.

Ore Encountered on Buff Munro.

At the Buff Munro property in the township of Munro a shaft has been started and at a depth of about 20 feet some very high grade ore has been encountered. So far the work has been done with hand steel, but it is expected that a small steam plant will be installed in the near future. The Buff is situated just one mile east from the famous Croesus property.

Canadian Kirkland Lake.

Seventeen promising veins have been uncovered on the property of the Canadian Kirkland Mining Company in the Kirkland Lake district and on two of these veins the assays are said to range around \$6 to the ton and a number of other veins are said to contain very fair values. Development work consists chiefly in the opening up of the vein systems on the property and the sinking of test pits wherever promising ore is encountered. Tenders have been asked for the necessary plant for the development of the property at depth and this plant will likely be in full operation in the course of the next few months. Considering the amount of development work that has been accomplished on this property the results are highly encouraging.

Ore Claims Sold.

The first cash payment on a deal for the Orr Gold Mines Limited and a group of six claims belonging to Saul Renaud and his associates, which lie a short distance south, has been made. The new company will control nine claims comprising an acreage of upwards of 300, on which it has been demonstrated that ore of a commercial character occurs. The north claim of the Orr group lies immediately adjacent to the Teck Hughes property. The Kirkland Lake Gold main ore body crosses the north-west corner of the Orr.

Underground Work Resumed at Schumacher.

Underground work and milling operations at the Schumacher mine in Porcupine which were recently resumed after a temporary shut down to aid in the construction and repair of the milling and mining plant of the company are now in full swing. The capacity of the mill has been increased considerably and when the program of construction is complete will be the fourth largest mill in the Porcupine district and will have a capacity of about 300 tons per day. The underground workings of the mine were also thoroughly gone over any many improvements effected which will greatly facilitate the handling of the ore. The grade of ore which has been encountered at the lower levels of the

mine is considerably higher than that on the upper levels and like that of the other mines in the immediate neighborhood, (The Hollinger and the McIntyre) is more consistent in width and volume at the lower levels than above. It may reasonably be expected that the conditions on the Schumacher will be found to coincide with that of the McIntyre, where the best values began to be encountered at the seven hundred foot level and have continued to a depth of over 1,000 ft. where a very large drift has been run in good ore to connect the three properties belonging to the McIntyre company. The present main shaft on the Schumacher will be sunk to the 1000-foot level and the No. 4 shaft which is some 1400-feet east will be sunk to the 400-foot level, where the ore zone lying to south of the present main shaft will also be developed underground. This portion of the company's property has hitherto never been developed underground.

Increasing Hollinger Production.

It is unofficially stated that during August the production at the Hollinger mine will beat all records in the history of the company. Working forces are becoming more satisfactory both in numbers and efficiency, and it is considered probable that the new milling facilities will be pressed into service before long. Were the mill at the Hollinger to be pressed into service at full blast the monthly tonnage would amount to approximately 48,000 tons and would result in the recovery of something like \$480,000 annually, this extraction would amount to around \$10,080,000 of which nearly half of this \$10,000,000 output would be gross profits. This, of course is based on previous Hollinger performances and taking into account the completion of the new milling equipment and the operation thereof. It is considered highly probable that dividends will be resumed before the end of the present year.

Minaker to Install Machinery.

Plans have been made for the installing of mining equipment on the Minaker-Kirkland of sufficient capacity to carry development work to the 200-foot level, and will permit of more rapid development than by the use of hand steel. Developments on the Minaker have been conducted chiefly on the surface except for a number of test pits the deepest of which has been sunk forty feet. The latter pit is on the vein discovered last spring on the North claim of the property and runs onto the property from the Lake Shore mine. The work so far done has given sufficiently encouraging results to warrant the installation of more powerful mining machinery.

Building Mill at Lake Shore.

The work of building the foundations for the new 80-ton mill at the Lake Shore mine at Kirkland lake is well under way and the building will be completed before the winter sets in. It is expected that the plant will be treating ore during the early part of the coming year. The main workings of the mine have been carried to a depth of three hundred and seventy feet and will be continued to the 400-foot level, where a cross-cut will be run to tap the vein which was encountered at the 200-foot level early this present summer. When the vein is tapped a raise will be put in to connect the working with the drift on the 200-foot level. Development work will also be carried on at the 400-foot level on the No. 1 vein system or the main workings of the property.

To Ship From South Lorrain.

It is anticipated that the Pittsburgh-Lorrain situated in the old South Lorrain district will ship a car-load of high grade ore early this fall. The Pittsburgh-Lorrain has taken over the old Wettlaufer mine and mill. The mill has been overhauled and is now in operation on

the treatment of the low grade ore developed in the course of taking out the car-load of high grade ore which is nearly ready for shipment. The ore on hand is thought to be sufficient to keep the mill operating for the balance of the present year when the mill will probably be closed down pending the probable tonnage that will be available for treatment in the spring from the aggressive mining development which will be carried on during the winter months, which should permit of the resumption of milling operations on a permanent scale by spring. The high quotations for bar silver should eventually lead to much activity in the once famous South Lorrain area.

Mr. Neilly's Report on Temiskaming.

The special Temiskaming report issued by Mr. Balmer E. Neilly, manager of the Penn-Canadian mine, on the request of Mr. Max Morgenstern, corresponds very closely with that of the management of the mine, which was issued recently. The report shows that from 400,000 to 450,000 ounces of silver is positively in sight, and lays considerable emphasis on the fact that the estimate deals only with positive ore, leaving room for estimates of probable and indicated ore. With silver selling at a figure close to a dollar per ounce the ore actually in sight at the mine has an estimated value of close to \$400,000.

