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CANADIAN MINING JOURNAL

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In This Issue:

The Refining of Nickel in Canada

*Metal Mining in British Columbia
in 1915*

Metallurgy of Cobalt Silver Ores

*Utilization of Bituminous Sands of
Alberta*

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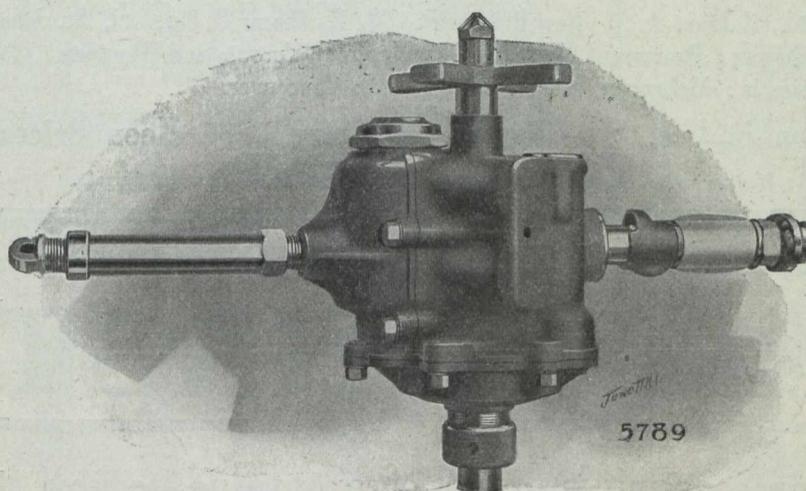
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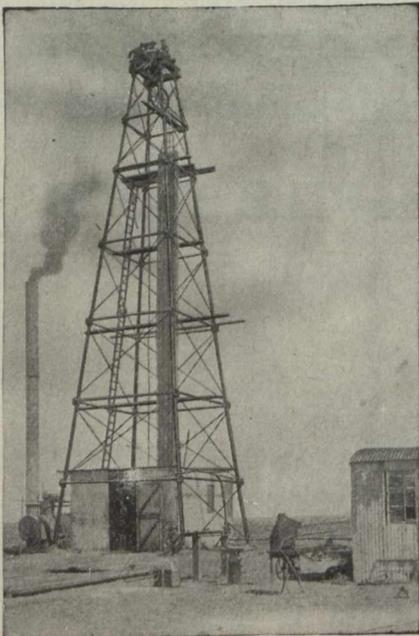
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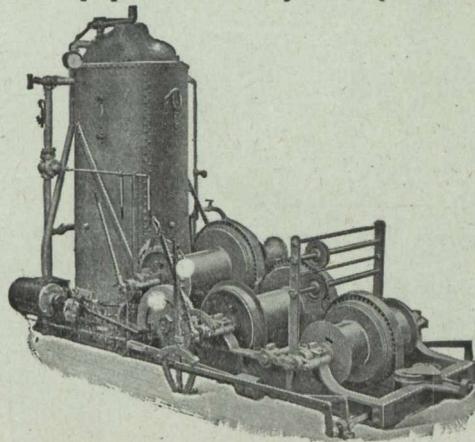
