

# THE CANADIAN MINING JOURNAL

VOL. XXXVII.

TORONTO, June 15, 1916.

No. 12

## The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published fortnightly by the

**MINES PUBLISHING CO., LIMITED**

Head Office . . . . . 263-5 Adelaide Street, West, Toronto

Branch Office . . . . . 600 Read Bldg., Montreal

Editor

REGINALD E. HORE

**SUBSCRIPTIONS** — Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

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## THE COBALT SILVER AREA

During the past few years the Cobalt district has been producing large quantities of silver, but exploration has not been carried on as vigorously as it might have been. During the past few months, however, there has been a revival of activity and it is not unlikely that discoveries of considerable importance will be made this year. The price of silver, while falling off considerably during the past few days is much higher than at any time for years and it is likely to remain so. This means greater profits from operations and has given new life to the district, bringing larger returns to shareholders of silver mining companies and permitting increase in wages.

It is now nearly thirteen years since the men working on the railway built to tap the great clay belt of Northern Ontario first paid serious attention to the mineral deposits in the vicinity of Long lake, now Cobalt lake. Since then there has been produced about one-quarter billion ounces of silver worth about \$130,000,000. It is generally believed that the zenith of production has been passed and that most of the veins have been discovered. It is folly to conclude, however, that exploration has been so thorough as to preclude the possibility of very considerable bodies of rich ore being still unfound. In fact it is very probable that exploration will prove the existence in the heart of the Cobalt area of many deposits that have yet escaped discovery. Structural conditions indicate that there may be at Cobalt many undiscovered deposits which do not outcrop, which the surface prospector has no chance of finding.

It is true, as might be expected, that the companies operating at Cobalt have done much underground prospecting. The development and prospecting work at the mines has resulted in the discovery of very many veins which do not outcrop. It has proven also that the vertical extent of most of the deposits is very small and that most of the ore is enclosed in the lower part of sedimentary rocks of the Cobalt series close to the underlying Keewatin rocks.

Much of the underground prospecting has been disappointing. It has, however, afforded information regarding the structural features of the deposits and is therefore not without value. It is to be hoped that the information gained will be recorded in such a way that it may prove useful to operators exploring neighboring properties.

Some of the companies operating in one section of the Cobalt area have made arrangements for careful study of structural conditions and for their accurate recording with a view to more intelligently directing

prospecting work on these properties. This is a step in the right direction and it is to be hoped that other companies will undertake such work and that all will give freely such information as is likely to be of assistance to the others.

If the information which the underground workings at Cobalt have disclosed is carefully collected and studied it is not unlikely that the existence of undiscovered ore will be indicated. Enough is known already to give courage to those who are undertaking exploration.

Until much more prospecting has been done at Cobalt we will be unwilling to admit that the possibilities of the area have received the attention they merit. It has been too readily assumed that all the ore is near the surface.

## ONTARIO'S NICKEL-COPPER PRODUCTION

Ontario's production of nickel, in the form of matte, in 1915 was 34,039 tons, valued at \$17,019,500. The present rate of production indicates a production of 40,000 tons in 1916. The value of this nickel as it leaves the smelter at Copper Cliff is estimated at \$20,000,000. Its value when refined should be about \$30,000,000.

During 1916 the nickel mines at Sudbury will also produce 22,000 tons copper. The value of this copper as it leaves the Copper Cliff smelter is estimated at \$8,000,000. Its value when refined should be about \$12,000,000.

The total value of the nickel-copper matte shipped from the Sudbury district during 1916 will be, at present production and prices, about \$28,000,000. The value of the refined product will be about \$42,000,000. Against the cost of refining and selling the producers will therefore have an item of \$14,000,000.

Over two-thirds of the nickel and copper produced from Ontario ores is mined and smelted in Ontario by the Canadian Copper Co. and then shipped to New Jersey for refining. The present profits of the International Nickel Company are so large that the delay in the establishment of that refinery in Canada can scarcely be attributed to lack of funds.

It is the announced intention of the International Nickel Company to establish in Canada a refinery of sufficient capacity to supply the needs of the Empire. It is to be hoped that the delay means that investigation has proven the desirability of refining all the matte in Canada.

Good results are being obtained in development work north of The Pas. The Canadian Government Railway now under construction in Northern Manitoba, seems destined to play an important part in the development of Canada's mineral resources.

## PRE-CAMBRIAN ORE DEPOSITS

The important discoveries north of The Pas should result in directing much attention to the Pre-Cambrian rocks in Northwestern Canada.

Ontario's chief metalliferous deposits are in Pre-Cambrian rocks,—Cobalt silver, Porcupine gold and Sudbury nickel-copper ores occurring in these old formations. The Michigan copper deposits and the great iron deposits of the Lake Superior states occur in the Pre-Cambrian. It has been confidently expected therefore that the unexplored broad expanse of Pre-Cambrian in Canada would prove to be the source of great wealth. The discovery of great deposits of sulphide ore on the Manitoba-Saskatchewan boundary strengthens that opinion and indicates that exploration of the hinterland will continue to result in the discovery of ores, the extension of the mining industry and the development and settlement of parts of the Dominion now uninhabited.

In Ontario, prospecting is resulting in many promising discoveries being made. The area proven to contain gold in considerable quantity has been greatly widened during the past year. The wonderful ore developed at the Croesus mine in Munro township would cause a great sensation, but for the splendid developments at Porcupine mines. The enormous orebodies developed at the Hollinger and Dome and the more recent discoveries at the McIntyre have placed Porcupine far in the lead among Canada's gold camps. While overshadowed by Porcupine, Kirkland Lake, Munro and Boston Creek areas are proving up well, and prospectors are reporting many discoveries in various parts of what is proving to be a very large gold bearing district.

At Flinflon lake, on the Manitoba-Saskatchewan boundary, in an area of Pre-Cambrian rocks, there is being explored by diamond drilling an enormous deposit of sulphide ore. The size and content of this mass has still to be determined; but enough has been learned to make the owners satisfied that they have a very valuable deposit. The Pre-Cambrian areas in the vicinity are naturally receiving close scrutiny. They warrant attention.

A map of the Boston Creek gold area, prepared by Mr. A. G. Burrows, of the geological staff of the Ontario Bureau of Mines, is nearly ready for distribution. The Bureau is to be congratulated on its success in meeting the needs of prospectors. The Deputy Minister of Mines and the Provincial Geologist lost no time in investigating the first discoveries at Cobalt and, in keeping with the reputation then gained, their Department has greatly assisted in the opening up of new districts ever since.

## PUBLIC PRINTING

In the third report of the Committee on Parliamentary Printing, Mr. Currie says: "During the past two or three years changes have been made in the typographical arrangements of several blue books, whereby considerable economy has been effected. On these books an annual saving of \$15,000 has been made."

From such a statement one may gather some idea of the waste that characterizes many Government reports. It indicates that the saving which might be made is a very considerable one, and worthy of the attention of those responsible for such reports.

Government reports are necessary and many of them are of great value. Among the most useful are those published by the Geological Survey and the Mines Branch. They record the work of many careful investigators and assist greatly in the development and utilization of our mineral resources. Many of the publications, however, in common with reports of other Departments, would be more useful and would have cost less if more attention had been given to the editing and printing. The saving that might be effected by changing the typographical arrangement is a large item. A further large sum might be saved by limiting distribution to those who make use of the reports.

Perhaps the most important saving could be effected by impressing the authors with the fact that the verbose reports are very likely to be shelved or thrown away. As one correspondent says of the publications of several Departments: "These reports would be read if they were concise." Valuable information, collected by great expenditure of labor and money, becomes lost in the mass of words.

## CORRESPONDENCE

### A MISLEADING ESTIMATE.

The Editor of The Canadian Mining Journal:

Sir,—Information has reached me that a letter from a member of the Canadian Mining Institute, making certain allegations against myself, is to be published in the June number of the Monthly Bulletin of that institution. If the secretary of the Institute had given me opportunity to correct in the same issue whatever mis-statements there are in that letter, I should not now ask you to permit me to address members of the Institute through the columns of your Journal. I think it well, though, rather than wait until a month shall have elapsed ere I can do so through the Monthly Bulletin, to make it clear that while I am not at all concerned about the opinions of myself held by certain self-important persons, I hold very strong views on the subject of publishing misleading information in the official publication of the Institute.

The following self-explanatory letter was sent by me to the editor of the C. M. I. Monthly Bulletin, but, so far as I have seen, was not printed in that publication:

"Victoria, B.C., January 10th, 1916.

"The Editor, Monthly Bulletin of C.M.I.:

"Sir,—With much regret I to-day find that the Bulletin has been permitted to become a medium of publicity for what I believe to be an inflated estimate of the

mineral production of British Columbia for 1915. So far as I am able to judge, not only is there little probability of a total equal to that of 1913 (\$32,440,800), being reached, but returns received this month make it appear that even my own estimate of \$30,375,000 made last month for the 'Annual Financial Survey' of the Toronto Globe is too high. May I ask you to publish this intimation from me—that if the Bulletin is to be made, even occasionally, a channel for the dissemination of 'hot air' from Vancouver or anywhere else in British Columbia, my name must be removed from its list of regular correspondents. Had I known in time that you would accept so inflated an estimate, I certainly would not have taken the trouble to prepare for you the summary review for 1915 that I have done.

"E. Jacobs."

I inadvertently omitted inverted commas when quoting from the Bulletin for January the misinformation that the value of the 1913 production was \$32,440,800; that was the total for 1912, which was the year of highest record.

The position as to the estimate of the value of last year's production is as follows: In December I made an estimate of a total of \$30,375,000. Too late to have correction made I was informed that the official who supplied the figures for one important colliery had made a mistake of 100,000 tons of coal, equivalent to \$350,000. Then, I guessed the miscellaneous production — chiefly building materials, etc. — at \$2,000,000, which was nearly \$853,000 less than the corresponding total for 1914. A month later, the Provincial Mineralogist decided on an estimate of \$1,500,000. If the difference of \$850,000 thus accounted for be deducted from my December estimate of \$30,375,000, there will be left a sum of \$29,525,000, or approximately \$225,000 more than the preliminary estimate of the Provincial Mineralogist, and only \$75,000 more than the revised total of \$29,447,508 now on official record. The wild guess of the Vancouver 'hot air' man was \$3,141,000 in excess of the official preliminary estimate and \$2,993,000 more than the figures of the final total. I hope members of the Institute will feel appropriately grateful for having been supplied in the Monthly Bulletin with the conclusions of an authority possessing such manifest qualifications as those of the Vancouver correspondent of the Bulletin.

E. JACOBS.

Victoria, B.C., June 1st, 1916.

With mining activity on its western boundary and at Rice Lake, Manitoba is attracting attention these days. The Flinflon district will be visited by many mining men this summer.

The province, unfortunately, does not control its mineral resources and little assistance in development is to be expected unless the Federal Government recognizes the advantages to be gained.

### ROCHESTER.

The Trethewey Mining Co. is exploring the Rochester property by a crosscut from a shaft on the Lumsden. The crosscut is being driven near the contact between the diabase sill and the Keewatin rocks, on the supposition that that horizon is the most promising. Results so far are encouraging, some small bodies of ore having been encountered.

## ONTARIO'S METAL PRODUCTION

Returns made to the Bureau of Mines by the metaliferous mines and works of the Province of Ontario for the first three months of 1916, show increases in all products except iron ore. Following are the figures, those for the corresponding period of 1915 being added for comparison:

	Jan.-Mch., 1915.	Jan.-Mch., 1916.	Inc. or Dec.
Gold, oz. . . . .	76,307	107,818	*31,511
Silver, oz. . . . .	5,230,167	5,297,831	*67,664
Copper, tons . . . . .	3,644	5,491	*1,847
Nickel, tons . . . . .	6,680	10,032	*3,352
Iron ore, tons . . . . .	28,332	6,573	†21,759
Pig iron, tons . . . . .	94,678	160,749	*66,071
Cobalt, metallic, lb. . . . .	450	36,460	*36,010
Nickel, metallic, lb. . . . .	.....	11,976	*11,976
Cobalt and nickel oxides, lb. . . . .	16,324	143,212	*126,888

\*Increase. †Decrease.

The value of the production for the first three months of 1916 was \$14,276,382, as compared with \$9,358,210 for the corresponding period of last year. This large increase was due not only to the greater output but to the higher prices now prevailing for most of the metals.

**Gold.**—The increase in the yield of gold was 31,511 ounces, worth \$656,872. Compared with the rate of production for the whole of last year the advance was less marked, but developments now under way are likely to lead to a substantial increase. Porcupine provided the bulk of production, namely 99,282 ounces. Hollinger led in output, followed by Dome, Acme, McIntyre-Porcupine, Porcupine Crown, Vipond, Schumacher and Dome Lake in descending order. The mines situate elsewhere making up the remainder of the yield are Tough-Oakes and Croesus. Consolidation of the Hollinger, Acme and Millerton interests will no doubt lead to a more extensive development and a greater output from these properties.

**Silver.**—A feature of the quarter was an actual increase in the yield of silver as compared with the first three months of 1915, amounting to 67,664 ounces. In value the increase was proportionately greater, namely, \$462,673. This was due to the remarkable rise in the price of silver, amounting to about 50 per cent. over the average figure for 1915. A large part of this increase took place in the latter part of the quarter and afterwards, consequently the benefit of the higher prices was only partially realized during the three months. The natural effect of the advance has been to stimulate both mining and prospecting in Cobalt and to enable low grade ores in the mines or on the dumps to be worked, which at the former low prices of silver were without value. Nipissing continues to lead in quantity of output; Townsite City, Seneca Superior, Kerr Lake, LaRose, Cóniagas, Cobalt Lake, McKinley-Darragh-Savage, Beaver, etc., follow in the order named.

**Nickel and Copper.**—The demand for nickel and copper, due to the war, has been insatiable, and the Sudbury mines have shown a capacity for meeting the requirements which could scarcely have been anticipated. The output of nickel and copper in the matte was each 50 per cent. greater than in the first three months of 1915. If the present rate of production is maintained throughout the year, 1916 will see about 40,000 tons of nickel and 22,000 tons of copper turned out by the

smelters in the Sudbury district, as against 34,000 tons of nickel and 19,600 tons of copper in 1915. The Canadian Copper Company and the Mond Nickel Company are the producers; the Alexo mine turning out a small quantity of ore which is sold to the Mond company.

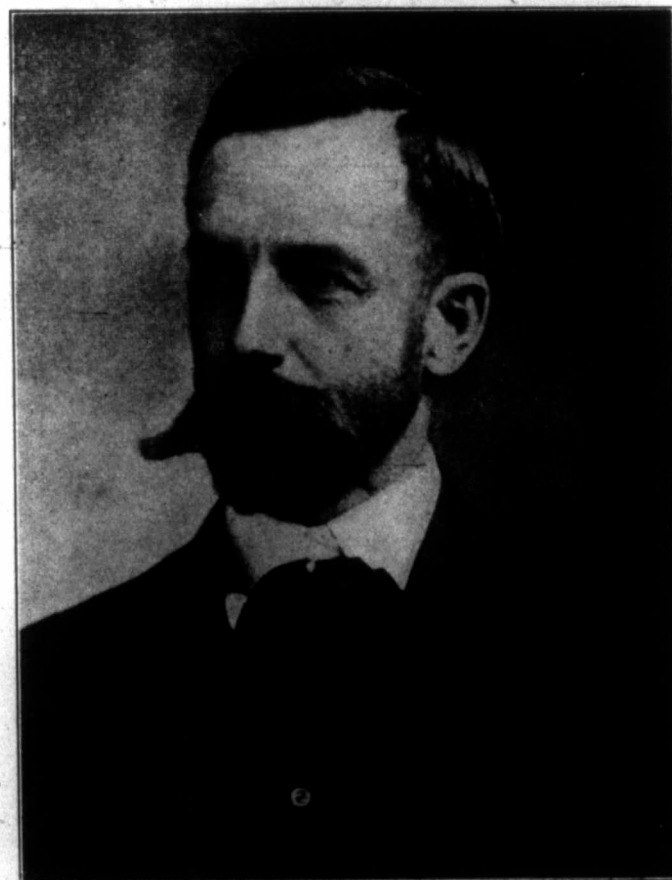
**Iron.**—The blast furnaces of the Province produced about 70 per cent. more pig iron than they did in the first quarter of 1915, and the product was worth almost 100 per cent. more. About 15 per cent. of the iron ore charged into the furnaces was taken from deposits in Ontario, the remainder coming from the United States.