Peterson Lake.

The quarterly report of the Peterson Lake Mining Co. recently issued over the signature of S. G. Forst shows the company to have cash in the bank of \$43,122. A small amount of ore is also on hand. It is also estimated that the mill residues and dumps on the property contain ore of a value of three hundred thousand dollars. The litigation with the Dominion Reduction company for the residues in Peterson lake valued at over \$1,000,000 is still in the courts. So far the development work on the Susquehanna section of the property has failed to produce ore in paying quantities, although numerous small pockets have been discovered. The report states: "From information obtained from several prominent mining engineers, the writer is of the opinion that but a small portion of your property has been properly prospected and is one of the best undeveloped sections of the Cobalt camp, and that the possibilities for same again becoming a heavy shipper are very promising."

Seven Oil Flotation Plants at Cobalt.

The oil flotation process for the treatment of Cobalt ores is now generally considered to be a success. This however, does not mean that the older standard methods of concentration will be displaced, but it does mean that it will now be possible to treat ore of a lower grade than was hitherto practicable. Seven companies in the camp have installed oil flotation plants and the daily capacity is upwards of 2,200 tons.

Portage Bay.

It is anticipated that the new record price for silver will lead to the active development of the Portage Bay district where numerous veins carrying considerable cobalt, and in a number of places small silver values, are in evidence. Up to the present time no deep mining has been attempted at Portage Bay with the result that the values which lie at depth remain still to be proven.

A Second Flotation Plant for McKinley-Darrah.

Within the next week or so the new oil flotation plant at the McKinley-Darrah mine, which is now practically installed, should be in operation. This new addition to the mill equipment of the mine should add considerably to the output of silver from the property. The McKinley-Darrah was the first mine in the camp to use the

flotation process of treatment, although the Buffalo mines was the first to commence the installation of a plant. The process has proven highly satisfactory as is evidenced by the fact that this second large plant is being installed.

BRITISH COLUMBIA.

At the time of writing mining matters are steadily settling down to a condition of general activity, but time alone will tell whether or not there will soon again be an interruption to progress. The unexpected has happened so many times, that it does not seem safe to make predictions. There are rumors of what miners, especially coal miners, will do ere long in retaliation for the passing of a prohibition law, but whether anything more serious than talk will result remains to be seen. There does not seem to be any room for doubt, though, that many men resent the interference with their liberty, and on the Coast there is certainly an undercurrent of dissatisfaction with the result of the efforts of "slackers and religious fanatics," as is freely alleged, but whether any concerted action will be taken by the dissatisfied ones can not at present be forecasted. It is earnestly hoped, though, that there will not be any renewed interruption to mineral production, but that a return to normal output conditions will be experienced.

Just now it can be stated that there has been satisfactory progress in recent weeks. Copper blast-furnaces have been blown in at Trail, Grand Forks, and Greenwood. More miners have been employed and more ore is being produced and shipped. The production of coal is getting back to what it was before labor difficulties in the interior seriously checked the output. The total production for seven months to the end of July is reported to have been between 1,300,000 and 1,400,000 long tons gross, that is including coal made into coke and that burned under colliery boilers, etc. These figures show an increase for Vancouver Island coal mines, but there has been a considerable loss of production from Crowsnest collieries, so that it is not unlikely the total output for the year will be less than that of last year. If men were available, there could be a much larger output made, but they are not, and the result is that the Coast collieries can not fully fill orders obtainable, while the interior coal operators are not much, if any, better off in regard to getting more miners and other workers for their mines.

Ore production at mines in Rossland and Boundary camps is now larger than for several months. There seems also to be a general increase in output from mines in Ainsworth and Sloacan divisions, while the Sullivan mine, in East Kootenay maintains its large output of lead and zinc ores. On the Coast, too, matters seem to be progressive. Some notes follow relative to mines in the Coast and tributary districts that have not generally been given in this correspondence as much notice as they should have.

Omineca.

Mining is making progress in the western part of Omineca mining division, in regions tributary to the Grand Trunk Pacific railway. The most productive and important mine in this division is that of the Rocher Deboule Copper Co., situated on Rocher Deboule mountain.

In his official report on the Hazelton-Telkwa district, in Omineca division, published in the 1916 Annual Report of the Minister of Mines for British Columbia, the Assistant Mineralogist gave the following introductory information when describing properties on Rocher Deboule mountain:

"The name 'Rocher Deboule camp' may be restricted to mean that piece of country surrounding the head of Juniper Creek and its small tributary, Balsam creek. It includes the Rocher Deboule mine, Great Ohio, Highland Boy, Delta, and Red Rose group, beside many less well known mineral claims. The Hazelton View group and other claims controlled by the New Hazelton Gold-Cobalt Company, are situated a short distance over the ridge of Rocher Deboule mountain from the mine of the same name, but they are reached by means of a trail starting from Carnaby, on the Skeena River side of the mountain. (Note—Carnaby is on the Grand Trunk Pacific railway, seven miles coastward from Hazelton).

The Rocher Deboule mine still continues to hold its place as the most important mine in the Omineca mining division. It was worked steadily during 1916 and while a considerable quantity of ore was shipped, at the same time development work was pushed ahead. The lease under which the Montana Continental Development Company commenced to work the mine in August, 1913, ran out in February, 1916, and since the latter date operation of the mine has been in the hands of the original company—the Rocher Deboule Copper Company. During the tenure of its lease the Montana company developed the mine from a prospect; equipped it with a hydro-electric plant, compressor, surface and aerial tramways, and much incidental machinery, ore-bins, buildings, etc., and shipped ore to the value of about \$700,000.