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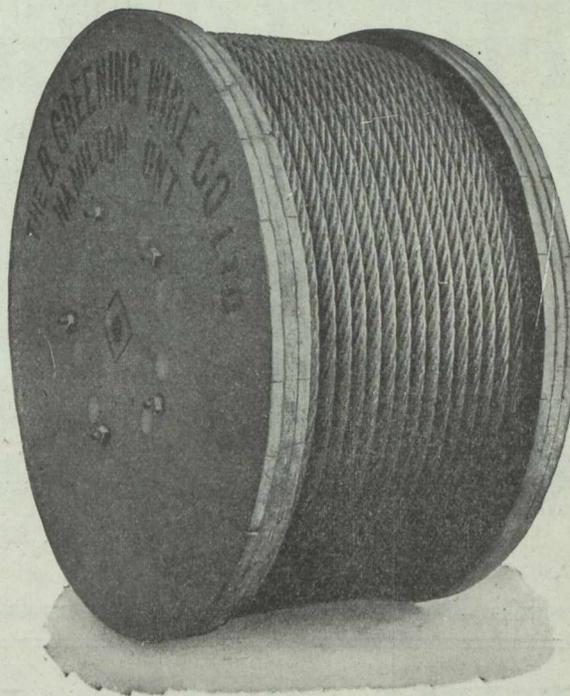
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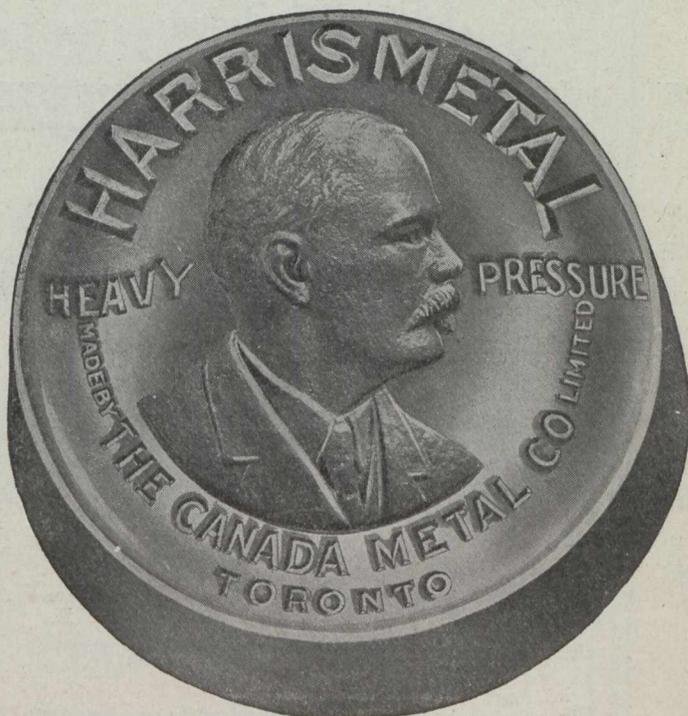
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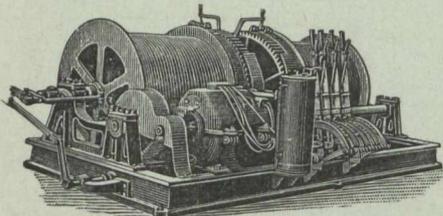
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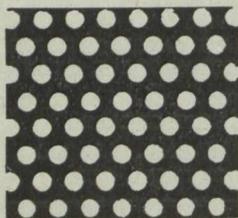
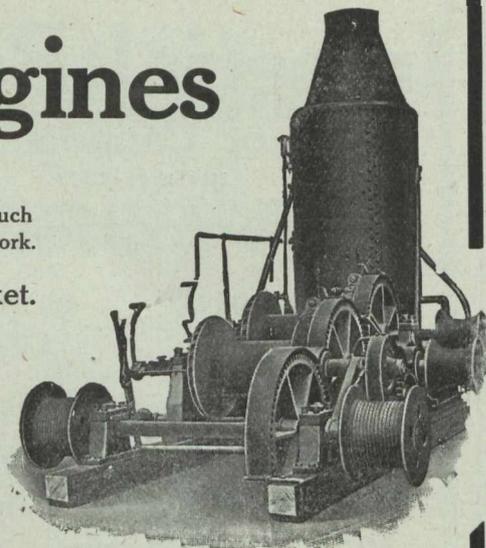
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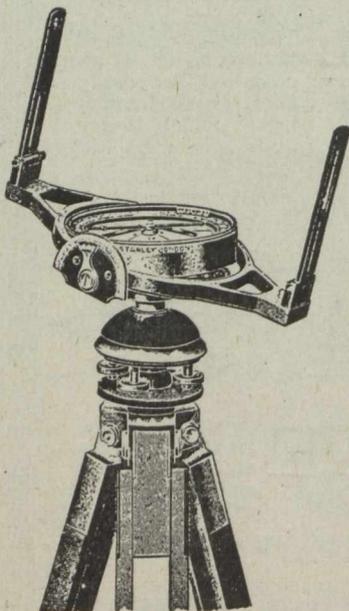