**By-products of Silver.**—Cobalt oxide and nickel oxide met with a rather better demand, though the quantities exported are still below those of normal times. Metallic cobalt is coming into use, principally in steel alloys, and there is now a small quantity of nickel refined in Ontario from the silver-cobalt ores of the Cobalt camp.

### COBALT AND THE GOVERNMENT RAILWAY.

Cobalt has not only paid for the T. & N. O. Railway twice over, but the people have in the railway, now that it is connected with the National Transcontinental, a valuable property which enhances the value of the agricultural lands and timber limits tributary to it, and offers an incentive to the opening of mineral areas such as Porcupine.

Cobalt has not only brought great profit to the Province of Ontario, but it has established faith in the mineral resources of the great pre-Cambrian regions, which occupy fully one-half of the surface of Canada. Lying on the southern point of these regions, it offers encouragement to the prospecting of the vast, and little known, territories of the hinterland.



DR. W. G. MILLER  
Provincial Geologist, Ontario.

## SILVER DEPOSITS OF THE COBALT DISTRICT

Silver was first found at Cobalt in 1903, during the construction of the Ontario Government Railway. During the summer many of the workers had noticed pecu-

that time attracted little or no attention, although it occurred in profusion in two or three of the weathered outcrops."



COBALT STATION, JUNE, 1905



PROSPECTORS AT COBALT IN 1904.

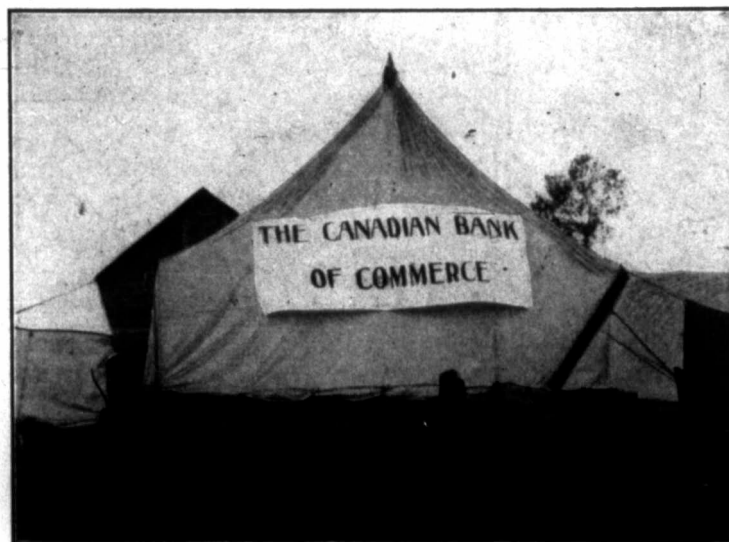
From left to right—

STANLEY GRAHAM,  
 PROF. S. F. KIRKPATRICK,  
 Queen's University, Kingston.  
 ANSON CARTWRIGHT,  
 PROF. WILGAR,  
 C. ROSS,  
 ALEX. LONGWELL,  
 Vice-President Coniagas Mines.  
 T. F. SUTHERLAND,  
 Chief Inspector of Mines of Ontario.  
 FRASER REED,  
 Superintendent Coniagas Mine.  
 VINCENT GLEASON,  
 CYRIL W. KNIGHT,  
 Assistant Provincial Geologist.

liar minerals in the rocks, and a few of them did some prospecting. Fred La Rose, blacksmith, spent some of his spare time in examining outcrops in the vicinity of his smithy, north of Cobalt lake, and located the claim which became known as the La Rose. At the south end of the lake two contractors, engaged in getting out ties for the railroad, found silver ore and located the McKinley-Darragh claims.

In October, 1903, Mr. Arthur Ferland, who located several claims at Cobalt, including the property which was taken over by the Nipissing Mining Co., showed samples of niccolite to Mr. Thomas Gibson, Deputy Minister of Mines of Ontario. Mr. Gibson sent a sample to Dr. W. G. Miller, Provincial Geologist, and asked him to examine the deposits. Dr. Miller, in his report, says of his first visit:

"At the time of my arrival in the district, in November, 1903, four veins, all of which were very rich, had been found. Three of these were within sight of the railway, and the fourth was a short distance to the southeast. The blackened, tarnished silver had up to



Canadian Bank of Commerce, Cobalt, 1905.

The Ontario Bureau of Mines, and particularly Dr. Miller, thus came into close touch with developments at Cobalt at a very early stage in its career and has played a very large part in its development. During the winter of 1903-04 publicity was given to the discoveries, and in the spring the preparation of a geological map of the area was begun by Dr. Miller and Mr. Cyril Knight. Their map was of great service to the pros-

morphosed rocks which they designated as Keewatin. On these lies a series of sedimentary rocks: conglomerate, greywacke, etc., which they call the Cobalt series. The Keewatin and Cobalt series are intruded by sills of diabase which Miller and Knight call the Nipissing diabase.

Most of the silver deposits occur in the sedimentary Cobalt series, some in the Nipissing diabase and some



Cobalt in November, 1905

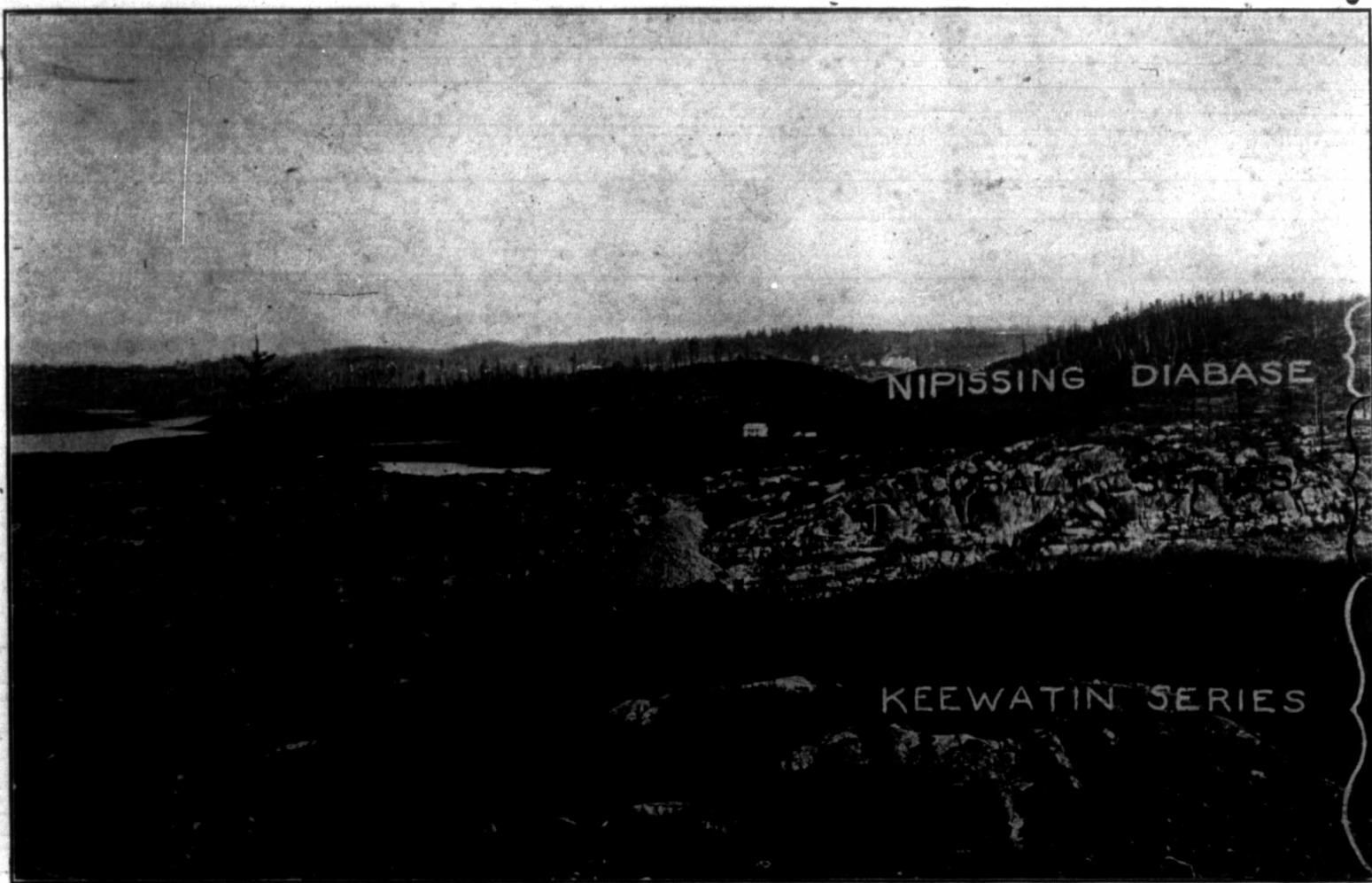


Lang Street, Cobalt, September, 1911

pectors and served as a key to the geology of a large area of Pre-Cambrian rocks.

It was soon found by Miller and Knight that the rocks at Cobalt of economic importance were of three ages. There is an old complex series of much meta-

in the Keewatin rocks. Most of the ore occurs in rocks which were probably at one time covered by diabase. Some occurs in rocks above the sill. The supposed structure is indicated in the accompanying diagrams taken from Dr. Miller's report.

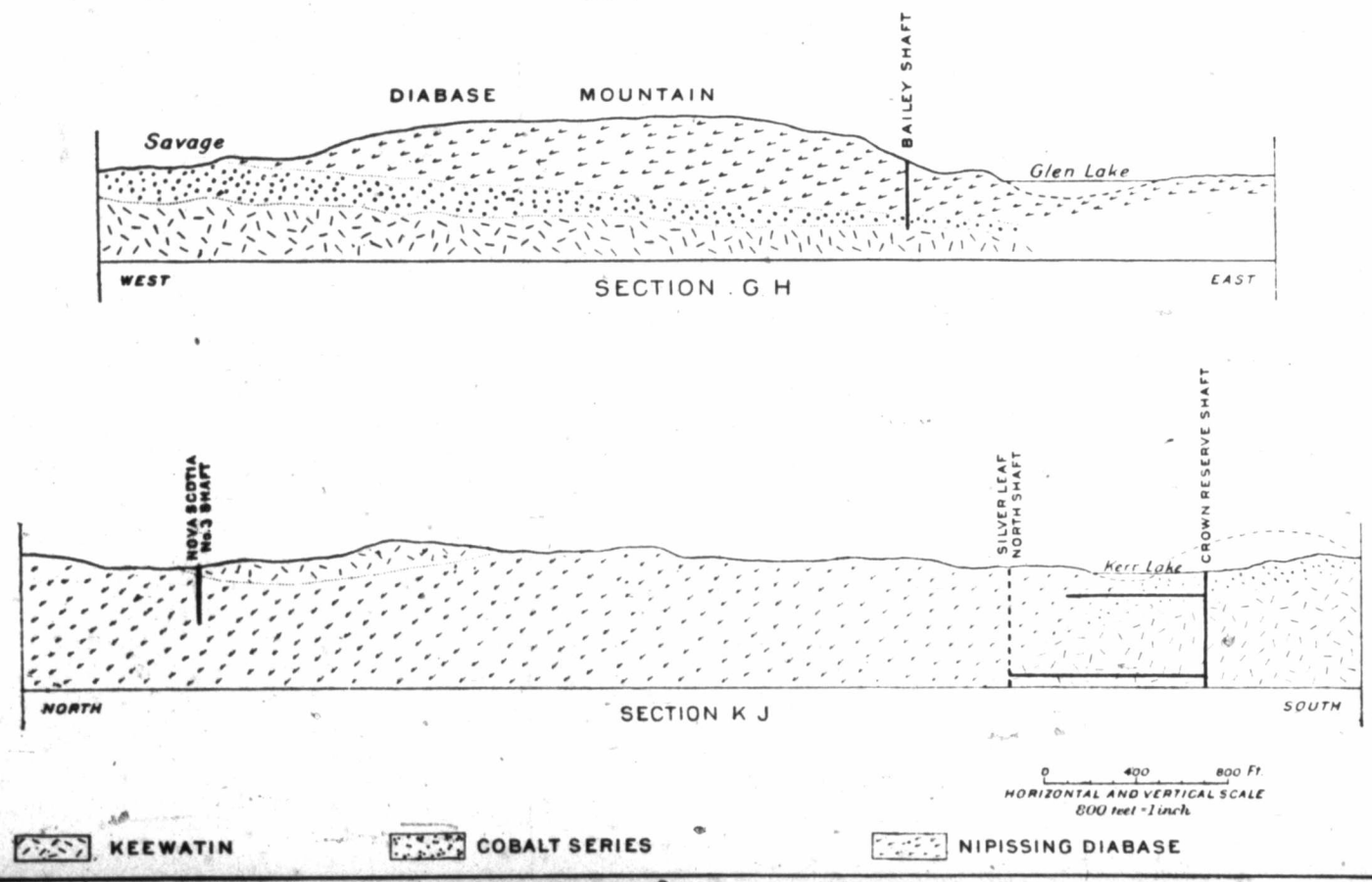


Conglomerate of Cobalt series, Cobalt.

**VIEW SHOWING THE RELATION OF ROCKS OF COBALT AREA**  
 Keewatin complex is overlain by Cobalt series sediments. The diabase is in form of a sill.

SECOND EDITION, APRIL 1913. PLATE II

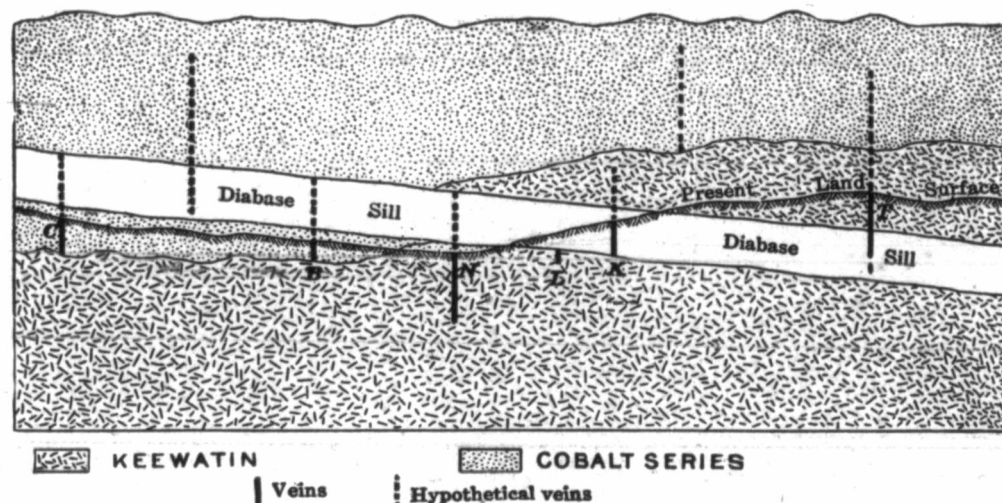
*The position of Sections is shown on the map of COBALT, scale 800 feet to an inch.*



Nipissing diabase, Cobalt.