"When the situation of the property is considered, its high elevation (4000 to 6000 ft.) with workings above timber-line, the long severe winter weather to be contended with, and the usual difficulties of opening a mine in a new camp and a new country this record, attained in thirty months, stands as testimonial to the ability, energy, hard work, and initiative of the manager, Mr. D. J. Williams."

In his report for 1915, the district Gold Commissioner stated that from May 17 to December 12 of that year, 17,000 tons of ore was shipped from the Rocher Deboule mine to the Granby Co's. smelting works at Anyox, Observatory inlet, this ore averaging about 8 per cent copper and \$1.65 in gold and 50 cents in silver to the ton. Elsewhere in the Annual Report for that year it was stated that the ore shipped contained 2,788,000 lb. of copper. Later official comment was: "When it is considered that, mining in this way and shipping without hand-sorting, a large amount of waste rock necessarily is included in the ore, it is evident that the shoots of clean ore contain a high percentage of chalcopyrite. The production for 1916 was 16,800 tons, containing 1200 oz. gold, 16,700 silver, and 1,619,145 lb. copper (recovered copper)."

Since the official reports, above quoted from, were made, ore has been encountered in lower levels of the Rocher Deboule mine, and in sufficient quantity to give promise of much production in the future, and, too, encouraging owners of other properties in the same camp to push on with development work and prepare for ore-shipment after transportation facilities and ore-handling equipment shall have been provided.

Various other mining camps also in the western part of Omineca division are worthy of notice, especially those on Glen mountain and Nine-mile mountain, both in the neighborhood of Hazelton, and in which silver-lead-zinc ores occur. Information published in the 1916 Annual Report is to the effect that there was shipped in 1916 from the Silver Standard mine, on Glen mountain, 651 tons of silver-lead ore, containing 126

oz. gold, 74,593 oz. silver, and 162,051 lb. lead; also 209 tons of zinc-silver ore containing 168,616 lb. zinc and 12,647 oz. silver. A concentrating plant is being put in for treating ore of a milling grade from this mine.

Just one more property will have brief notice at this time, namely the Santa Maria group, in Howson basin. The Assistant Mineralogist in notes introductory to his account of Howson basin stated that: Howson basin is situated at the head of Howson creek, a tributary coming in from the west to the south fork of the Telkwa river. It is distant about 28 miles from Telkwa (Telkwa station is 59 miles from Hazelton and 236 miles from Prince Rupert along the Grand Trunk Pacific railway), and is reached by a trail following up the main Telkwa river and then the south fork of that river to its headwaters." Considerable progress has been made since the Assistant Mineralogist investigated the property for his last year's report on it. In that report he mentions a fairly well-defined vein averaging about four feet in width, and that chalcocite is the most important mineral found, but other sulphides of copper and of iron also occur. A sample across four and one-half feet of the vein, taken from 35 ft. down the shaft, assayed: Gold, trace, silver, 7.5 oz.; copper, 12.3 per cent. From the material taken from the shaft about 50 tons of good ore had been hand-sorted and piled on the dump; a grab sample of from 35 ft. down the shaft, assayed: Gold, trace; silver, 13.2 oz.; and copper, 21.7 per cent. Since the report was written it has been ascertained that during the winter of 1916-17 247 tons of ore was shipped to the smelting works at Anyox, this ore averaging about 18 per cent. copper and 11 oz. in silver to the ton.

Coast.

Apart from the far-and-away more important operations of the Granby Consolidated Company its Hidden Creek mine and its smelting works at Anyox, Observatory inlet, the most noteworthy mining news from the upper Coast district is the report that the Engineer gold mine, in Atlin mining division, "has been sold for a sum which reaches seven figures," and that "if the report be true it means that several hundred men will be employed in development work." As, however, there has in the past been much talk about the great things to be expected when this property should be sold, it will be well to wait until the suggested much larger activities shall have become accomplished facts.

A more important evidence of progress is the approaching completion of the gold-saving mill the Belmont-Canadian Mines, Ltd., has been erecting and equipping for treatment of ore from its Surf Inlet gold mine, in which that company has during the last two or three years done much important development work. Surf Inlet is on Princess Royal island. The Belmont-Canadian Mines, Ltd., is understood to be a subsidiary company of the Tonopah-Belmont company, operating in Nevada and having among its principal shareholders residents of Philadelphia. The district mine inspector in his last annual report mentions the occurrence on this company's property of a series of lenticular masses of white pyritiferous quartz containing gold, with smaller value in silver and copper. The mine is situated seven miles inland from the head of Surf Inlet, at an altitude of about 1,000 ft. So far three distinct lenses of ore have been developed to a depth of 1,000 ft. vertically from the outcrop, and more than 13,000 ft. of drifting has been done. In connection with the hydro-electric power system being

established, a hollow concrete dam 490 ft. long and in places 75 ft. high, has been built across the lower end of one of a series of lakes. An incline has been constructed from the wharf at the head of the inlet to the top of the dam, for transference of materials from tidewater to barges on the lake, whence there will be a water route to within a mile and a half from the mine, and this latter distance is covered by tramway to be electrically operated. The hydro-electric power station, a concrete structure, is near tidewater; its equipment provides for generating 1500 h.p., with a water-head of a little more than 50 ft. The mill and concentrating plant will have a capacity of more than 250 tons, with provision for increase to 500 tons. Machine shops will have power tools to be operated by electricity. At the mine besides the necessary mine buildings there will be accommodation for employees—between 200 and 300 in all.

NEW YORK WANTS CONTROL OF THE SILVER MARKET.