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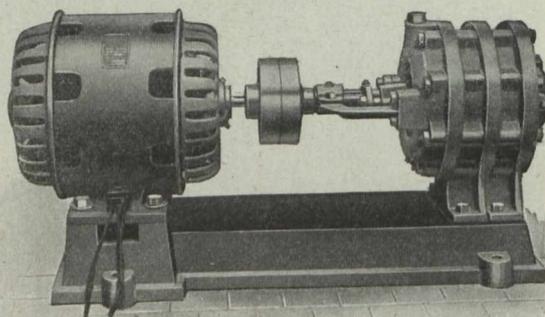
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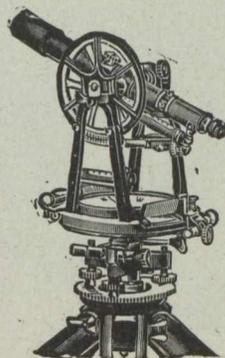
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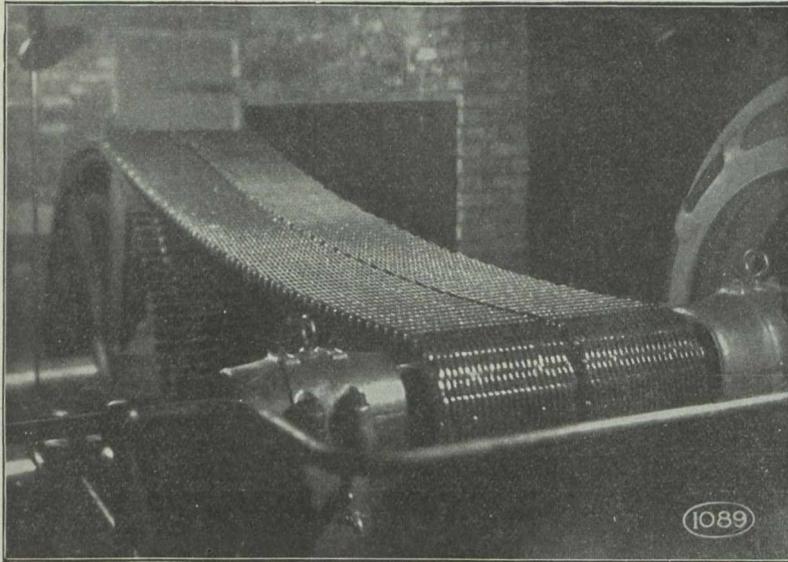
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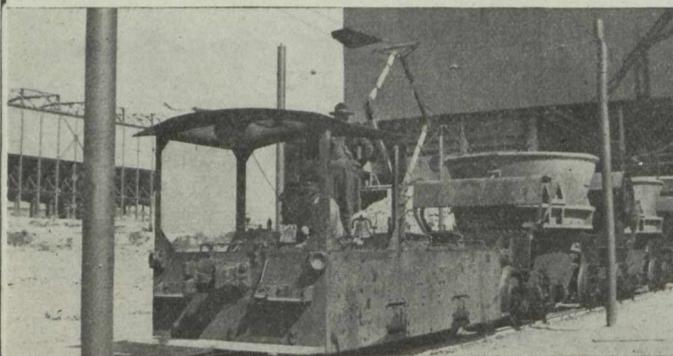
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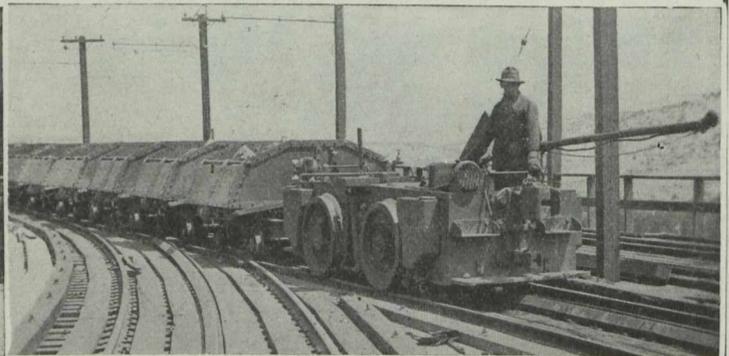
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THE CANADIAN MINING JOURNAL