The ore occurs chiefly in rich thin veins, generally less than one foot thick. The veins are mostly nearly vertical. The ore shoots are short. Comparatively few veins have been followed more than one thousand feet in length or over 300 feet in depth. The ore in the veins is chiefly arsenides of cobalt and nickel mixed

The profit from mining the silver deposits of the Cobalt district has been exceptionally high, the profit being nearly one-half the value of the product. The following shows the disbursements to shareholders up to January 1st, 1916:



with native silver. Silver is by far the most important mineral in the deposits.

Aside from the high grade vein ore there is a very large amount of low grade ore in which the silver is found in small particles in minute fractures in the wall rock. A considerable part of this silver occurs as a sulphide.

Shipments from Cobalt silver mines began in 1904 and up to April 1st, 1916, there had been produced 239,612,199 ounces silver, valued at over \$125,000,000. The production up to the end of 1915 was as follows:

	Ounces.	Value.
1904.....	206,875	\$ 111,887
1905.....	2,451,356	1,360,503
1906.....	5,401,766	3,667,551
1907.....	10,023,311	6,155,391
1908.....	19,437,875	9,133,378
1909.....	25,897,825	12,461,576
1910.....	30,645,181	15,478,047
1911.....	31,507,791	15,953,847
1912.....	30,243,859	17,408,935
1913.....	29,681,975	16,553,981
1914.....	25,162,841	12,765,461
1915.....	23,653,713	11,703,966
Totals.....	234,314,368	\$122,754,523

The average price received for silver during the twelve years was 52.389 cents per fine ounce. The total production of silver from all sources up to the end of 1915 had a value of \$138,293,060.

Nine Cobalt mines produced more than a million ounces each during 1915:

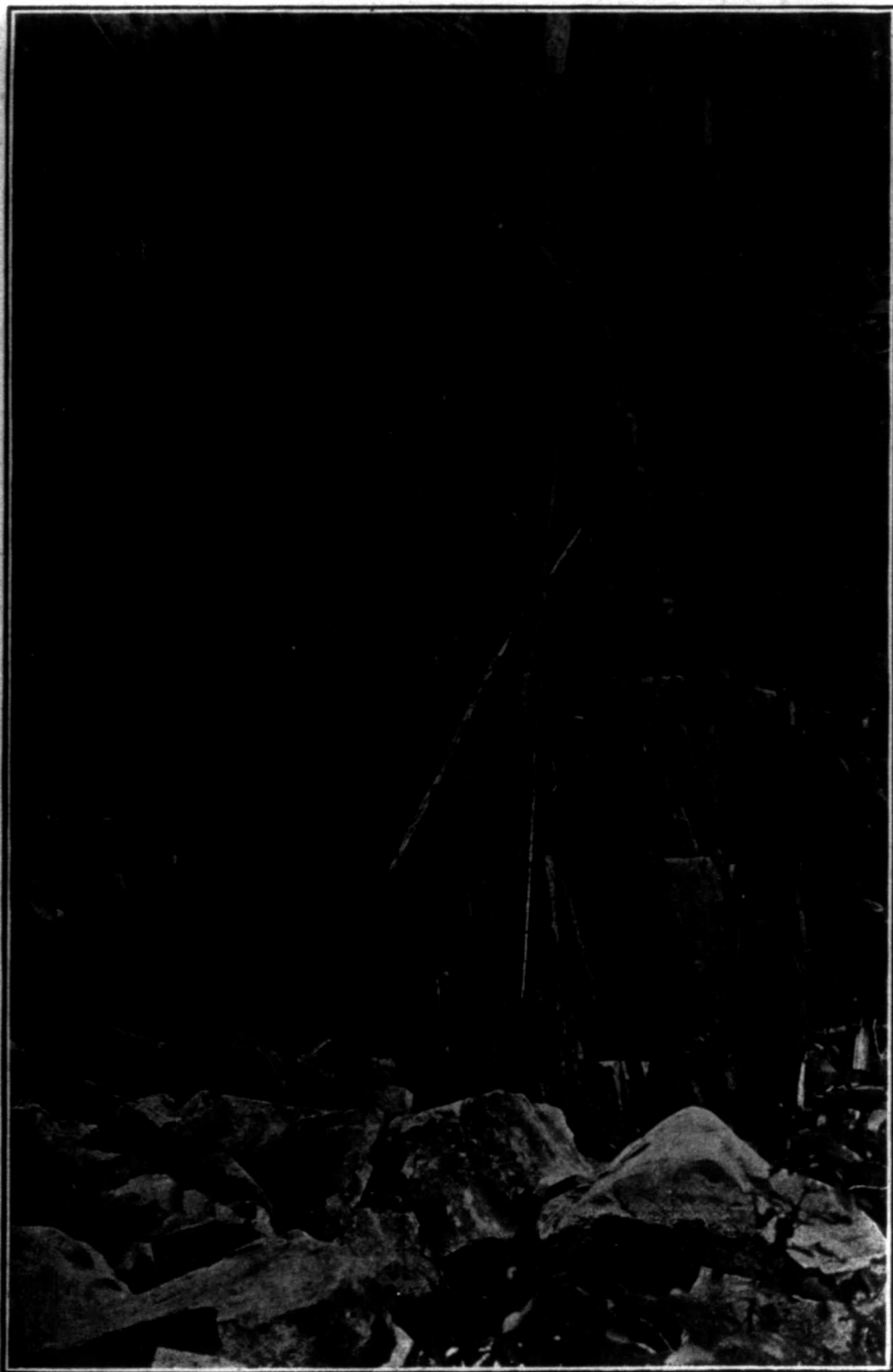
Mine.	Ounces.
Nipissing.....	4,610,051
Mining Corporation of Canada (Townsite).....	2,776,589
Kerr Lake.....	2,109,355
Seneca-Superior.....	1,996,257
Coniagas.....	1,916,616
Mining Corporation of Canada (Cobalt Lake).....	1,566,206
Timiskaming.....	1,486,400
La Rose.....	1,071,694
McKinley-Darragh-Savage.....	1,061,827

Beaver Consolidated Mines, Ltd.....	\$ 590,000
Buffalo Mines, Ltd.....	2,787,000
Caribou Cobalt.....	115,000
Casey Cobalt Mining Co., Ltd.....	203,249
City of Cobalt Mining Co., Ltd.....	145,000
Cobalt Lake Mining Co., Ltd.....	465,000
Cobalt Townsite Mining Co., Ltd.....	1,042,259
Mining Corporation of Canada, Ltd.....	768,125
Cobalt Central Mines Co., Ltd.....	192,845
Cobalt Comet Mines, Ltd.....	103,000
Cobalt Silver Queen, Ltd.....	315,000
Coniagas Mines, Ltd.....	7,840,000
Crown Reserve Mining Co., Ltd.....	6,137,784
Foster Cobalt Mining Co., Ltd.....	45,000
Kerr Lake Mining Co., Ltd.....	6,434,000
La Rose Mines, Ltd.....	5,786,668
McKinley-Darragh-Savage Mines of Cobalt, Ltd.....	4,674,207
Nipissing Mining Co., Ltd.....	14,433,297
Peterson Lake Silver-Cobalt Mining Co., Ltd.....	315,095
Right of Way Mining Co., Ltd.....	324,643
The Right of Way Mines, Ltd.....	219,115
Seneca-Superior Silver Mines, Ltd.....	645,993
Temiskaming and Hudson Bay Mining Co., Ltd.....	1,940,250
The Hudson Bay Mines, Ltd.....	778,909
Temiskaming Mining Co., Ltd.....	1,459,156
Trethewey Silver-Cobalt Mine, Ltd.....	1,061,998
Wettlaufer-Lorrain Silver Mines, Ltd.....	637,465

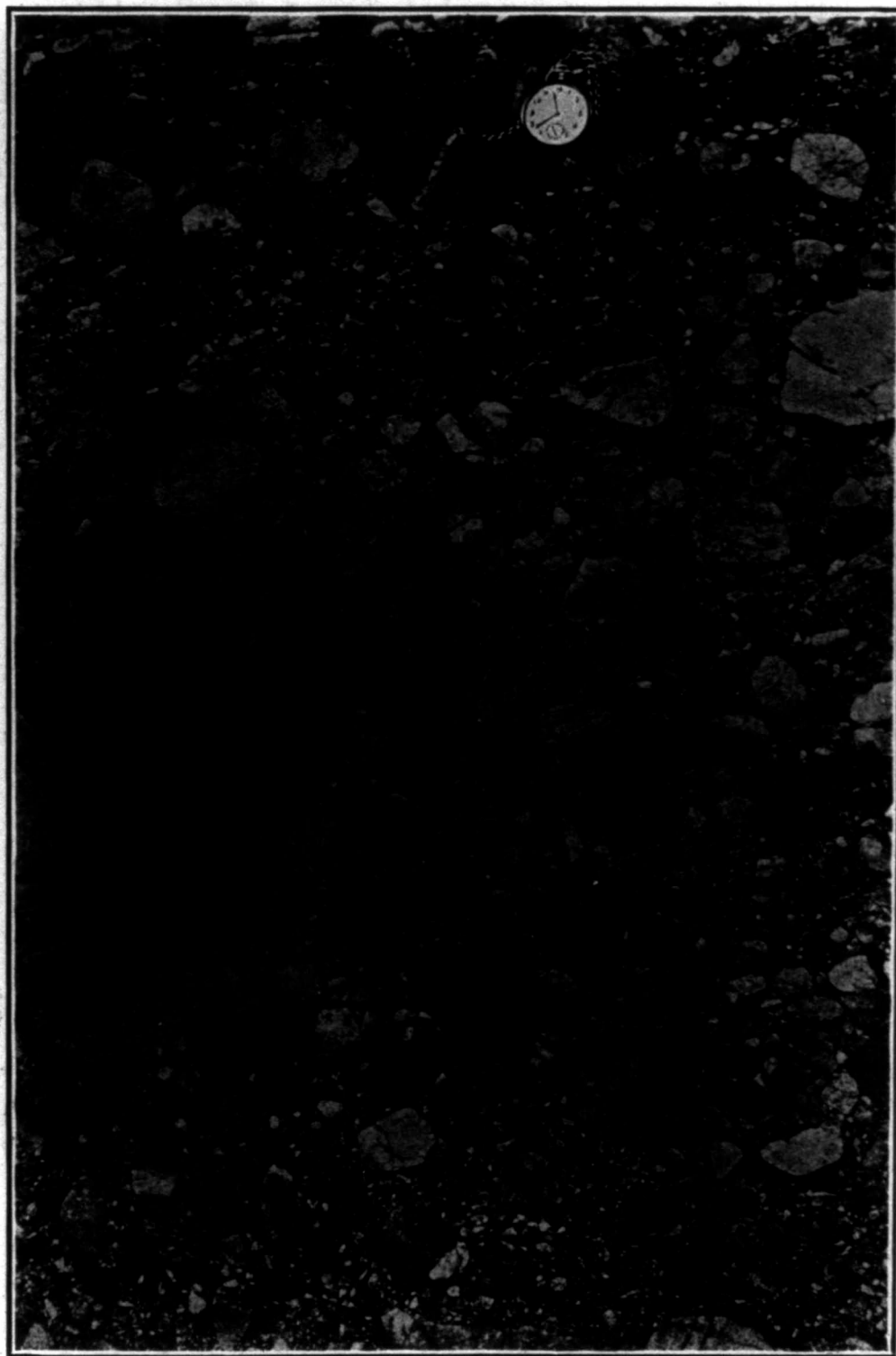
#### RECOVERY OF MERCURY AT COBALT.

In treating high-grade silver ores and concentrates at Cobalt considerable mercury is used. In the residues from the amalgamation-cyanidation process over ninety per cent. of the mercury exists as mercuric sulphide. Mr. E. B. Thornhill, formerly metallurgist at the Buffalo mine, devised a process for recovering this mercury. The sulphide is leached out with a caustic alkaline sulphide solution and the mercury precipitated with metallic aluminum. Excellent results are obtained and much of the mercury recovered has been sold at a high price during the past year.