Boston, Aug. 28.—London has for years been recognized as the silver market of the world. So it was with copper until after the outbreak of the war, but determination of the price of the latter metal has found lodgment where it belongs,—with the American producers who supply the greater part of the world's needs. The point arises: Can control of the silver market be lodged in New York, the headquarters of the principal silver producers of the world?

The representative of one of New York's leading silver firms says: "Great Britain controls the silver market through domination of purchases for a very large part of the present yield. All of India's requirements are handled through London, and, as is generally known, the Far East, including China and India, are the greatest consumers of silver for mercantile purposes.

"A few weeks ago, it may be recalled, when silver commenced to soar in price after a lull, London sought to put a damper on bullish enthusiasm by declaring an embargo on silver imports into India without official sanction from the British government. This was the answer to an extraordinarily heavy movement from the United States and Canada via Pacific ports direct to the Far East. A slump in prices then followed, but a subsequent recovery has carried silver to new high levels.

"Merchants in this country with remittances due the Far East were requested to make no further payments in silver as a part of this program of restricting the Pacific movement.

"You ask if this movement has been stopped. I cannot answer directly, but it is known that the movement of silver to San Francisco is still heavy, and such a movement is obviously for a single purpose."

The United States government has been buying silver very heavily during the past few months for coinage purposes and wants more. England, it is pointed out, might withdraw from the market temporarily in an effort to depress silver prices, but such withdrawal could only be temporary.

The belief exists in some well informed quarters in the silver producing industry that to New York by virtue of its control of production belongs the duty of making the silver market, and such an attempt, which was started some weeks ago, would doubtless be pushed should the British government undertake to regulate the price of this commodity.—Boston News Bureau.

SCHUMACHER GOLD MINES LIMITED.

In a letter, dated Aug. 30, to the shareholders of Schumacher Gold Mines, Limited the directors say: The mine has just been reopened after a shut down of 51 days. For some time previous to the closing down of the mine it had been apparent that it would be necessary to cease operations at some time in order to make numerous changes and repairs which they deemed necessary to put the mine in first-class working condition. In June a crisis arose in the labor situation in the Porcupine Camp, there being much talk of a strike by the men and rumors of a contest for men between several of the larger mines in the camp. The directors decided this was an opportune time to temporarily close down the mine and effect the much needed improvements they had in mind. Accordingly mining operations ceased about the end of June and the staff was reduced to the minimum necessary requirements. Underground work was not resumed until the 16th inst., and the mill was not again running until the 20th inst.

In the interval the following improvements were carried out, namely: In the mine the track on the first three levels was taken up and relaid to a standard gauge and the cars were likewise adjusted and repaired. The advantage of this one change can be easily understood when it is known that with the tracks and cars in their present condition a car can be trammed by one man, while formerly two men were necessary for each car. The drilling machines were all overhauled and put in good shape, and the underground was made ready for winter. In the mill, the floors were cleaned, the tanks emptied and cleaned, and all values precipitated. The Hardinge mill was relined and thoroughly overhauled, and the pumps were repaired, the clarifier lowered to meet the requirements of a new flow sheet, new belts were put on to replace the old worn-out ones, the old agitators were taken out and new ones installed, and the mechanisms of the old agitators were fixed to fit larger tanks which were installed in order to increase the capacity of the mill. On the surface the steam lines were all taken up and relaid with proper drainage and protection from frost, which last improvement will mean a considerable saving of coal throughout the winter months. The mill launder was cleaned, a new section pipe put on the lake pump and a new electric sub-station erected and fitted up and a new transformer and compressor installed. This last mentioned machinery addition will increase the drill capacity from 14 to 25, which means that a more aggressive development policy can now be carried on.

The work on the new mill addition is proceeding very satisfactorily and should be completed in a few weeks. Now that the first unit of the mill has been so completely overhauled and new tank capacity added, it is expected that 150 tons per day will be handled almost immediately, which will be increased to 180 tons as soon as the new tanks now in course of erection are completed. With the new compressor installed and our capacity brought up to 25 drills, this will enable us to block out a great deal of ore. When this is completed then all that remains for us to do will be to install one Hardinge mill and one tube mill to bring the mill up to 300 tons daily capacity, which will make the mill the fourth largest in the Porcupine Camp.

While bullion production has been gradually increasing during the period just prior to closing down, costs therewith were necessarily increasing and at the time we closed down we were forced to mine \$10 and

\$12 ore in order to meet these high costs. Now with these additions and improvements hereinbefore mentioned, we can mill much lower grade ore and mill it at a profit, which means that your property can be mined and not stripped.

From developments made by the Hollinger and McIntyre companies, which adjoin the property, it is evident that values in this section of the Porcupine Camp continue to great depth, and we therefore decided upon an aggressive development program and intend to sink the present main shaft from its present level of 600 feet to a depth of 1,000 feet, and also to sink number 4 shaft, which is some 1,400 feet east of the main shaft, to a depth of 400 feet. The known ore zone lying south of the present main shaft, which has never been developed underground, will also be developed.

• THE COBALT PROVINCIAL MINE.

An interesting account of the early history of the Cobalt Provincial mine which is to be reopened, is given in a market letter recently published by Mark Harris & Co. Mr. Harris says in part:

The Cobalt Provincial is one of a number of valuable mining properties in the Cobalt camp which were not staked out by prospectors during the early rush, but which were for various reasons held by the Government and later on sold at public auction, at which they commanded a high price owing to their proximity to some of the big producers of the camp.