VOL. XXXVII.

TORONTO, February 1, 1916.

No. 3

The Canadian Mining Journal

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CIRCULATION

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A NICKEL REFINERY FOR CANADA

The nickel question is up again. It was the chief topic of discussion at the meeting of the Toronto branch of the Canadian Mining Institute on Saturday, January 15. A few days later the interest of the general public was revived by newspaper reports to the effect that the refining of nickel in Canada is likely to be undertaken at an early date. We hope that these reports will prove well founded. In view of the circumstances they seem not unlikely to be so.

On January 19 the following item appeared in a Boston financial paper: "Canada's resolution to refine its own production of nickel is endorsed by International Nickel Co., who declare they will undoubtedly, when the time comes, erect refinery there to work on the 80 per cent. of world's nickel supply which Canada produces. International Co. now refines three-fourths of it."

On January 22 the same paper published the following: "International Nickel Co. has decided to erect a nickel refinery in Canada. In this respect it is stated that the company desires to co-operate with the Canadian Government in its desire to have some of the nickel ore mined in the Sudbury district of Canada refined in the Dominion. Pres. Monell recently returned from Canada after conferring with officials of the Dominion. The arrangement is said to be satisfactory to both the Canadian Government and the company."

About the same time Ottawa correspondents of Toronto papers sent out news items on the same subject. The Toronto World, which is largely responsible for the great public interest in the nickel question, had in its issue of January 21 the following item from a staff reporter at Ottawa:

"Negotiations are almost completed for the establishment of a nickel refinery in Canada by the International Nickel Company, which has control of the Sudbury nickel mines. The refinery will be situated in Cape Breton, N.S., and henceforward all the nickel material which has hitherto gone to New Jersey for refining will be refined in Canada. The export of nickel from Canada is to be controlled completely by the Government in order to insure a steady supply for the allies for the manufacture of armaments for field and naval purposes, and to render it certain that no Canadian nickel will find its way to the enemy."

Under the same date The Globe published the following: "The recent visit to Ottawa of Mr. Ambrose Monell, the creator of the International Nickel Company and the industry which it represents, has resulted in the announcement that arrangements have been made whereby the final processes of refining nickel in Canada will be

completed in this country by the corporation of which Mr. Monell is the moving spirit. It is reported that an understanding has been reached between the Dominion Government and the International Nickel Company whereby a nickel refinery will be established on the Atlantic seaboard. This departure is understood to be dictated entirely by economic conditions, the destination of the output of the Ontario nickel mines never having been the cause of any anxiety to the Government of either Canada or Great Britain. Since the war began, there has been close co-operation between the International Nickel Corporation and the British War Office and largely through the increased activity of the Canadian nickel mines the requirements of Great Britain and her allies have been satisfied. The new arrangement, however, will mean an important addition to the list of industries which will be opened somewhere near the time that peace is declared."

Other newspapers have published similar statements concerning the significance of Mr. Monell's visit to Ottawa, all accepting as plausible the report that a refinery will be established in Canada; but differing widely in opinion as to why and when it will be established and what part of the nickel matte produced will be refined here.

According to the Boston News Bureau of January 19 the International Nickel Company will erect a refinery in Canada—"when the time comes." We are naturally interested in knowing what is meant by this significant phrase. Does it mean that the company expects the Canadian Government to insist on refining being done here? Apparently it does. Does it mean that all the refining will have to be done here? On this point the reports vary, one answers the question affirmatively and the other negatively.

The Toronto World, which invited our hostile criticism by demanding a year ago an embargo on the export of nickel matte to the United States, seems to interpret the news item as an indication of the Government's dissatisfaction with the present arrangements for preventing nickel from reaching the enemy. It may be true that some Canadian nickel is reaching Germany; but if so a great many people whose business it is to know what is going on are being grossly deceived. We have had no good reason yet to conclude that such is the case. It is obvious that Germany has been making every attempt to procure nickel and she may have succeeded in some cases. The British Admiralty is, however, in a position to secure necessary information in this connection and the Government has reported that present arrangements are satisfactory.

It is possible that since the Government assurances were given that control of export has been lost and that nickel is now reaching the enemy. It may be that the Government has obtained reliable information of such traffic and has determined to insist on all the refining being done here. We have no information to this effect, however, and consider it quite unlikely.