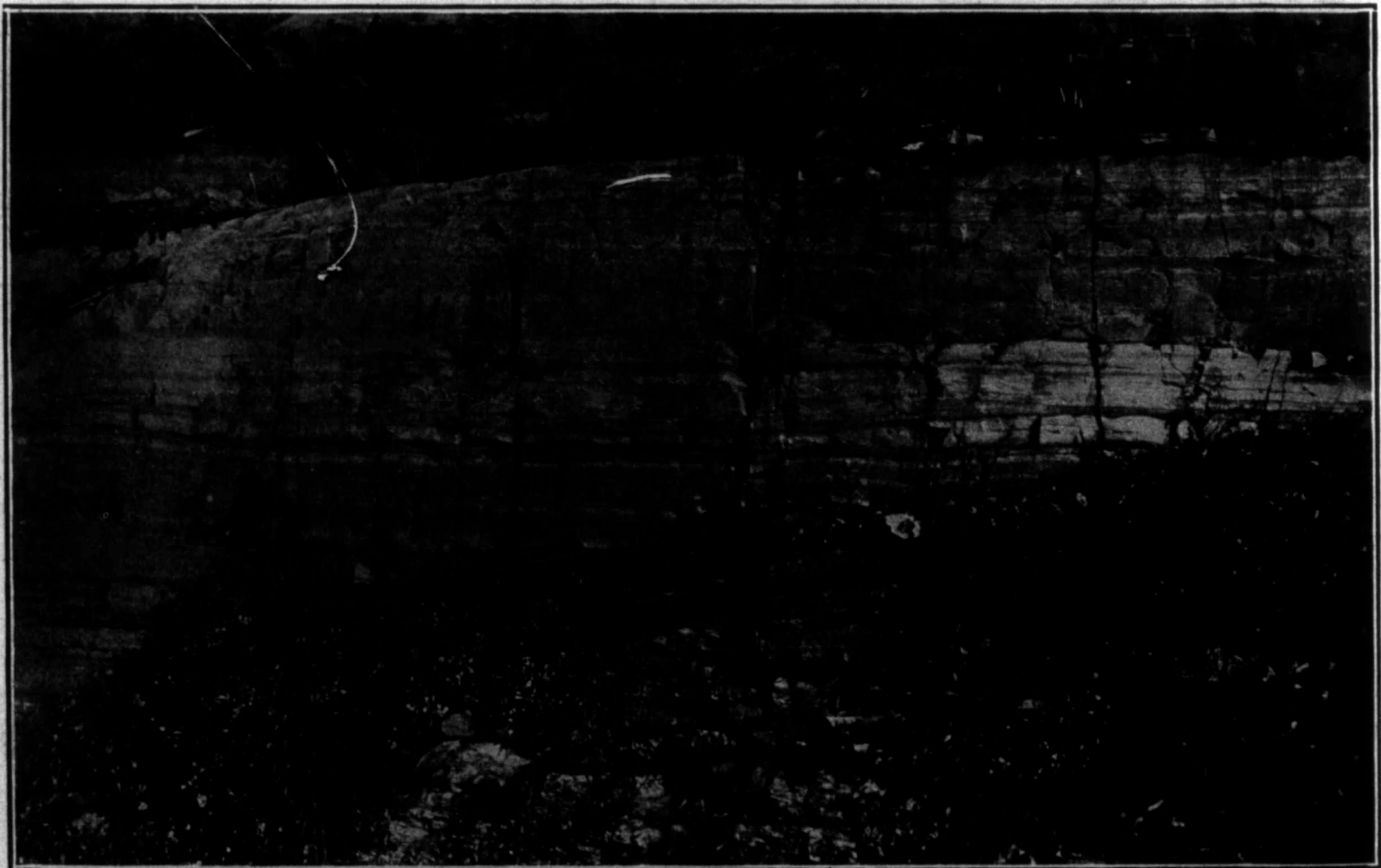
**Nipissing diabase, Cobalt.**



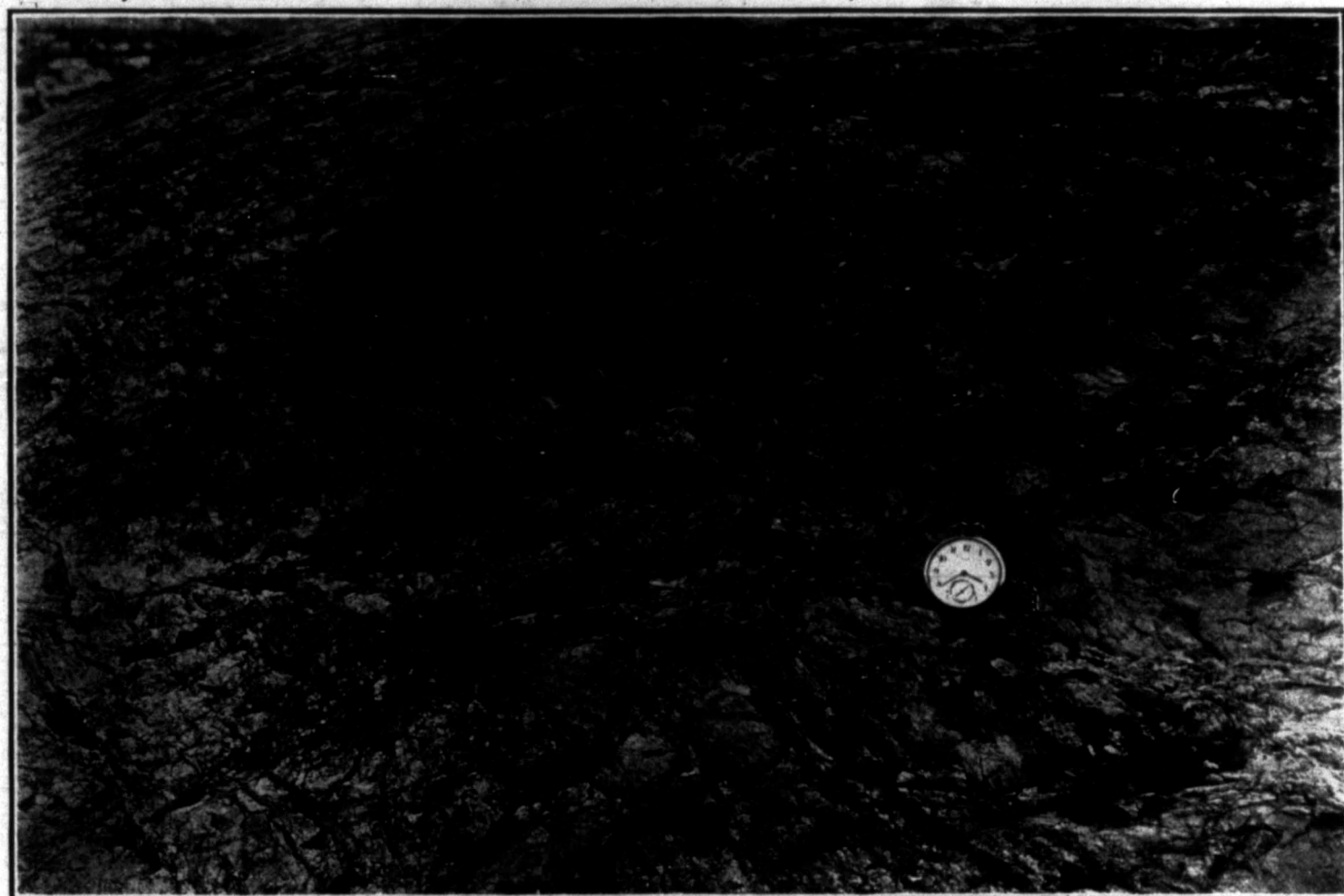
**Conglomerate of Cobalt series, Cobalt.**



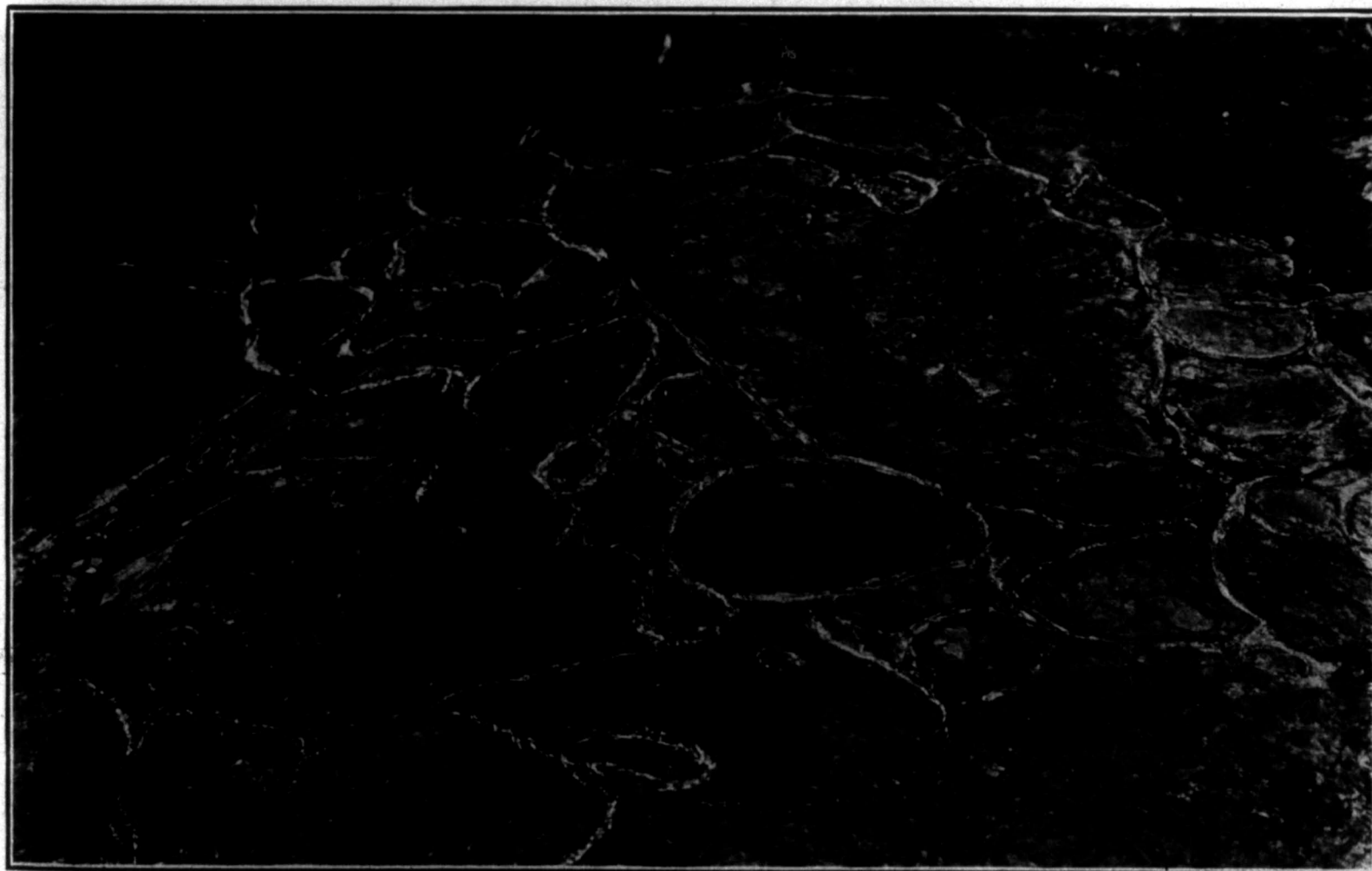
**Coarse boulder conglomerate of the Cobalt series, Cobalt.**



**Slate-like greywacke of the Cobalt series, Cobalt.**



**Characteristic weathered surface of fine-grained Keewatin greenstone, Cobalt.**



**Ellipsoidal basalt, of Keewatin series, Cobalt.**

## SILVER PRICES IN NEW YORK.

Average monthly prices of silver in New York, per fine ounce, as published by "The American Metal Market":—

	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.
January	47.57	57.05	60.69	65.29	68.67	55.67	51.75	52.37	53.79	56.22	62.93	57.56	48.89½	56.77
February	47.89	57.59	61.02	66.11	68.83	56.01	51.47	51.53	52.22	59.04	61.64	57.50½	48.48	56.75
March	48.72	56.74	58.05	64.60	67.52	55.36	50.47	51.45	52.74	58.37	57.87	58.07	50.24	57.93
April	50.56	54.20	56.60	64.76	65.46	54.50	51.43	53.22	53.33	59.23	59.49	58.52	50.25	64.41
May	54.11	55.43	57.83	66.98	65.98	52.79	52.90	53.87	53.31	60.88	60.36	58.18	49.91½	74.27
June	52.86	55.67	58.43	65.39	67.09	53.66	52.54	53.46	53.04	61.29	58.99	56.47	49.03	.....
July	53.92	58.10	58.92	65.10	68.14	53.11	51.04	54.15	52.63	60.66	58.72	54.68	47.52	.....
August	55.36	57.81	60.26	65.95	68.74	51.68	51.12	52.91	52.17	61.61	59.29	*54.34	47.18	.....
September	58.00	57.12	61.69	67.93	67.92	51.72	51.45	53.30	52.43	63.08	60.64	53.29	48.68	.....
October	60.36	57.92	62.03	69.52	62.43	51.43	50.92	55.49	53.34	63.47	60.79	50.65	49.38½	.....
November	58.11	58.45	63.85	70.81	58.67	49.65	50.70	55.64	55.72	62.79	58.99	49.10	51.71	.....
December	55.37	60.56	64.85	69.05	54.56	48.77	52.23	54.43	54.90	63.37	57.76	49.38	54.97	.....
Average	53.57	57.22	60.35	66.79	65.32	52.86	51.50	53.49	53.30	60.83	59.79½	54.81	49.69	.....

\*Quotations suspended August 1st to 21st.

## WORLD'S PRODUCTION OF SILVER.

According to figures issued by the Director of the United States Mint. (Fine ounces.)

	Quantity.	Value.
1882	86,472,091	\$98,232,300
1883	89,175,023	98,984,300
1884	81,567,801	90,785,000
1885	91,609,959	97,518,800
1886	93,297,290	92,793,500
1887	96,123,586	94,031,000
1888	108,827,606	102,185,900
1889	120,213,611	112,414,100
1890	126,095,062	131,937,000
1891	137,170,000	135,500,200
1892	153,151,762	133,404,400
1893	165,472,621	129,119,900
1894	164,610,394	104,493,000
1895	167,500,960	109,545,600
1896	157,061,370	105,859,300
1897	160,421,082	96,252,700
1898	169,055,253	99,742,600
1899	168,337,452	101,002,600
1900	173,591,364	107,626,400
1901	173,011,283	103,806,700
1902	162,763,483	86,264,700
1903	167,689,322	90,552,200
1904	164,195,266	95,233,300
1905	172,317,688	105,113,700
1906	165,054,497	111,721,100
1907	184,206,984	121,577,100
1908	203,131,404	108,655,100
1909	212,149,023	110,364,400
1910	221,715,763	119,727,000
1911	226,192,923	122,143,800
1912	224,310,654	137,883,800
1913	223,907,845	135,246,400
1914	211,339,749	116,849,900
1915	.....	.....

The gross freight revenue of the Temiskaming and Northern Ontario Railway in 1915 was \$997,342. Of this \$445,843, or 46 per cent. is attributed to the mining industry.

## THE PRICE OF SILVER

A distinctly interesting article bearing on the price of silver appears in the Financial News of London, England, from which we quote the following:

Messrs. Samuel Montagu & Co., in their bullion circular, give the principal explanation of the rise. We can hardly do better than quote one passage: "Not only the position of the market at present, considered as a whole, but also its strength, is unique. The quotation fell quite as heavily when silver was demonetized upon a large scale; but no advance in the price has ever been so sustained. Now an exactly reverse operation is taking place. Silver is being monetized upon a large scale." Here we have the position in a nutshell. The persistent and sustained advance cannot be attributed to speculation, though in every prolonged movement like that now being witnessed the speculative fraternity is fairly certain to fasten on the hem of the investment garment. Speculation now exercises virtually no influence upon the fluctuations in the metal. The buying is not confined to one Government alone; hence the strength of the market.

For half a century the price of bar silver has continued on the down grade until last year it reached what may be regarded as its nadir, of 23½d per ounce. To what heights it will soar remains to be seen. The chances are in favor of a further recovery towards the old level of 60d; when the movement will be stayed depends upon various factors. According to some views there is a "national limit" to the rise, the limit being reached when it would be profitable to send rupees back from India to be melted. Before such a stage is reached a further 8d or so per ounce must be added to the existing price, while at 46d Messrs. Samuel Montagu and Co. are of opinion that it would begin to be worth while to ship the Straits dollar to Europe for refinement. Such an authoritative statement is worthy of consideration. But the point that does not seem quite lucid is whether sufficient rupees and Straits dollars could be collected for shipment here to satisfy all demands. As already mentioned, the claims on the silver production of the world are not confined to this country or to India; the requirements are general. Supposing hoards of Eastern silver could be secured

for Europe, would the character of the natives change, or would there be a desire to replenish?

Messrs. Samuel Montagu and Co. recognize difficulties; for they say: "An advance in the price of silver to 45d would create a serious problem for the Imperial authorities. Considering the size of the stock of rupees, it would be impossible to recall and remint the metal quickly into a coin with less silver content." India is a large user of silver, and, as the stock of rupees seems to be diminishing, it would be interesting to learn whether she is coming forward again as a purchaser. In some quarters the view is held that, with gold vanishing and with paper currencies expanding in various countries, some scheme will be attempted—not necessarily in this country—to establish a silver backing to the notes. Who shall say that impoverished Germany may not have to revert to silver, or take steps in this direction, to give some value to the mass of worthless paper which she has printed during the war? China is not a negligible quantity where silver is concerned. There is a movement in that country for a standardization of coinage. Should this proposal eventuate the influence upon the price of silver would be pronounced.

## THE PLACE AND USES OF SILVER

By Thomas W. Gibson, Deputy Minister of Mines, Ontario.

In common speech, silver is linked with gold as one of the "precious metals," but this should not be permitted to obscure the fact that, unlike gold, silver is a commodity pure and simple, whose price depends upon supply and demand. The general abandonment of silver as a basis for currency has deprived it of any claim to fixity of value in relation to gold.

Nevertheless, the production of silver has for many years gone on at an increasing rate. This has been due in large part to the fact that the most important sources of silver are not primarily ores of that metal, but ores of gold, copper and lead which carry a sufficient proportion of silver to warrant its recovery as a by-product. Cobalt is one of the few camps where silver is worked for itself, and so far the richness of its ores has enabled the mines to produce freely, notwithstanding the low prices which in the main have prevailed since they were opened.