The Provincial lies right along the line of what is known as the Gillies timber limit, a tract of land lying on both sides of the Montreal River and about 100 square miles in extent. This limit was not thrown open for prospecting, the reason being that it contained a large quantity of green pine, the owners of which were apprehensive lest fire should be introduced if prospecting and mining were permitted. The northern apex of this tract penetrated like a wedge into the Township of Coleman to a short distance south of Cobalt Lake, and was, therefore, geographically within the favorable area for the occurrence of minerals.

In the spring of 1906 it was decided to prospect and work the mineralized portion of the Gillies limit on Government account, and the Ontario Legislature approved of the proposal and granted the necessary funds. Professor Willet G. Miller, the provincial geologist, took charge of operations.

The first real discovery in the Gillies timber limit was made on what is now the Cobalt Provincial on July 19, 1906, when a fine seven-inch vein carrying smaltite and niccolite, accompanied by a profusion of native silver, partly in sheets and nuggets and partly disseminated in smaller particles throughout the vein matter, was uncovered. Very little actual mining work was done that year, the balance of the period being taken up with carrying on surface prospecting and trenching, while at the same time the entire northern part of the limit was surveyed and mapped out.

Little progress was made at the Provincial in 1907 owing to the failure of machinery companies to deliver plant according to contract, and to the labor difficulties in the Cobalt camp. Furthermore, construction work on the Kerr Lake branch of the T. & N. O. Railway, which passed within 200 feet of the mine buildings, retarded operations considerably, as these could only be carried on with jeopardy to the lives of the workmen.

Mr. E. T. Corkill, then Inspector of Mines, was as-

sociated with Prof. Miller in the management of the Provincial, which went on a producing basis in 1908. In all two shafts were put down and a comparatively small amount of lateral development work carried on at the first two levels. Shipments from the property that year comprised one carload, 48,625 pounds of silver ore, and two carloads, 92,103 pounds, of cobalt ore, the proceeds from which were \$12,317.

The mine was worked by the Government until September, 1909, when it was put up at public auction and sold for \$113,111 possession being given to the new owners on Oct. 6, 1909. The reason for the sale is set out in the Ontario Bureau of Mines report, Vol. 19, Part 1, as follows:

"It was one thing to work a rich deposit of ascertained value, and quite another thing to adventure the funds of the Province with results which might be satisfactory or might be unsatisfactory—even such chances as a private company risking its own capital might deem itself in every way justified in taking. In short, while quite willing to work the mine for the benefit of the treasury if it had turned out to be a bonanza similar to some of the well known Cobalt mines farther north, the department did not deem it desirable to speculate with the Province's funds, notwithstanding the fact that the Legislature had placed them at its disposal."

The purchasers of the property incorporated a company, the Cobalt Provincial Mining Company, Limited, thereby retaining the name which had been given to the holding by the Government. Work was carried on in a small way and ore shipments were made at recurring intervals, the total production since incorporation, amounted to approximately 140,000 ounces of silver. The decline in the white metal to below fifty cents an ounce, however, made it impracticable to work the mine at a satisfactory profit, and on that account, in common with many other one time prominent holdings, the Provincial was shut down pending a return to normal conditions in the silver industry.

DOLLAR SILVER IN SIGHT.

Dollar silver is in sight, according to officials of mining companies contributing in substantial amounts to the world's supply of this metal.

The president of an active silver producer says in a Boston paper: "The world is clamoring for silver and there is not enough to go around. This shortage—for it is nothing else—means higher prices.

"Practically every government is coining silver as never before; the Far East, always a big consumer, is looking for large quantities and the leading nations of the world, all at war, are in need of silver for coins to be used in paying their troops.

"Mexico, an important producer, is doing very little in comparison with its former yield. Cobalt is falling behind for the demand upon Canada's man power to enter the army long ago made itself felt in a scarcity of labor north of our border.

"And to cap the climax there must be considered the strike among the western copper mines, practically all of which are producers of silver as a by-product.

"Never in my recollection has the situation in silver been so acute. For every ounce above ground there is a strong demand. Shipments are again being made to London, notwithstanding the high cost of transportation and the additional war risk."—Boston News Bureau.

MEN NEEDED FOR THE MINES.

Commenting on the labor situation the "Cobalt Nugget" says:

Despite the constant drain on the country's man power due to war, working forces at the producing mines of Cobalt continue comparatively satisfactory, while at Porcupine, and Kirkland Lake, a more or less steady improvement is being recorded.

Up until very recently, production of munitions of war in other parts of the country together with the extensive demand for labor on the farms was at a maximum. Now, however, from many parts of the country come reports that hundreds or even thousands of munition workers are being laid off. Also, the harvesting of the bountiful grain crop in all parts of the Dominion is now in its advanced stages and within the next few weeks thousands of harvesters will probably be seeking employment in other lines of industry. No doubt the application of conscription will consume a large portion of any surplus man-power that may ensue, but there would appear to be very little doubt but that the mining industry with its attended high average rate of remuneration, will attract fairly large numbers of men to this district. The high price of the white metal is a spur that is ever urging the silver mine operators of the country to greater and greater efforts to increase the output, with the result that net earnings compare very favorably with the banner months or years since the beginning of mining silver from the mines of Cobalt. With quotations for commercial bar silver advancing steadily toward the dollar mark, there will be no let up to the impetus with which operations are being conducted. This is a guarantee that the mine workers will receive high rates of pay, shareholders of the various producing companies will receive handsome dividends, merchants will experience a marked falling off in "bad accounts" and business in general should be elevated to a new concrete plane.

The producing mines at Porcupine, Kirkland Lake, and Munro are in greatly improved physical condition. Ore reserves of the gold mines are greatly in excess of any previous year in the history of gold mining in Ontario. Were the release of munition workers and farm labor to result in say only two thousand mine workers finding their way to the gold mines of the country, which is now believed not improbable, the time for a general return to a dividend paying basis by the leading companies of the camp which have temporarily suspended profit disbursements would not be long.