While we disagree with the World concerning this phase of the nickel question we agree with its contention that steps should be taken to have the refining done in Canada. It is obviously to the advantage of Canada and the mining industry that we should send out finished rather than raw materials. We would rather export nickel than nickel matte; further, we would like to export nickel steel instead of nickel for the manufacture elsewhere of nickel steel and we would prefer to export nickel-plated articles instead of nickel for plating.

We agree also with the World that it is regrettable that in a time like the present we are dependent on a foreign plant for the production of refined nickel. We take issue on the question of how this condition should be remedied. The World seems unwilling to believe that the International Nickel Company is not exploiting Canada in the interests of Germany. We prefer to believe that the company is in business primarily to make money, and that the directors consider the present arrangements satisfactory on account of business reasons and not from a desire to deprive Canada of an industry or to further the interests of Germany.

We have therefore expressed in these columns satisfaction with the present arrangements as being in the best interests of Canada and of the company. By placing an embargo on nickel matte we would be depriving the Empire and a friendly country of needed supplies. By failing to take precautions satisfactory to the British Admiralty for preventing nickel from reaching our enemy, the International Nickel Company would put itself in a position which would force Canada to prohibit the export of nickel matte to the United States. It is obvious that the company is not anxious to bring about such a condition of affairs.

We have also expressed on former occasions a desire to see nickel refineries established here if such a change can be made without unfairly treating the company which is chiefly responsible for the existence of Canada's nickel industry. It is not unlikely that the company would be willing to make some concessions in view of the large profits that are being made and of the feeling in Canada with regard to the question, and we imagine that the company could establish a refinery in Canada and still be able to pay dividends. We consider, however, that there should be more disposition to meet the company half way and we have no sympathy with the demand that the company be forced to abandon its New Jersey plants.

In the Globe's comment, quoted above, it is hinted that a nickel refinery will be established about the time that peace is declared. The authority for that statement is not given by the Globe. Is there any connection between these remarks and the statement in the Boston News Bureau that a nickel refinery will be established in Canada "when the time comes?"

We fail to see why the end of the war should be chosen as the time for adding to Canada's industries. To our mind the time is now. The demand for nickel and copper was never so great as to-day. The output of the

Sudbury district was never so large. It is evident that if the increased demand is to be met by increased production there must be increase in plant. If there is to be increase in plant, is not now the time to begin construction of a refinery in Canada? It could take care of the new business and gradually be extended to meet the demands for increased output which is bound to come. The New Jersey plant, instead of being scrapped, could be used to supply part of the market under the present restrictions. Before the time comes for the lifting of the present restrictions consideration should be given to the advisability of providing that the New Jersey plant should be used only for supplying the United States market.

THAT COPPER RULING

News despatches recently have credited the British Government with making a rule that the price of copper must not exceed £100 per ton—equal to about 21 cents per pound. Naturally there have been adverse comments on what appears an arbitrary measure to fix the price of a commodity which England must obtain abroad and chiefly in the United States.

As the Journal of Commerce points out, such a ruling might prevent British munitions manufacturers from obtaining copper. "In that case the British factories will have to close, and the orders for munitions will have to be sent to the United States and Canada, where manufacturers are free to buy their copper in such quantities and at such prices as the market conditions may allow. Such a result would not meet the purposes which the Government had in view. They desired to guard against the excessive price of an article absolutely necessary in the production of munitions. They may have to come to the conclusion that it is better to have copper at a high price than not to have it at all."

The wording of the ruling is, however, worthy of consideration. It states that no order should be placed at prices exceeding £100 per ton "without first consulting the director of materials." The news despatches have omitted these significant words.

CANADIAN MINING INSTITUTE

There is to be no election of officers at the meeting of the Canadian Mining Institute in March, but there are indications that the business session will be enlivened by discussions on the by-laws. At least two amendments have been drawn up and submitted for consideration at the meeting.