For coinage purposes silver disputes, or rather divides, the field with gold, copper and nickel. In all countries gold is used for coins of the largest value, silver for those of medium, and copper or nickel for those of smaller computation. The fact that the present intrinsic value of silver coins is much less than their face or denomination value does not appear to detract from their usefulness, which primarily depends upon their ability to pass from one person to another without demur. That a 50-cent Canadian coin, the silver in which is worth 75 cents per ounce only, say, 26 cents, or a 25-cent piece worth only 13 cents, circulates freely at face value is due not only to the coins being legal tender, but also to the circumstance that they were first made legal tender at a time when their nominal and real value much more nearly corresponded than they do now. Use and wont have habituated people to the situation, and silver "change" for a \$5 gold piece is given and accepted without thought, and in many cases doubtless without knowledge, that if the silver and gold were both melted the latter would sell for \$5, while the former would bring only \$2.60. Even if silver were to sink to a point much below its present

price, it is unlikely that the general acceptance of our silver coins would be seriously affected. If in the future it should become necessary to lessen the gap between the real and face value of silver coins, which could be done by lowering the denomination or increasing the weight, the many advantages of silver for coinage purposes would in all probability retain it in use.

It may be observed that it is the Government which coins the silver, and stamps it with its nominal value, that profits by the difference, and not at all the miner of the silver, who sells it to the mint for the same price as to any other buyer. That these profits are considerable may be deduced from the fact that in Great Britain the rate of seignorage rose from 9.09 per cent. in 1870, when the average price per standard ounce of silver (925 fine) was 60½d, to 135.29 per cent. in 1913, when the price paid by the Mint had fallen to 28 1/16d. In fact, the gross profit on the coinage of silver by the British Mint of late years has been very great. In 1910 it amounted to £1,582,858, in 1912 to £1,142,538, and in 1913 to £762,926. Silver coins of a value of £1,934,404 were issued by the London Mint in 1913, and of a value of \$1,175,000 by the Canadian Mint in the same year. The estimated face value of Canadian silver coin in circulation in Canada on 31st December, 1913, was \$17,901,031. During that year, it may be noted, foreign silver (mainly of the United States) to the extent of \$2,034,937 was deported by the Finance Department. The advantages possessed by silver as a circulating medium are thus supplemented by the financial benefit which governments all the world over derive from its coinage, and it may therefore readily be assumed that this use will afford a permanent outlet for the metal.

Another unailing employment of silver, and one which is steadily increasing, is in the arts and manufactures. Solid silver plate, for instance, is not now the mark of luxury, or so far removed from the reach of people of moderate means as it used to be, and in proportion to the decrease in price of an article so generally desired as silver, is likely to be the increase in its use for purposes of this kind.

### COBALT.

Cobalt is one of the chief constituents of the silver ores of the Cobalt district. In fact the district owes its name to the abundance of cobalt in the silver ores. It is said that Dr. W. G. Miller put up a sign "Cobalt Station" at Long lake and that the town and lake have been known by that name ever since.

Cobalt is recovered as a by-product in the treatment of the silver ores at the smelters. For the most part it comes into the market in the form of an oxide. It is used chiefly as a coloring agent in pottery manufacture.

Metallurgical cobalt has recently come into use for electroplating. It resembles nickel, but is somewhat more lustrous. During the past year cobalt anodes for the electroplating industry have been manufactured in Ontario.

Alloys of cobalt, chromium, tungsten and molybdenum make excellent lathe tools. An alloy known as stellite is now being manufactured by the Deloro Mining and Reduction Co. It is much superior to ordinary tool steel.

Mr. T. W. Gibson has recently suggested the use of cobalt for coins. It would make a very attractive coin, superior to nickel. One problem to be met in coining cobalt is to soften it. This may possibly be accomplished by alloying with magnesium.

## THE TREATMENT OF COBALT SILVER ORES

Cobalt silver ores have received the attention of many of the best metallurgists. Consisting largely of arsenic, cobalt, nickel and silver they presented many problems to those who first undertook to treat them. At first there was a good price available for cobalt and arsenic and the difficulty of separating the constituents was partially offset by the value of the products. As the production increased, however, the price of cobalt and arsenic decreased, the market for these substances being very limited. Nickel in the ores, instead of being a source of revenue as the original discoverers of niccolite naturally expected, proved to be an undesirable constituent.

At first the ore produced at Cobalt was hand picked and shipped to American smelters. Low grade ore was not treated. Then smelters were established in Ontario at Copper Cliff, Thorold and Deloro and concentrating mills were built at the mines for treating low grade ores. Cyaniding was soon adopted by several companies and finally an amalgamation-cyanidation process for treating high-grade ore was worked out and put into operation at the Nipissing property. A considerable portion of the silver production now leaves Cobalt in the form of bullion. A large proportion of the high grade ore and concentrates goes to Ontario smelters at Thorold and Deloro. Some high grade ore, concentrates and low grade ore is still shipped to United States smelters for treatment.

The Ontario smelters for some time produced chiefly silver, white arsenic and cobalt and nickel oxides. Recently, however, they have been producing metallic cobalt and nickel as well.

During the past year there have been put into operation at Cobalt several experimental plants for the treatment of low grade ore by the oil flotation process. It has been found that a good recovery can be made from tailings carrying a few ounces of silver per ton. As there are many thousands of mill tailings at Cobalt which carry four to eight ounces per ton it is expected that the oil flotation process will be used to advantage. It has been found that the native silver in the tailings is not very readily recovered, but the silver sulphides are. In the tailings much of the silver is present in the form of sulphide minerals.

One difficulty which presents itself to those who adopt the oil flotation process is the disposal of the concentrate produced. The cyanide process gives a product which is melted down at the mine into bullion. The flotation process gives a product which needs to be further treated. Smelting may prove to be the best method of handling the flotation product.

From the results obtained in the experimental cells which have been in operation for some months, two companies concluded to put in a few units of large size. The Buffalo and McKinley-Darragh plants are nearly ready for operation and the results obtained will be of great interest to operators. We will publish in an early number of the Canadian Mining Journal a description of these oil flotation plants.

According to the report of Mr. A. A. Cole, mining engineer of the T. & N. O. Ry., there was milled at Cobalt in 1915, 486,924 tons ore, producing 9,657 tons concentrates. There was treated by cyanide plants 206,858 tons low grade ore, yielding bullion contain-

ing 4,139,918 oz. silver. There was also treated a large quantity of slimes. At the Buffalo and Nipissing high-grade plants there was treated in 1915, 1,472 tons ore and 459 tons concentrate, yielding bullion containing 4,515,448 oz. silver.

According to Mr. Cole's report, 16 per cent. of the silver produced from Cobalt ores in 1915 was from ore treated by U. S. smelters. Southern Ontario smelters yielded 45% of the bullion and plants at Cobalt 39 per cent. The 16 per cent. still going to the United States consists of some high grade ore along with all the low grade material, both ore and concentrates, shipped. The Canadian smelters are not equipped to handle this low grade material. In the high grade mills at Cobalt the silver only is recovered, the cobalt, nickel and arsenic being left in the residue for future treatment or sold for the cobalt content. The Deloro and Thorold smelters are equipped with complete refineries and produce arsenic, cobalt and nickel ready for the market.

### WHY HEAVY MINERALS FLOAT.

According to Mr. Geo. D. Van Arsdale, of New York, in a recent bulletin of the American Institute of Mining Engineers, the immediate cause of the main phenomenon of flotation is the resultant of the several surface tensions involved, together with the wetness or non-wetness of the particle, but electrostatics is probably very important as a secondary cause, which may and probably does act in at least two different ways: (1) as one of the causes of wetness or non-wetness; and (2) as one of the possible causes of oil attraction to mineral particles.

"Any substance specifically heavier than water may be made to float by reason of surface tension provided its size be small enough, and provided the particle be non-wet, that is, has a sufficient surface film, which may be either solid, liquid or gas, electrostatic charge, or a combination of these. A non-wet particle in contact with a gas bubble will float while a wet will sink. Hence separation of particles of ore from particles of gangue becomes possible.



COBALT IN 1905

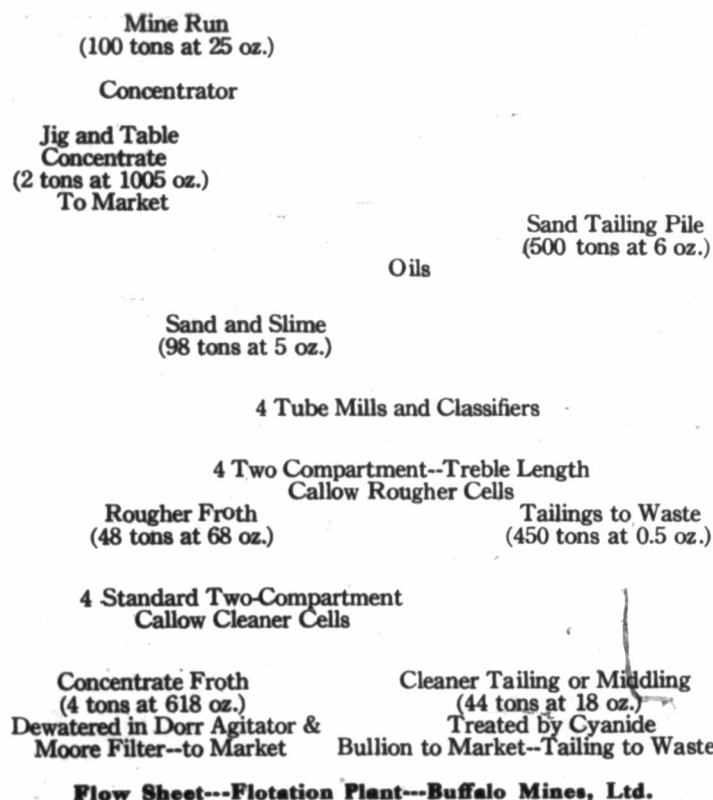
# CONCENTRATION OF COBALT SILVER ORES BY OIL FLOTATION\*

By A. A. Cole.

The applicability of concentration by oil flotation to Cobalt ores has been demonstrated and a number of companies are now planning oil flotation installations.

The most extensive experimental work has been carried on at the Buffalo mine where a 50-ton plant was put into operation in the fall of 1915 using the Callow Pneumatic Process. The results obtained from this plant were so satisfactory that a larger installation was deemed desirable, and work is now well under way installing a flotation plant to have a daily capacity of 600 tons.

The fine grinding equipment will consist of four 5-ft. 6 in. x 20 ft. 0 in. tube-mills and the flotation equipment will be four, two-compartment, treble length, Callow pneumatic cells used as roughers, followed by four standard two-compartment Callow pneumatic cells used as cleaners. The old cyanide plant will be used for de-watering the flotation concentrate and for the treatment by cyanide of a quantity of flotation middling.



Flow Sheet---Flotation Plant---Buffalo Mines, Ltd.

The process is one which is particularly applicable to the low grade material which makes up the tailing piles of the camp and will make available for treatment immense tonnages of rock which heretofore have been considered of little or no immediate value.

At the Buffalo it is proposed to treat 600 tons daily made up of 100 tons of mine rock and 500 tons of material from the old tailing pile. The mine rock will be run through the concentrator as formerly and the tailing resulting will be sent to tube-mills for further grinding. The 500 tons of material from the tailing pile will be sent directly to tube-mills and the whole product ground to pass 120 mesh. This material after

the addition of suitable oils is sent to the flotation cells where the valuable mineral is floated and collected and the worthless gangue run to waste.

The product collected, containing the silver values, will be run to cleaner cells where a further separation will be made dividing the values into two products, one for shipment and one which will be treated by cyanide on the property.

The tonnages and values in the different products, based upon the experimental work done, will be approximately as indicated in the accompanying flow sheet.

Good results are obtainable by returning the cleaner tailing to the rougher cell. There appears at present to be a decided advantage, however, in treating a small tonnage of a middling by cyanide owing to the slightly greater total recovery and to the saving effected in freight and smelter charges.

Construction is well under way and the plant should be in operation early in the summer of 1916.

The McKinley-Darragh-Savage Company is installing a 200-ton unit for the treatment of current tailing, and several other companies are carrying on flotation experimental work and have plants in contemplation.

## NATIONAL MINES.

The old King Edward property on Cross Lake which was formerly operated under lease by the York Ontario Silver Mines, Ltd., is now being developed by the National Mines Co., of Rochester.

## COCHRANE.

The Cochrane mine in southeast Coleman, adjoining the Temiskaming, is being unwatered by the Crown Reserve Mining Co. The property was formerly under option to the General Assets Co.

## ARSENIC.

Arsenic is one of the chief constituents of the Cobalt silver ores. It is recovered as a by-product and sold as white arsenic, the oxide.

Arsenic is used in glass manufacture. It is said to help remove impurities and also to enter into the glass. Plate-glass factories use large quantities.

White arsenic and arsenate of soda are used in the manufacture of Paris green, lead arsenate and other insecticides.



COBALT IN 1905

\*Extract from report to T. & N. O. Ry. Commission.

## RECENT DEVELOPMENTS IN THE COBALT DISTRICT

There is now evident at Cobalt a great desire to take up old silver prospects and work them. The Trethewey started work again on the 1st of June and will continue to work regularly from now on. Six drills are running and the mill is treating 100 tons of ore a day. The ore is coming from old stopes in the mine and not much development work is being undertaken. The last annual report of the Trethewey showed that in February of 1915, there was in sight in blocked-out ore 7,139 tons and this, with the broken ore, totalled 11,064 tons. The mine has been kept clear of water and the mill was soon put in shape, so that development could soon be resumed. It is probable that the Trethewey will be a steady producer from this time forward, until the mine is definitely worked out, which may be some time to come, in view of the increased tonnage that the higher price of silver has made profitable.

In the month of May the Nipissing produced \$2,901,898, against \$124,452 in April, or an increase of almost 75 per cent. This production was obtained without drawing upon the main stopes at the Meyer at all. A large portion of the month's production came from development work on vein 490. To date the drifts on the winze level of this vein have developed 225 ft. of 4-in. ore, assaying 1,200 oz. to the ton. Further development will be carried on on vein 490 and the management believes that this will most probably meet with success.

It is satisfactory to note that the orebody found on the north claim of the Nipissing, which has never yielded the company anything before, is showing persistence. The vein was picked up at the second level of the shaft sunk on the O'Brien property, near the Nipissing line and the operations are being carried on at the joint expense of the two companies. The vein now shows on the Nipissing side of the line for a distance of 114 ft. It is singular in that the vein itself is small and usually of low assay, but the adjoining wall rock is so impregnated with silver that the entire width of the drift has an average value of 50 oz. No ore has as yet been taken out of this work.

While the price of silver is still good, old dumps all over the 800 odd acres of the Nipissing are being cleaned up and taken to the central mill. The same applies to the low-grade ore that has been left on the old open cuts on the surface. On Nipissing hill itself the shafts 123 and 86 are being reopened and all the ore in sight taken out. It is the history of all good veins and ore deposits in the camp, that when the final cleaning up is made they produce far more ore than could have been anticipated. All these auxiliary supplies of ore made it possible for the Nipissing to more than maintain production and yet not deplete the main ore reserves hardly at all.

As a commentary on the result of the higher price of silver on Nipissing production, it is to be noted that the Nipissing company received from its own and customs ore during the month of May, \$420,822 from 558,148 oz.; while in March the company received \$322,176 for only 6,227 oz. less, being an increase of almost \$100,000 for a little less silver produced. There is no disposition on the part of either the Nipissing or the other mines in the camp to do more than clean up old dumps while silver is high.