ASBESTOS FROM NORTHERN ONTARIO.

Some samples of excellent asbestos from Deloro township, Ontario, were shown in Toronto at the Exhibition last week. Quebec is the asbestos producing province and these specimens were from Ontario's first producing mine. There is a good demand for asbestos and Quebec mines are very busy this year.

The lack of appreciation of the problems of the mineral industry displayed by members of the House at Ottawa, emphasizes again the need of the presence of a Minister of Mines at committee meetings affecting the mineral industry. There should be at least one well informed man in a position to explain the government's proposals and to lend some degree of understanding to debates on subjects relating to the development of our mineral resources.

THE BUFFALO SILVER MINERS' GARDEN.

An interesting account of the interest taken by mine managers and employees in food production this year is given by E. A. C. in the September number of the C. M. I. Bulletin. The following is an account of the plan adopted by Buffalo mines.

"Up at mileage 104, north of the road leading to the old King Edward, is a fine area of tillable land known as the Watash mining claim. The manager of the Buffalo mine, Tom R. Jones, saw here a chance to garden on a fairly large scale. His first step was to organize the Watash Farmers Association from among the mine employees. Every employee is eligible for membership and the only expense for which the members are liable is the cost of keeping one man at work on the farm for a specified time throughout the summer. There were a few stumps in one corner of the area; but these presented no difficulty to Captain McAllister and his crew of miners. Stumps are easily dislodged by the judicious use of 25 per cent. powder, so with a case or two of 50 per cent. the miners blew them twice as far as was perhaps needful. The land was prepared and all the seed purchased by the company.

"Each member is required to do 50 hours work during the summer, and his interest is negotiable and may be sold to any other employee. In July there were 57 working members, divided into squads each with a duly appointed leader. In order to facilitate the work a 15-passenger car is provided for the free transportation of the members. The driver being also a member, collects no fares but will share in the fall 'clean up.'

The miners planted 240 bushels of potatoes, 2000 brussels sprouts, 10,000 celery plants, 5500 cabbage plants, 650 tomato plants, and over four acres of turnips, parsnips, beets, carrots and other vegetables. The men are intensely interested in the scheme. So is the manager who when practicable visits the farm daily. A notice posted in a conspicuous place sets forth that the products of the farm will be divided in proportion to the size of the family of the members participating.

"I asked Tom Jones to estimate the probable crop yield. He answered in characteristic fashion, that if a kind providence would continue to send the sunshine there would be no hungry children in Cobalt this coming winter and that after the harvest the camp would be in a position to supply some outward freight, in form other than silver bullion and concentrate, for the T. & N. O."

ONTARIO BUREAU OF MINES EXHIBIT.

The Ontario Bureau of Mines, as usual, had an excellent exhibit at the Exhibition in Toronto this year. New features that proved very attractive were a Groch centrifugal flotation machine and a model stamp mill. The miniature mill was constructed by Mr. J. N. Evans of Belleville. The flotation machine which is described elsewhere in this issue of the "Journal," was operated by Mr. Frank Groch and Mr. W. E. Simpson. These gentlemen had an interesting time explaining the principles of the machine.

Excellent samples of molybdenite from Eastern Ontario attracted considerable attention. Ferro molybdenum which is now being manufactured at Orillia and Belleville and stellite, the cobalt alloy which is being manufactured at Deloro, were among the products shown.

The exhibit was in charge of Mr. W. R. Rogers of the Bureau of Mines staff. His enterprise in adding new features to the exhibit was well rewarded by the interest shown by visitors.

BULLION VALUE OF SILVER.

Anglo & London-Paris National Bank of San Francisco monthly circular says of silver: Apparently all the mints of the world are at work coining standard or subsidiary silver coin and demand for the metal is growing and the price has been steadily rising. Already bullion value of the pure silver in some coins in some countries is equal to or greater than face value of the coins, and a very slight increase of bullion value over face value will lead to exporting or melting.

This had led some to suppose that silver was remonetizing itself and that without legislation the old ratios of 15 or 16 to one of gold would re-establish themselves throughout the world. Silver has a long road to travel yet before that point is reached, as will be seen by the table following, which shows price per ounce at which bullion value of silver in the coin is equal to face value in country of issue, as fixed by director of the mint in United States currency.

The table shows the situation only roughly, as bullion value of silver usually differs in different countries, and at present may differ materially:

	Face value in Canadian currency cents	Pure silver contents grains	Price at which silver in coin equals face value, cents
Canadian dollar	100	333.00	144.144
U. S. dollar	100	371.25	129.293
U. S. half dollar	50	173.61	138.241
Philippine peso	50	246.912	97.201
Philippine half peso	25	115.74	103.681
Mexican peso	49.84	377.1395	63.433
Mexican half peso	24.92	154.32	77.512
British shilling	24.33	80.7272	144.665
French franc*	19.29	44.286	143.713
German mark	23.81	77.16	148.118
Japanese half yen	24.92	124.9992	95.693
Indian rupee	32.44	165.00	94.371

*Standard coins of other countries in Latin Union have same ratio.

NIPISSING'S BIG PRODUCTION.

Manager Hugh Park, of the Nipissing Mine, in his regular monthly report to the president and directors, states that during the month of August the company mined ore of an estimated value of \$293,116, and shipped products from the Nipissing and Customs ore of an estimated net value of \$588,254.