The exception may be at Kerr Lake. This property is maintaining a record production since silver grew

in value. The production from the Kerr Lake mine is being maintained at about 225,000 oz. a month. Of this, 125,000 oz. is very high grade ore, and to-day it may be said that the Kerr Lake is about the only regularly producing mine that is obtaining the majority of its profits from the mining of high grade ore. This is true in normal times. Last month the Nipissing mined more high grade than milling ore, but as a general rule it is true. In the first eight months of their fiscal year, the Kerr Lake Mining Company had produced approximately 1,450,000 oz. With a regular production of 225,000 oz. the gross production for the year will be well over two million and a quarter ounces. This would give a production of about a quarter of a million ounces more than in 1915, but owing to the very much higher value per ounce, the profits will be 25 to 30 per cent. higher at least. At the other end of the scale, it is also to be noted that costs will be down. For the bare mining and hoisting at the mine the company only now pays at the rate of six cents an ounce. While it is quite true that this heavy production is making inroads on the stopes of the Kerr Lake, the much wider extent of the enrichment will admit of the putting in sight of considerably more ore than could have been anticipated when estimates were made by Mr. Livermore last year. Stopes are now being broken through to the surface on the very rich veins found at the bottom of Kerr Lake when the lake was drained. One of these veins was so rich that sufficient ore was taken from one short open cut to pay for the Kerr Lake share of the entire cost of draining the lake. Development and stoping is showing up a remarkable width of low grade ore. One of the stopes on the lake vein is now 80 feet wide on the 140-ft. level, and it is quite possible that the whole of the surface from the 140-ft. level will pay to "Glory Hole."

The Kerr Lake Mining Company is also finding that the old Drummond mine, which was purchased from the Caribou Cobalt Mines, is proving a good investment. Last July they bought 837,400 shares of the one million shares issued of the Caribou Cobalt for \$50,000. Since they commenced to operate the property they have only failed to make a profit one month in the year. They have been shipping 25 tons of ore to the Dominion Reduction Company every day, but recently they have been breaking so much mill ore that they have doubled this amount. The new discovery on the hill is now practically stripped of high grade ore, but the mill ore and the wall rock is proving of exceptional width. The Big Chamber is again being stoped out. It was found that at the present price of silver, the "fill" was quite well worth sending to the mill and it is now being taken out. The wall rock has also been tested and several feet more have proved to be profitable to mill and are now being broken down. Occasional patches of high grade ore were also found in the mill rock.

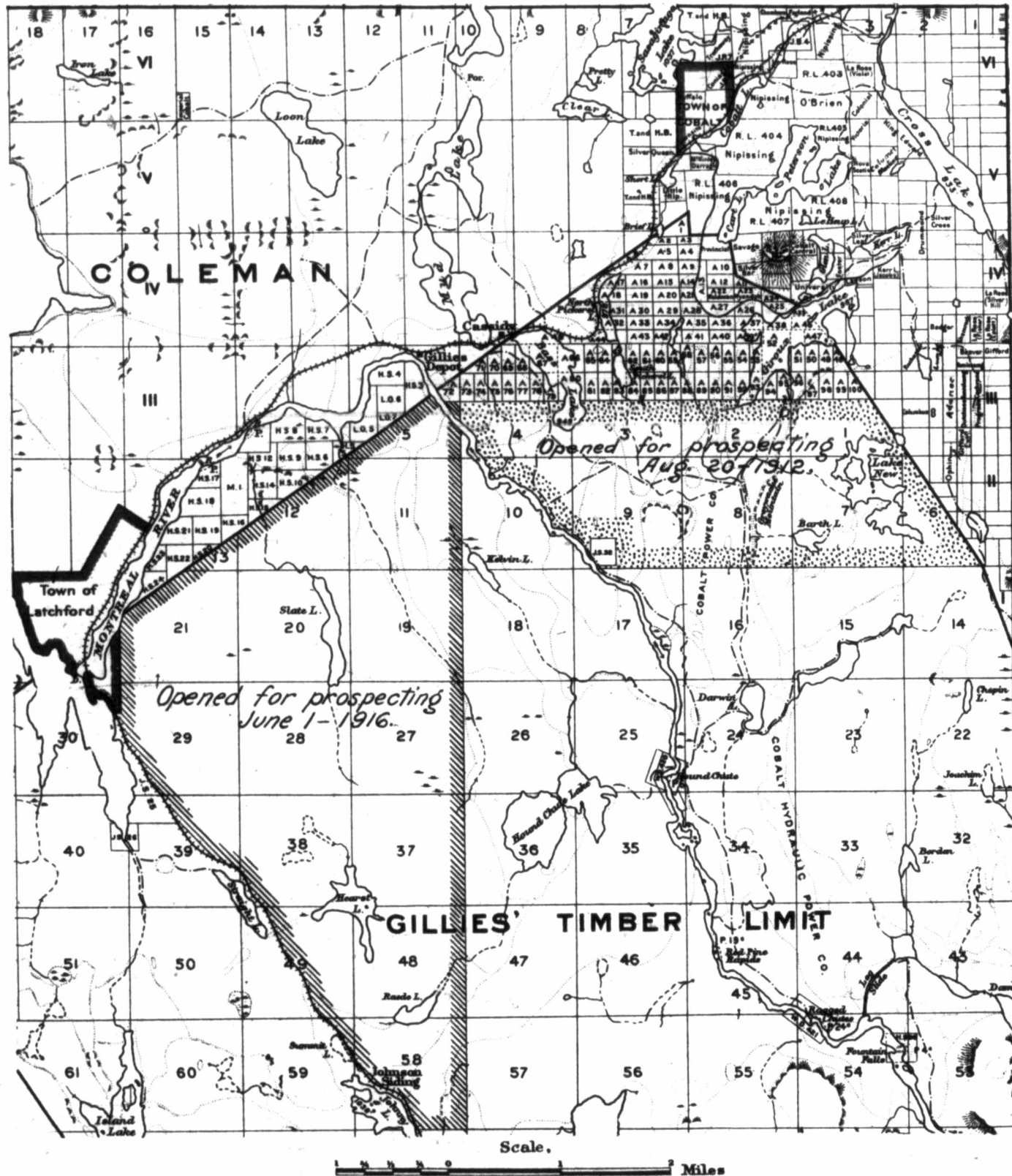
The Kerr Lake Mining Company has pursued the energetic policy of taking up prospects and developing them, during the past year. Apart from the Cobalt Comet they are now working under option the St. Anthony mine in Western Ontario and they still have an option on the Smith-LaBine property at Sesekinika, although they are doing no work on these claims at present. They have recently taken an option on the Maidens property in South Lorrain and have dewatered the shaft and will thoroughly sample. It is con-



tended by the owners that there is a good body of milling ore here, although its existence has never been definitely established before.

Developments in the South Lorrain camp, considering the small amount of work that has been under-

inches of 10,000 oz. ore. It was close to the contact between the Keewatin rocks and the diabase, and it seems most probable that if other prospects were developed along this contact that further ore would be discovered.



taken during the past six years, are distinctly encouraging. Upon the Pittsburg-Lorrain, which company is working the old Curry adjoining the Wettlaufer, there has recently been found a wonderfully rich shoot of ore. The extent of this orebody is, of course, not yet determined, but where it was struck it was four

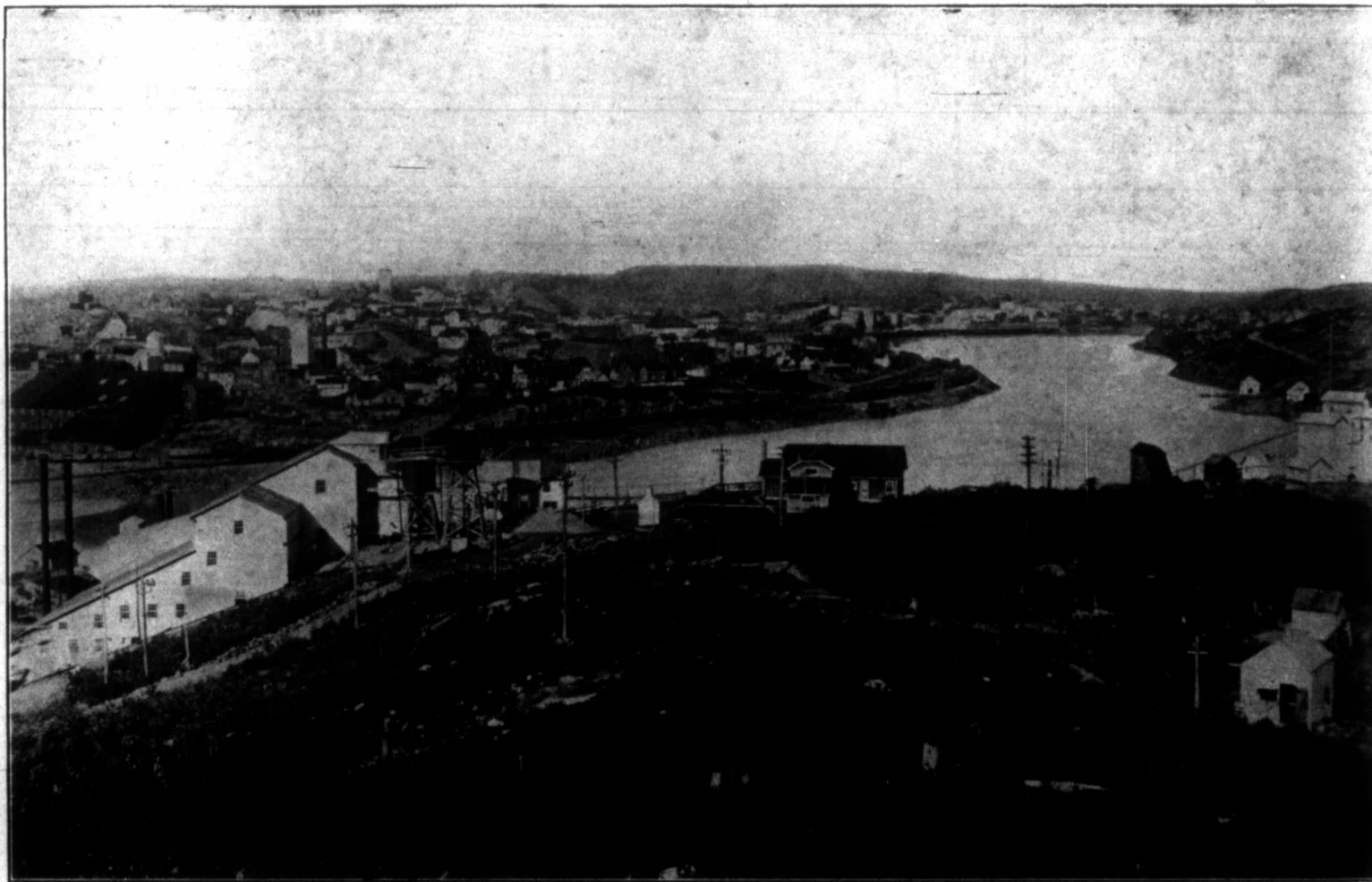
The Bellellen is now working in a winze about 100 feet below the 150-ft. level, or 275 ft. below the collar of the shaft. In the winze now the vein is 18 in. wide. Silver contents are low, but they are yet a considerable distance above contact and the prospects of them getting into ore lower down are quite good.

The Comfort Leasing and Mining Company is working the Wettlaufer and has already obtained such results that it is certain that they will make handsome profits on their lease. A little encouragement in new ground in the South Lorrain camp would lead many old claim owners to resume operations in this section of the silver field.

Gowganda is in a different category, since transportation is so difficult and tedious. There is not much of real importance to encourage mining men to take up

will be built between the Silver Queen and the Townsite; the Silver Queen to pay two-thirds of the expense and the Townsite, McKinley-Darragh and Right-of-Way to share the other third.

While there has been almost as rapid a decrease in the price of silver as in its rise, there is no lack of confidence in the belief that it will maintain a highly profitable level for operators. During the past three weeks it has shown a drop of between 7 and 8 cents, which is quite material. This drop will affect the pro-



COBALT LAKE AND TOWN, 1911

claims so far back from the railway, over such a vile road. The Miller Lake-O'Brien continues to be the only steadily producing mine in the camp, although the Reeves-Dobie is being worked and several prospects round Calcite lake are active. The Royal Silver mines in Auld Township, near Elk Lake, have taken in two 40 H.P. boilers and a five-drill compressor, to work the silver veins in the diabase. In this township there are quite a number of small veins in the diabase showing native silver, but the poor record of Elk Lake has hindered the introduction of capital in working these deposits.

The Silver Queen Mining Company is now working the old Silver Queen again. The difficulty with regard to water has been settled after a long controversy. Nearly all the mines to the south and west of the town have broken through their party walls, so that broadly speaking when one is flooded all will be more or less flooded, unless some provision were made to segregate them. It has now been arranged that concrete dams

posed sliding scale of wages which the companies had decided to put into force. The men will, of course, get the increase for the month of May, as the average was well over seventy cents, but if the price does not speedily recover, they will certainly not get it in June. There has been some little further dissatisfaction with even the recent increase in wages and as silver will probably show an average of less than seventy cents in June, this will mean that surface workers who are getting from \$2.25 to \$2.75 a day will not receive any benefit from the increase at all. It is quite possible there may be a further adjustment in the wages, as it is recognized that the cost of living has gone up very considerably.

#### ROGNON GOLD MINES, LTD.

The corporate name of Laurentian Consolidated Mines, Ltd., has been changed to Rognon Gold Mines, Ltd.

## FLINFLON LAKE DISTRICT

In the summary report of the Geological Survey for the year 1915 Mr. E. L. Bruce says of the deposits at Flinflon lake, examined by him in 1915:

"Late in the summer of 1915 discoveries of mixed sulphides were made at Flinflon lake and much staking and some development work have been done. The canoe route to this lake leaves the north arm of Athapapuskow by way of Trout creek which is ascended to Schist lake. At the north end of the long arm that trends a little west of north is a large creek. This is ascended to a lake from which a portage leads southwest to a smaller lake, and from this a portage leads into Flinflon lake. Only a brief visit was made late in the season.

"On the original claims, which are along the east side of the lake near the south end, cross trenching has been done, but as the ore is near water-level it has been difficult to get down to solid sulphides and at the time the claims were visited the trenches were filled with water with knobs of sulphides showing above it. The trend of the ore zone is northeast and southwest and in the main trenches the surface width is nearly 200 feet. Four hundred and fifty feet south of this, it has again been trenched across showing the same width. Between these two series of trenches, there is, however, an elliptical horse of unmineralized rock 50 feet in width. The sulphides have also been found in trenches north of this main mass. Inland the land is low and solid rock has not been reached east of the sulphide zone and hence its attitude is unknown. The western part of the zone consists of pyrite. Eastward across the vein this gives place to banded pyrite, sphalerite, and galena, while the eastern part exposed shows considerable chalcopyrite. The banded ore has a dip of 45 degrees to the east. There is no quartz present.

"The country rock of this district consists of ancient volcanic rocks—greenstones, pyroclastics, and autoclastics, some bands of later conglomerates, and intrusions of quartz porphyries which are probably genetically related to the ore deposition. These porphyries are believed to be connected with the granitic batholiths that lie within a few miles of the district. No careful sampling of the deposit was possible and the amount of development is not sufficient to show whether or not the values are high enough to bear the cost of treating a smelting ore."

Since Mr. Bruce's visit much diamond drilling has been done and the existence of a very large body of ore has been proven. Exploration is progressing with very encouraging results.

## THE PAS MINING DISTRICT

The Pas, Manitoba, June 2.—The mining headquarters of the northland will be established in The Pas is the word Mr. F. H. Kitto brought here yesterday from Controller Rowatt, of the mining lands and Yukon branch of the Department of the Interior. Mr. Kitto is here to also fix the location of Flinflon and determine in which province it lies. He informed the Herald that the department were fully cognizant of the development taking place here, and every aid would be extended by the Government.

The importance of making The Pas the mining office for this district has been emphasized by many organizations, and now that the matter is decided, it will cause a general feeling of appreciation among mining men and prospectors. It was a much needed improve-

ment, and the Dominion Government are to be congratulated for taking the step.

The details are being worked out, said Mr. Kitto, and it will take some little time to arrange a transfer of the records now in the offices at Dauphin, Prince Albert and Winnipeg, but as soon as this was in readiness the change would be effected. He mentioned also that the new district would be known as The Pas Mining District, and would include all the mining areas of Beaver, Flinflon, Schist and Herb lakes. The documents and records of all mining claims and mining transactions made in the district would be kept in the new office, he said.

G. S. Scott, of the Coniagas smelter, of Thorold, Ontario, returned from a three months' examination of the orebody at Flinflon and Schist lakes on Friday. Mr. Scott said he was quite pleased with his observations and he thought the Hammel properties would develop into a mine. He likes the appearance of the ore, and the size of the body greatly impressed him. Joe Metcalfe and Jack Bridges also came by the same boat from Flinflon. Mr. Bridges said the drills at Flinflon were on their tenth set of holes, and he understood that the contract was half completed. The first 65-degree holes were being drilled as the party left the camp, it was stated. The ice in all the lakes has disappeared.

Frank Stanley is down from Herb lake, and he reports a strike of a 4-foot quartz vein on Little Herb lake. Henry McCafferty and Bob Hassett are the finders, said Mr. Stanley.

A syndicate to control a bunch of claims at Piquitona was formed on Saturday. The members are Messrs. Masterson, Young, Ridyard, Spring, Long, Robbie, Lovell, Ocumpaugh and others.

Messrs. Kerr and Nash got out from Herb lake on Monday. They spent two weeks studying the ore strikes. Mr. Nash is acting for the Alaska-Gastineau Gold Mining Co., and he will make a report to his company on his trip into Mike Hackett's stamping ground. Kerr owns nearly half the claims at Herb lake, and he is anxious to get something started up there.

A group of claims have been staked at Mile 191, Hudson's Bay railway, for silver. The claims are two miles from the track, and were located by O. C. Ocumpaugh. Whatever knowledge the locator has about the values, he is keeping it to himself.

R. W. Brooks, of Flinflon, paddled down from the north on Tuesday night. Mr. Brooks is the engineer in charge of the mines.—The Pas Herald.

## KAMISKOTIA MINING CO.

The Kamiskotia Mining Co. has been incorporated under the laws of Ontario. The provisional directors are Henry H. Shaver, John McKay Macbeth, and James Parker, barristers, and J. C. Thomson and J. G. Hamilton, students-at-law, all of Toronto.

## GOLD DISCOVERY IN GAUTHIER.

Rich specimens of gold ore from the Elstone claims in Gauthier, about two miles east of the Lebel line and two miles north of the McElroy line, have been brought to Toronto.

## KOWKASH.

Mr. P. E. Hopkins of the Ontario Bureau of Mines has proceeded from Toronto to Kowkash to continue geological mapping of that district. Kowkash is now a mining district and M. R. Morgan has been appointed recorder.

## PERSONAL AND GENERAL

Prof. Wm. Nicol of Queens University, has resigned as Professor of Mineralogy, a position which he has held since the School of Mining was founded, in 1893.

Mr. Alfred H. Brooks, geologist in charge of the Alaska investigations, will be engaged in office work in Washington till the middle of June, when he expects to start for Alaska to visit the Nome, Ruby, and Juneau districts. He probably will not return to Washington till early in October.

Mr. P. E. Hopkins, of the geological staff of the Ontario Bureau of Mines, is at Kowkash in charge of a party mapping the area.

Mr. A. G. Burrows, of the geological staff of the Ontario Bureau of Mines, has completed a preliminary report on the Boston Creek gold area.

Mr. Alex. Longwell has returned to Toronto after visiting gold mines at Porcupine.

Mr. Geo. Guess, Professor of Metallurgy at the University of Toronto, has been engaged by the Vermont Copper Co. to start up the copper smelter at South Strafford, Orange Co., Vermont. Prof. Guess left Toronto last week to take charge of operations. The furnace has not been operated successfully. Semi-pyritic smelting was tried, but abandoned in 1908.

Mr. Charles O'Connell, who has recently taken up again his work as manager of the Tough-Oakes mine after some months' holiday for his health, was in Toronto last week.

Mr. Jack Hammel is in Toronto. Owing to the illness of Mrs. Hammel he has postponed his visit to this property at Flinflon lake which is being developed under option by Hayden & Stone Co.

Mr. A. B. Clabon is in Toronto.

Mr. C. A. Foster was in Toronto last week.

Mr. Ben Hollinger, who has made a gold discovery at Boston Creek, was in Toronto last week.

Mr. G. S. Scott is at The Pas.

Mr. W. J. Porter, of Victoria, B.C., who some years ago was active in the development of mining properties near Phoenix, Boundary district, has been engaged by the Granby Consolidated Co. to take charge of development work on one of the islands along the coast of British Columbia.

Mr. Arthur Lakes, Jr., for a year or two superintendent of the Wilcox mine, in Ymir camp, Nelson division of British Columbia, on his recent return from Alaska, whence he went to examine mining properties, visited his father, Prof. Arthur Lakes, at Nelson, B.C.

Mr. James McGregor, inspector of mines in West Kootenay and Boundary districts of British Columbia, has been granted three months' leave of absence, during which Mr. H. H. Johnston, a well-known underground official in the Consolidated Mining and Smelting Co.'s Centre Star-group of mines, Rossland, will be his locum tenens.

Mr. George Watkin Evans, coal geologist, of Seattle, Washington, who several years ago did a season's field work in the Groundhog coal field in the northern Skeena country, British Columbia, and has done much geological work in the Northwestern States and Alaska, has been spending a few days on Vancouver island, B.C. He will shortly proceed to Alaska to again undertake investigations for the United States Bureau of Mines.

Mr. Charles Graham, superintendent for the Corbin Coal and Coke Co., operating in the Crowsnest district, Southeast Kootenay, British Columbia, was at Nanaimo and Victoria for several days about the end of May.

Mr. Thomas Graham, chief inspector of mines for British Columbia, left Victoria on June 2nd for Joplin, Missouri, where he will attend the annual meeting of the American Mine Inspectors' Institute, of which he has been first vice-president during the year now closing. He will be absent from Victoria until the beginning of July.

Mr. J. F. C. B. Vance, of the Dominion of Canada Assay Office, Vancouver, B.C., has obtained a commission as a lieutenant in the 11th Regiment (Irish Fusiliers of Canada).

Lieut. (supernumerary) O. E. LeRoy, of the 72nd Regiment, has been confirmed in his rank. He was recently successful in passing an examination in Victoria, B.C., for the rank of captain.

Mr. A. H. Gracey, for several years manager of the Athabasca-Venus Gold Mines, near Nelson, B.C., is now at Oatman, Arizona.

Mr. Albert I. Goodell, a metallurgist well known in the Northwest, has been appointed ore buyer for the British Columbia Copper Co., with smelting works at Greenwood, Boundary district.

Mr. Henry Clark, representative of the Head, Wrightson Co., mining machinery manufacturers, England, has returned to Victoria, B.C., from Japan.

On May 25th the Daily Colonist, Victoria, B.C., published the following information: "Recognizing the need of men for war service, Prof. Stuart J. Schofield, M.A., Ph.D., head of the Department of Geology at the University of British Columbia, has enlisted in the ranks of the British Columbia company of the Western Universities Battalion as a private. He joined last Tuesday with the splendid aggregation of collegians who are going to do their 'bit.' His example will no doubt give a big stimulus to recruiting for this distinctive unit which is now rapidly nearing its complete strength of 250. Nearly 200 have already enlisted. Professor Schofield has had a noteworthy career. Before joining the staff of the university he was with the Dominion Geological Survey and conducted a number of important surveys. A graduate of Queen's University, he secured honors at other educational institutions, including the Boston School of Technology. He held a commission in the 3rd Field Company of the Canadian Engineers while resident in Ottawa before coming to the Pacific coast."

Mr. Samuel W. Cohen, general manager of the Crown Reserve Mining Company, Limited, and the Porcupine-Crown Mines, Limited, has returned to Cobalt after a two months' examination trip through Idaho, Oregon and California.

The Jeffrey Manufacturing Company of Columbus, Ohio, announce the reopening of their northwestern branch office at Seattle, Wash., and the appointment of Mr. Percy E. Wright, consulting mechanical engineer, as district manager for Oregon, Washington, Alaska, British Columbia and Alberta.

### CALUMET AND MONTANA MINE, COBALT.

Cobalt, June 10.

The new head-frame and ore house at the Calumet and Montana Consolidated was completed last week and mining operations are now under full swing again. The company began hoisting ore on Tuesday last for the first time, while the ore bin was being completed and as soon as possible a shipment will be made ready. All of the ore will have to be handpicked for high-grade, while the milling rock will be sent to one of the local concentrators.

## NOVA SCOTIA

**Renewal of P. W. A. Agreement with Dominion Coal Co.**—The long-standing wage agreement between the Provincial Workmen's Association and the Dominion Coal Co. has been once again renewed. The agreement would ordinarily have expired at the close of 1916, but the unusual conditions brought about by the war, particularly the increased cost of living, caused the anticipation of the usual negotiations. The new agreement provides for an increase in all mining rates and day wages at the mines of six per cent., effective at the first of June, to be followed by a further increase of four per cent., making ten per cent. increase on the rates paid in May, effective at the first of January, 1917; the agreement being renewed and extended for a further two years, or to the end of 1918.

The history of this wage agreement is unique in the labor annals of Canada. The first wage agreement contracted between the P.W.A. and the Coal Co. dated from the beginning of 1905 for a period of three years. Upon the expiry of the agreement at the end of 1907, certain adjustments in rates were scheduled by the Coal Co. which were objected to by the workmen, and a Board of Conciliation was called under the chairmanship of Prof. Adam Shortt. The award of this board made certain modifications in the published schedule, and in all other particulars carried forward the understanding of the so-called Three Years' Contract of 1904. The Shortt award has been renewed on subsequent occasions in 1909, 1911, 1913 and now again in 1916, so that the present renewal, carrying the agreement as it does until the end of 1918, links up a continuous agreement covering a period of fourteen years, during which long term of years the two parties to the agreement have loyally kept faith with each other. The present willingness of the Coal Co. to anticipate the expiry of the 1913 renewal by seven months, and to grant a substantial increase in wages, under the existing difficult and uncertain conditions of the coal trade, is proof of the good understanding that exists between the company and its workmen. During the fourteen years referred to the rate of wages for unskilled mine labor has increased from \$1.32 per day paid in 1904 to \$1.80 from the 1st of June, 1916, and will increase still further to \$1.87 per day in January, 1917.

The Dominion Coal Co. at the present time is operating under two grave handicaps, namely, a decrease in outputs due to shortage of labor caused by recruiting, and a most serious shortage of vessels to carry coal to market.

The production of the company's collieries, operating to full capacity of the available workers, was in May this year 90,000 tons below the production of May, 1915, and indications point to a further reduction in production.

Notwithstanding the drop in outputs the available freighting tonnage will not suffice to transport to a market even the reduced production of the mines, and unless the authorities can be prevailed upon to release for the coal-carrying trade the vessels now under Admiralty requisition, it will result in the partial idleness of the collieries at an early date, and it may even force the temporary closing down of certain collieries. With the exception of the requirements of the steel companies and local bunker sales, the coal trade of Cape Breton is entirely an export business, and it is quite evident that if freighting vessels are not obtainable there is no outlet for the coal production, which must

necessarily be reduced in proportion to the shortage in carrying tonnage.

The shortage of vessels may also restrict the coal requirements of the steel companies. The raw materials for steel making, with the exception of coal, have all to be assembled by water, the iron ore coming from Newfoundland, and the limestone from the interior of the Bras d'Or Lakes. It is necessary, because of the climatic conditions, to stock sufficient limestone and ore at the steel plants during the summer to last until the disappearance of the drift ice in the spring, this being usually about the middle of May. If stocks are insufficient to last through the winter, steel manufacture must be restricted, or cease entirely. In such an event the consumption of coal will be affected.

The need of ships for Admiralty purposes is undoubted, and may be imperative. But the need for coal and steel is fully as imperative. The unique nature of the Cape Breton coal-trade consists in the fact that the principal market for Cape Breton coal is inaccessible during six months in each year. It is therefore necessary to compress the requirements of twelve months into half that time, and unless shipping commences promptly and in heavy quantity immediately the ice has gone, the lost time cannot be regained. The gravity of the present situation will disclose itself very unmistakably next autumn, but it will then be too late to remedy the shortage which will have accrued, in production, and in transportation to market.

The "Colliery Guardian," in a recent editorial, remarked that: "Only Germany so far seems to have realized that success in modern warfare is limited to ability to produce and carbonize bituminous coal." This sentence crystallizes well informed opinion on the status of coal in the present war. Your correspondent has for a long time past endeavored to point out that 1916 will see in Eastern Canada a considerable diminution in the production of bituminous coal, the one basic, paramount, and indispensable munition of war, the substance which enables the soldier to go to the front and provides all his weapons of offence. There is every reason to suppose that the production of bituminous coal in Eastern Canada will in 1916 be two million tons below the capacity of the collieries. If success in modern warfare really does depend on the production of bituminous coal—and the more this dictum is considered and pondered over the truer it will be found to be—the reduction in the output of coal in Nova Scotia is more than a question of the dividends of the coal companies, or the ability of the miners to earn wages that will give them the necessities of life, or the supply of coal in Montreal next winter; it is a matter of national import. The manufacture of munitions in Canada, the enormous necessary expenditures on military matters, and the million and one expenses arising out of the war, are being paid for by borrowed money. Would it not be just as well to mine two million tons of coal in Canada as to buy the coal from the United States? Two million tons of coal to-day should easily be worth ten million dollars, and that is ten per cent. of the Canadian Government War Loan, on the raising of which we so plumed ourselves a little while ago.

A prominent mining man, who visited Belgium shortly before the war, has expressed the opinion that the Germans in their initial burst through Belgium did not expect to take Paris, but that their operations were really conceived with the idea of occupying and exploiting the coal fields of Belgium and the iron ore deposits of Lorraine.

Protests against injustice to particular industries or localities are always open to the accusation of special pleading or particularism. Enquiry will show, however, that nothing has been accounted of more paramount importance in the economic councils of the Allies than this particular question of the maintenance of the coal supply. The Government of Canada would have excellent precedent if they decided to appoint a Royal Commission to enquire into the reduction of the production of bituminous coal in Nova Scotia.

### PORCUPINE, KIRKLAND LAKE AND BOSTON CREEK

While the construction work at the two big mines of the Porcupine camp continues to absorb most attention, the developments on the McIntyre and the West Dome have the most interest for the outside world. While the shareholders of the McIntyre have not yet received the annual reports, statements containing some statistics have been given to the press, and from these it is seen that the first reports of the discoveries on the McIntyre were not exaggerated. The orebody on the 700-ft. level, it is true, was shallow, but the extent of it at that level and for 30 or 40 feet below it made great compensation. The 1,000-ft. level is also responding to development. Beyond the 25-ft. orebody first cut, there has now been opened up another wide orebody through the first long crosscut from the McIntyre Extension shaft to the No. 5 shaft. The heads to the McIntyre mill are running very high and the production during the months of May and June will be far above normal. The Jupiter is now producing regularly and 75 tons of ore a day is being sent to the McIntyre over the surface tramway. This ore is weighed and carefully sampled, before it leaves the Jupiter rock house, and it is mixed with the McIntyre ore to be treated.