No new veins were encountered during the month, but the regular sources of production continued to be satisfactory. All stopes are keeping up their tonnage and value, and several have considerably exceeded the limit expected. A number of new working places were started, some on exploration and others developing promising veins encountered during previous months.

An estimate of production for the month of August is: Washing plant, \$141,420; low grade mill, \$151,696; totals, \$293,116. The low grade mill treated 6,395 tons, the high grade mill treated 32 tons and shipped 640,092 ounces fine silver.

During the current year Nipissing shipped ore of an estimated value of \$2,057,283. The production has shown a steady increase since the month of March. The monthly production of the company dating back to the beginning of the present year follows: August \$293,116, July \$272,490, June \$269,469; May \$261,663, April \$259,082, March \$256,953, February \$271,527, January \$172,983, total for year to date \$2,057,283.

Nipissing Mines Co. Ltd. has been incorporated in Ontario, Canada, with \$6,000,000 capital, to own and control the Nipissing Mining Co., an operating concern, and to exercise the functions of the Nipissing Mines Co. of Maine.

Within a fortnight it is expected that the Maine corporation will have been dissolved after all its assets and business have been transferred to the newly organized company. The new Ontario concern will issue new certificates share for share for those of the existing company.

Nipissing has shared handsomely in the advance of silver through sales made at top prices. Many of these transactions have taken place on a basis of Vancouver prices, or several cents an ounce over the New York quotation. A small part of the premium would have to cover extra cost of transportation across the continent although much of it would accrue to profits.

Dollar silver means that Nipissing has in reserve \$9,000,000 in gross values against \$4,500,000 when the metal was at 50 cents an ounce. At a cost of 30 cents an ounce the maintenance of dollar silver would add \$6,300,000 to net profits from the 9,000,000 ounces now known to be below ground.

TEMISKAMING.

Cobalt, Sept. 11.—Considerable comment is rife throughout the camp over the new outbreak of hostilities between President F. L. Culver, of the Temiskaming Mining Company, and Mr. Max Morganstern, of New York.

At the special general meeting of shareholders held in Toronto on Thursday last Mr. Douglas Mutch, E.M., of the T. H. and B., was by resolution appointed by the shareholders to examine the Temiskaming mine, he being the unanimous choice of the large majority vote represented by Mr. Morganstern.

On Saturday morning Mr. Mutch, in company with Mr. Morganstern, arrived at the Temiskaming, armed with the resolution, and announcing that he was there to begin his examination of the mine as ordered by the majority of the shareholders. Much to the surprise of both gentlemen President Culver refused the request to permit either to even go underground. He is said to have acknowledged that the resolution presented by Engineer Mutch was correct in every particular and regularly passed at the meeting he had presided over on Thursday.

Mr. Culver's refusal to carry out the wishes of his shareholders according to report, was based on the fact that Mr. Mutch had not yet been officially notified of his appointment, and until such had been carried out he would continue to refuse as well as until arrangements regarding costs and conditions for such examination and the handling of the report. Mr. Mutch after carefully reading the resolution passed at the shareholders' meeting, refused also to treat with President Culver because of the fact neither his name was mentioned therein nor was there any provision for the making of any arrangements as demanded by Culver, against the shareholders' representative. The opposing forces locked horns in a wordy argument, but Mr. Culver held the fort. It is likely an appeal will be made to the courts, as the feeling throughout the camp is that Mr. Culver was somewhat indiscreet in his stand.—Mail and Empire.

WILL RESUME CONSTRUCTION OF STEEL PLANT.

The United States Steel Corporation has completed its plans for the erection of a \$20,000,000 plant at Ojibway, Ontario, and development work in that connection will now be carried on, according to Ward B. Perley, vice-president and general manager of the Canadian Steel Corporation, the Canadian subsidiary of the big U. S. concern. This company was incorporated some three years ago. A tract of land on the St. Clair River, north of Windsor was purchased, a separate municipality was established, and streets were laid out for an ideal town, such as the United States Steel Corporation has at its American plants. Then the war put a temporary stop to construction. The bid for tenders for the construction of a slip and huge concrete and steel docks for the Ojibway Company was the sign for a renewal of construction and further plans of the company will now be proceeded with.

The plant will include blast furnaces and mills for the manufacture of wire, rails and bars, and perhaps other steel products.—Financial Times.

THE EMBARGO ON IRON.

Philadelphia, Sept. 11.—Shipments of iron to Canada came to an abrupt end Aug. 15. Embargo placed by government went into effect over night. The only notification was sent to railroads, which refused to accept shipments Aug. 16. Shippers have since found it impossible to satisfy government requirements as to export licenses for iron. Forms for export licenses have been changed three times, and now prescribed form calls for answer of every conceivable question that might have anything to do with the matter. Application must be signed by shipper, consumer, Washington authorities and Canadian authorities, and document must travel several hundred miles before finally being attached to bill of lading. Even then if shipment is not made all at once, additional applications must be sent around the circle.

Difficulty of business under these conditions is enormous. Meanwhile, Canadian plants dependent on supply of iron from United States have been forced to go into market to supply their needs or shut down. How long present condition will last is uncertain, but there are indications that iron will begin to go to Canada again in limited quantities soon.

ALBERTA'S COAL PRODUCTION.

Some very interesting figures are given in the quarterly report of the Dominion mines branch for the quarter ending June 30 last. The report shows the monthly production of the various mining districts in Alberta and the total sales of the different kinds of coal mined.

The report also shows the number of tons of coal imported through the various ports of the Dominion during the first and second quarters, and the value. The total number of tons of coal imported during the first six months of the present year was 1,097,546 tons as compared with 1,161,164 tons during the first six months of 1916.

The total number of tons of lignite, bituminous and anthracite coal mined in Alberta during the months of April, May and June was 416,845 tons, and the total number of men employed in the various mines is given at 11,856.

The total output of anthracite coal from the Banff district for the second quarter is given at 3,114 tons, which was practically all sold within the province.

:~: **Markets** :~:

STANDARD STOCK EXCHANGE.

(Continued—J. P. Bickell & Co.)

As of Close, Sept. 11.

Gold.		
	Asked.	Bid.
Apex . . . . .	.09½	.09%
Dome Extension . . . . .	.16½	.17½
Dome Lake . . . . .	.15	.16
Dome Mines	10.00	....
Imperial . . . . .	.02%	.03
McIntyre	1.60	1.61
Hollinger	5.00	5.15
Newray . . . . .	.81	.82
Porcupine Crown . . . . .	.40	.44
Porcupine Vipond . . . . .	.28	.30
Preston East Dome . . . . .	.04½	.04%
Teck Hughes . . . . .	.40	....
West Dome . . . . .	.18½	.18%

Silver.		
	Asked.	Bid.
Adanac . . . . .	.19½	.19%
Bailey . . . . .	.06	.06½
Beaver . . . . .	.38¼	.39
Buffalo	1.25	....
Chambers Ferland . . . . .	.15½	.16
Coniagas . . . . .	....	4.00
Crown Reserve . . . . .	.28	.28½
Gifford . . . . .	.05¼	.05½
Great Northern . . . . .	.06%	.07
Hargraves . . . . .	.16	.16¼
Hudson Bay . . . . .	....	.38
Kerr Lake	5.70	5.80
La Rose . . . . .	.50½	.55
McKinley . . . . .	.71	.72
Nipissing	9.25	9.35
Peterson Lake . . . . .	.11%	.12
Right of Way . . . . .	.05	.05¼
Seneca Superior . . . . .	.02	.03½
Silver Leaf . . . . .	.01%	.02
Temiskaming . . . . .	.33	.34
Trethewey . . . . .	.15	.16
Wettlaufer . . . . .	.07	.08

SILVER PRICES.

	New York. cents.	London. pence.
Aug. 27	88%	45
" 28	88%	45
" 29	89%	45½
" 30	90%	46
" 31	90%	46
Sep. 1	90%	46
" 3	holiday	47
" 4	93%	47½
" 5	95%	48½

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
 Cobalt oxide, grey, \$1.65 per lb.
 Cobalt metal, \$2.25 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 15 cents per lb.
 Sept. 10, 1917—(Quotations from Canada Metal Co., Toronto)
 Spelter, 11 cents per lb.
 Lead, 12½ cents per lb.

Tin, 63 cents per lb.
 Antimony, 18 cents per lb.
 Copper, casting, 32 cents per lb.
 Electrolytic, 33 cents per lb.
 Ingot brass, yellow, 20 cents; red, 25½ cents per lb.
 Sept. 10, 1917—(Quotations from Ellas Rogers Co., Toronto)
 Coal, anthracite, \$9.50 per ton.
 Coal, bituminous, nominal, \$9.00 per ton.

Porcupine Gold Production.

Year.	Ounces.	Value.
1910	\$1,947	\$35,539
1911	765	15,437
1912	83,725	1,730,628
1913	207,748	4,294,113
1914	251,131	5,190,794
1915	362,186	7,480,901
1916	452,095	9,397,536
First half year, 1917	228,673	\$4,586,941

Dividends paid by Ontario Gold and Silver Mining Companies

	Cobalt.	Porcupine.	Kirkland Lake.
Paid during 1916	\$4,958,650	\$4,166,000	\$260,750
Total paid to end of 1916	67,459,852	9,168,000	325,937

Dividends Paid by Cobalt Silver Mines to Dec. 31, 1916.

Mining Company.	Amount of Di- vidends and Bonuses Paid During 1916.	Total amount of Dividends Paid to 31st Dec., 1916.
Beaver	\$60,000	\$650,000
Buffalo . . . . .	.....	2,787,000
Caribou-Cobalt (Drummond) . . . . .	.....	225,000
Casey-Cobalt . . . . .	.....	203,249
City of Cobalt . . . . .	.....	139,281
Cobalt Central . . . . .	.....	192,845
Cobalt Lake . . . . .	.....	465,000
Cobalt Silver Queen . . . . .	.....	315,000
Cobalt Townsite . . . . .	.....	966,726
Coniagas	600,000	8,440,000
Crown Reserve . . . . .	.....	6,102,399
Foster . . . . .	.....	45,774
Hudson Bay (T. & H. B.) . . . . .	.....	1,940,250
Kerr Lake (Holding Co.)	600,000	6,720,000
La Rose (Holding Co.)	299,725	6,882,707
Mining Corporation	570,615	1,348,740
McKinley-Darragh-Savage	269,723	4,876,474
Nipissing Mines Co. (Hold. Co.)	1,500,000	15,340,000
Peterson Lake	168,127	420,318
Right of Way Mines	16,855	235,965
Right of Way Mining Co. . . . .	.....	324,643
Seneca Superior	598,605	1,579,817
Temiskaming	225,000	1,684,156
Trethewey	50,000	1,111,998
Wettlaufer . . . . .	.....	637,465
Private Corporations (Est.) . . . . .	.....	3,825,000
Totals	4,958,650	67,459,852

Dividends Paid by Porcupine Gold Mines.

Mine.	Amount of Di- vidends and Bonuses Paid During 1916.	Total amount of Dividends Paid to 31st Dec., 1916.
Dome Mines	800,000	\$1,200,000
Hollinger Gold Mines	3,126,000	7,456,000