Surface developments at the Hollinger, in the prosecution of their work for the extension of the mill, are proceeding apace; although there is some difficulty experienced in getting surface labor. It is a fact that there is not yet any great scarcity of skilled labor, either underground or on the surface, at Porcupine, but there is a very decided shortage of unskilled labor, both in the regular work of the mine and for additional construction. Many of the foreigners who were in the camp last year have gone to the United States and operations have so increased that the existing supply is barely sufficient to meet the needs.

Additional energy will be given to the controversy between the exponents of ball mills for first crushing and adherents of stamps, by the decision of the Dome to throw out all their stamps and put in three more large ball mills. This is the most interesting since at the other end of the camp the Hollinger was as emphatic in upholding the merits of the stamps, when they decided to install 100 more stamps, after tests with ball mills. The Dome already have two ball mills installed, but only one of them is at present treating ore. The other will be this month.

The Dome record for the month is easily the best that they have ever attained. The production was 39,300 tons for the month of May and the grade took a sudden rise after the low point obtained in April. The result was that the increase of bullion was the most material for many months. Another most satisfactory feature is that costs are still kept down. While they ran \$2.46 per ton, or five cents more than the pre-

vious month, it is to be noticed that milling showed a decrease of three cents a ton and is now down at the record low cost for the camp of seventy-two cents a ton. The Dome is still handicapped by the fact that they cannot reach their stopes on the sixth and seventh levels and nearly all the ore from the higher grade orebodies that is going to the mill is still from development. Of the 39,300 tons sent to the mill, over 26,000 still comes from the open pits on the surface.

The central shaft is itself now finished to below the 700-ft. level and the steel head-frame is well advanced towards completion, but the hoist for the man-way cage has not yet arrived and according to advices may be delayed for some time yet. The hoists for the ore cages are on the ground and will be installed at once.

Continued success is being obtained with the diamond drill on the West Dome Consolidated. Following the success obtained in the No. 1 hole, four more veins have been cut in the No. 2 hole with the diamond drill, above the 950-ft. level, or 700 ft. vertical. The three first veins to be cut were much lower grade than that found in the first hole put down. They run from \$7.50 to \$8.60 a ton and average from five to six feet wide, but the fourth vein cut showed far more mineralization than the others and will undoubtedly run much higher. It is at least 10 ft. wide. As far as can be ascertained this latter orebody will be a continuation of the ore cut in the No. 1 hole. The shaft is being continued down to the 300-ft. level and the vein still shows a reassuring amount of free gold; although it is still comparatively narrow. The other drill hole sunk on the north side of Edwards lake had not opened up any ore of any value for as far as the 1,000-ft. level.

The discovery of some high grade ore in a small quartz vein on the Hollinger property adjoining the McCrea claims at Boston Creek, has aroused very much interest. This is due not only to the surface value of the discovery, but to the fact that Benny Hollinger has once again found gold in the new district, and that this is something new. The discovery was made by Paddy Barrie, one of Hollinger's partners. He had left work on a much larger quartz vein, to do a little prospecting and in pulling the moss off this quartz vein on the side of a hill, he suddenly discovered some remarkably rich ore. This vein apparently has strength and persistence, since it has been traced for several hundred feet on the neighboring property of the O'Donald. There is no doubt that active operations will be conducted on both these properties at once.

Of far more actual importance, although not attracting so much attention, is the discovery of very rich ore below the 100-ft. level of the R. A. P. Syndicate. The R. A. P. Syndicate is sinking from the 100 to the 200-ft. level, and ran into about a foot of very high grade ore in their shaft. There is much free gold and fine sulphides in a blue quartz and the gold exists in considerable quantities in the wall rock. A drill is also being run in the east drift of the 100-ft. level and results are most reassuring. There is now in the face about two feet of high grade ore and the zone of enrichment is probably  $4\frac{1}{2}$  ft. wide.

At Kirkland Lake, the Lake Shore has opened up a patch of very high grade ore on the 300-ft. level. This patch of ore is extraordinarily rich in altaite, and there is almost as much free gold as in the Tough-Oakes ore. There is now about 400 ft. of ore developed at the 300-ft. level of the Lake Shore, and the mine is now most promising.

Prospects in Kirkland Lake are being held up by lack of any definiteness in the power situation. In the

spring several companies were organized to develop small water powers in the neighborhood. It was found that these water powers would develop such limited horse-power that they could not take care of all the properties then in sight. The project was dropped and the Northern Ontario Light and Power Company canvassed the district with regard to obtaining contracts from companies, if they decided to put in power. The plan to use the surplus power now available in the Cobalt camp for Kirkland Lake and district, by extending the transmission lines, has been fully outlined before, but owing to the cost and difficulty of obtaining supplies of copper and other material, nothing further has been done, beyond buying the poles and negotiating for right-of-way. It is not possible that the power can be delivered into Kirkland Lake or Boston Creek now, until the fall is far advanced. This is unfortunate for the Teck-Hughes Mining Company, which now has a completed mill which cannot very well be used until electric power is available in the camp.

**BRITISH COLUMBIA  
WEST KOOTENAY.**

**Ainsworth.**—Shipment of ore was resumed several weeks ago by the Florence Co. and the Highland mine. The Utica, in the western part of the division, continues to send out a carload of silver-lead ore every two or three weeks. A new mine on the producing list is the Comfort, situated near the Bluebell, on the eastern side of Kootenay lake, from which property 25 tons of ore was received at Trail in May. The Lucky Jim is reported to be making headway, and obtaining a profit on its mining operations so that its liabilities are being reduced.

**Slocan.**—The Rambler-Cariboo and the Ruth-Hope, in central Slocan, and the Galena Farm, Hewitt and Standard are maintaining ore shipments from the mining region in the neighborhood of Silverton, Slocan lake. The year's shipping list to date includes the names of sixteen mines, but only three or four of these have shipped more than 500 tons of silver-lead ore this year. The Standard is in the lead, with a total to the end of May of about 3,500 tons shipped to Trail; the Rambler-Cariboo is next with about 700 tons. Both these mines also shipped zinc ore, which was sent to United States smelting works.

**OMINECA.**

A newspaper report of an interview with Mr. Morley Donaldson, vice-president and general manager of the Grand Trunk Pacific Railway Co., included several allusions to mining in Western Canada. Referring to matters particularly affecting the British Columbia end of the company's railway he is reported to have said that the exploration work being done in connection with mining is very much greater than the public supposes is the case. He said, further: "At a number of railway stations I noticed piles of ore sacks brought in from distant places by prospectors who are opening mining properties and sending bulk samples of ore for test purposes to smelting works. In addition, I found that from one mine near Hazelton about 3,000 tons of copper ore is being shipped monthly, and a vessel at Prince Rupert was being loaded with 1,000 tons of this ore while I was there." Mr. Donaldson also said: "In Alberta mining is developing to a remarkable extent, and our company has decided to this season utilize in Winnipeg coal from that province. We have not made any purchase of American coal this year, and if the

best of our western coal shall prove a success it will give these coal mines and towns a busy future."

The ore alluded to by Mr. Donaldson was that being shipped by the Rocher Deboule Mining Co., for late in May the barge Baroda, loaded with 1,800 tons of copper ore from the Rocher Deboule mine, in the Hazelton region, was towed from Prince Rupert to Tacoma. The intention was to ship only 1,000 tons on the Baroda, but there was delay in getting a tug to tow the barge south, so as the ore was accumulating to such an extent as to hinder progress, the larger quantity was put on the scow and the congestion relieved to that extent. Prior to commencing to ship ore to the smelting works near Tacoma, Puget sound, Washington, the Montana Continental Development Co., which then had a lease of the Rocher Deboule Co.'s mine, in the second half of last year shipped to the Granby Consolidated Co.'s smelting works at Anyox, Observatory inlet, about 17,000 tons of ore which contained an average of 8 per cent. copper and small value in gold and silver.

**GENERAL NOTES.**

The development of the Sunshine group of mineral claims at Uchucklesit harbor, on the west coast of Vancouver island, has been resumed. It is expected that small shipments of copper ore will be made during the ensuing summer.

Meetings of the Western Branch of the Canadian Mining Institute are to be held at Sandon, Central Slocan, and Silverton, Slocan lake, during the latter part of June. There is much mining activity in the neighborhood of both Sandon and Silverton, so the decision to hold meetings at those places at this time is regarded with satisfaction in the district.

The W. R. Grace steamer "Colusa," which late last month arrived on the British Columbia coast from South American ports, after discharging 2,400 tons of nitrates at the James Island works of the Canadian Explosives, Ltd., proceeded to Tacoma, Puget sound, Washington, with the remainder of her cargo, the greater part of which consisted of ore for the Tacoma smelting works. Years ago ore from the Mexican coast and places farther south used to be received occasionally at the Tyee Copper Co.'s smeltery on Vancouver island.

**FLIN FLON.**

Drilling at Flinflon lake is proving up an enormous body of ore of good grade.

**SILVER PRICES.**

	New York.	London.
	cents.	pence.
May—		
23. . . . .	71%	34 1/8
24. . . . .	71 1/2	34 3/8
25. . . . .	71 1/2	34 3/8
26. . . . .	71%	34 3/8
27. . . . .	71%	34 1/8
29. . . . .	70%	33%
30. . . . .	holiday	32 7/8
31. . . . .	68%	32 7/8
June—		
1. . . . .	68%	32 7/8
2. . . . .	64 7/8	31
3. . . . .	64%	31
5. . . . .	66 1/2	31 3/4
6. . . . .	66%	31 1/8
7. . . . .	66%	31 1/8
8. . . . .	66%	31 5/8
9. . . . .	62%	30

## MARKETS

## STOCK QUOTATIONS.

(J. P. Bickell &amp; Co., Toronto.)

As of close June 8, 1916.

## New York Curb.

	Bid.	Ask.
Atlantic Steel	60.00	62.50
Atla. Cons.	60.00	63.00
Butte.	6.87	7.00
Can. Car	69.00	70.00
Curtiss Aeroplane	48.00	50.00
Chevrolet.	2.45	2.48
Can. Copper	2.00	2.12
Chandler Motors	117.50	119.00
Chalmers.	220.00	250.00
Cambria Steel	81.00	85.00
Canada Cement	71.00	71.25
Emma Copper	60.00	65.00
First National	4.50	4.75
H. & B. Car	34.00	35.50
Howe Sound	5.00	5.25
International Petroleum	10.50	10.75
Inter. Nickel (New)	45.37	45.50
Kennecott Copper	53.25	53.37
Maxim Munitions	7.00	7.25
Midvale Steel	64.87	70.00
Marconi.	3.00	3.12
Magna.	15.00	15.50
Mother Lode	25.00	26.00
Steel of Canada	62.25	62.50
Steel & Radiation	38.00	41.00
Submarine Boat	37.00	37.50
Tonopah Extension	6.00	6.12
U. S. Light	3.75	7.00
White Motors	59.00	59.50

## Porcupine Stocks.

	Bid.	Ask.
Apex.	.08	.08½
Dome Consolidated	.12	.15
Dome Extension	.32½	.33
Dome Lake	.30½	.31
Dome Mines	26.75	28.00
Eldorado.	.....	.00½
Foley O'Brien	.51	.....
Gold Reef	.01½	.01¾
Hollinger	29.50	30.10
Homestakes.	.50	.55
Jupiter.	.35	.35¾
McIntyre.	1.74	1.75
McIntyre Extension	.53	.54½
Moneta.	.13½	.14
Porcupine Crown	.93	.95
Porcupine Imperial	.03½	.03¾
Porcupine Tisdale	.01¾	.02
Porcupine Vipond	.58	.60
Preston East Dome	.04¾	.05¼
Teck Hughes	.20	.22
West Dome Consd.	.37¼	.37½

## Cobalt Stocks.

	Bid.	Ask.
Adanac.	.61	.63
Bailey.	.08	.08¾
Beaver.	.40	.42
Chambers Ferland	.24	.24¾
Coniagas.	5.00	5.25
Crown Reserve	.50	.51
Foster.	.09	.09½
Gifford.	.06½	.07
Gould.	.00¼	.00½

Great Northern	.....	.06
Hargraves.	.03½	.04½
Hudson Bay	35.00	.....
Kerr Lake	.04½	.04¾
La Rose	.65	.70
McKinley.	.60	.62
Nipissing.	7.25	7.40
Ophir.	.08	.08¾
Peterson Lake	2.66	2.72
Right of Way	.04¾	.05½
Rochester.	.....	.06½
Seneca Superior	.23	.....
Silver Leaf	.02	.02½
Temiskaming	.64	.65
Trethewey.	.22	.25
York Ontario	.01	.01¾
Wetlaufer.	.07½	.09

## NEW YORK MARKETS.

June 9, 1916—Connellsville Coke—

Furnace, spot, \$2.75.

Contract, nominal, \$2.50 to \$2.75.

Foundry, prompt, \$3.25 to \$3.50.

Contract, \$3.50.

June 9, 1916—Straits, Tin, nominal, 44.75 cents.

Copper—

Prime Lake, nominal, 27.75 to 28.25 cents.

Electrolytic, nominal, 27.75 to 28.25 cents.

Casting, nominal, 25.75 to 26.00 cents.

Lead, Trust price, 7.00 cents.

Lead, outside, 6.85 to 6.95 cents.

Spelter, prompt western shipment, 13.80 to 14.05 cents.

Antimony—

Chinese and Japanese, 21.50 to 22.50 cents.

American, 21.50 to 22.50 cents.

Aluminum, nominal—

No. 1 Virgin, 98-99 per cent., 60.00 to 62.00 cents.

Pure, 98-99 per cent. remelt, 58.00 to 60.00 cents.

No. 12 alloy remelt, 48.00 to 50.00 cents.

Nickel, 45.00 to 50.00 cents.

Cadmium, nominal, \$1.25 to \$1.50.

Quicksilver, nominal, \$70.00.

Platinum—nominal, \$78.00.

Cobalt (metallic), \$1.25.

Silver (official), 62.75 cents.

Metal Products—Following base prices are all f.o.b. mill:

Sheet Copper, hot rolled, 37.50 cents.

Sheet copper, cold rolled, 38.50 cents.

Copper wire, 31.50 to 32.00 cents.

High sheet brass, 38.00 to 39.00 cents.

Seamless brass tubing, 43.00 to 44.00 cents.

Seamless copper tubing, 43.50 cents.

Braze brass tubing, 45.50 to 46.50 cents.

Brass wire, 38.00 to 39.00 cents.

Brass rods, 38.00 to 39.00 cents.

Sheet zinc, f.o.b. smelter, 21.00 cents.

## TORONTO MARKETS.

June 12—(Quotations from Canada Metal Co., Toronto)—

Spelter, 20 cents per lb.

Lead, 9 cents per lb.

Tin, 52 cents per lb.

Antimony, 35 cents per lb.

Copper, casting, 30 cents per lb.

Electrolytic, 31½ cents per lb.

Ingot brass, yellow, 16 cents; red, 21 cents per lb.

June 9—(Quotations from Elias Rogers Co., Toronto)—

Coal, anthracite, \$8 per ton.

Coal, bituminous, \$5.75 per ton.