One of these amendments would provide that certain matters now decided at the annual meetings should be decided by letter ballot. From what we have heard of this proposal it is apparently the opinion of Mr. Norman Fisher and Mr. B. Neilly, who are proposing this amendment, that the present method is unfair to the large number of members who are unable to attend the meet-

ings and are thus deprived of a vote. Most of us agree with them in this. It is generally acknowledged that there are good grounds for dissatisfaction with the present practice. Many members live so far from the places of meeting that they are seldom able to attend. It is not desirable that they should be deprived of an opportunity to vote on some of the questions which are now decided at the annual meetings. On the other hand the business sessions would lose most of their interest if questions of importance could not be decided there. Most of the members who attend the business sessions do so because something is to be decided there and because they want to hear or take part in the discussion. If no decision was to be arrived at the session would lose nine-tenths of its interest. The proposal merits consideration. It is not an easy matter to decide which method of voting is in the best interests of the Institute.

The Temiskaming Mining Company directors have a particularly interesting report to present at the annual meeting, the date of which has not yet been set. The year 1915 was a very successful one and the prospects are even better, for important additions have been made to ore reserves. President F. L. Culver deserves great credit for the able manner in which he has handled the company's affairs.

The excellent inspection system at the Beaver mine has attracted much attention. Numerous favorable comments have been made on it and the Chief Inspector of Mines of Ontario, Mr. T. F. Sutherland, has pointed it out many times as a good example. A recent publication of the U. S. Bureau of Mines pays the management of the Beaver a well deserved compliment by singling out the Beaver system as the best in America for a small mine.

The Nova Scotia Steel and Coal Co. has decided to enlarge the plant at New Glasgow. A new open hearth furnace of 200 tons capacity and a plant for forging shells have been contracted for.

American mining companies paid in dividends in 1915 the sum of \$75,383,387 as compared with \$60,323,529 in 1914.

Deep in the German mind was the sentiment that robbery is not robbery when Germans steal for Germany; deep in the German mind was the sentiment that to get by force is as good a way as any. So, having got by industry what was to be had, Germany has published her creed: "Property first, righteousness at convenience." We have all seen the document sealed with blood of Belgium. We have all accepted notice that Germany is for Germany, property first, and all of us who are not Germans admit that Germany on her present basis is of all the nations the most powerful enemy of peace.—Life.

INTERNATIONAL NICKEL CO.

New York, Jan. 26.

International Nickel Co. in the three months ended Dec. 31 earned 6.8 per cent. on \$41,834,600 common stock, and in the nine months ended Dec. 31 earned 19.4 per cent. on the same amount of stock.

The following tabulation shows the income account for the three and nine months periods ended Dec. 31, 1915:

	Three mos. end. Dec. 31	Nine mos. end. Dec. 31
Gross.	\$3,541,776	\$10,209,531
Other income	65,496	168,449
Total income.	3,607,272	10,377,980
Administration and gen. exp.	184,026	636,152
Net income	3,423,246	9,741,828
Depreciation, mineral exhaust.	464,704	1,215,867
Surplus.	2,958,541	8,525,960
Preferred dividend	133,689	401,067
Balance for common	2,824,852	8,124,893
Per cent. on common	6.8	19.4
Common dividend	2,091,730	3,993,305
Surplus.	733,122	4,131,588

In three months ended Dec. 31, International Nickel Co. had a balance equivalent to about 7 per cent. on the common stock, or at rate of 28 per cent. for the year. This takes into consideration the stock issued in payment of the 10 per cent. stock dividend.

In the first nine months of the current fiscal year, after allowing all charges for depreciation, mineral exhaustion, and preferred dividends, the company earned about 20 per cent. on the increased common stock. Thus the full year's cash dividends were earned in nine months.

Gross in quarter ended with December was greater than any previous quarter. The current quarter is expected to show even a bigger gross. It is expected that last half of the fiscal year will show gross fully 50 per cent. in excess of the first six months, with a commensurate gain in balance for dividends.

Cash balance at close of the fiscal year, March 31, if no extra dividend is charged out in the meantime, will approximate 25 per cent. on the common. There is every reason to believe common shareholders will receive a substantial extra cash dividend in the near future.

REFINING AND USES OF NICKEL

In "The Globe," Toronto, under date of Jan. 21, is an interesting unsigned contribution on nickel. We print it below with a few changes which have been made to correct what are obviously typographical errors:

The establishment of a nickel refining plant in Canada will be a considerable economic problem, as it will entail increased cost of sulphur—sulphur-free, free oils, coke, nitre cake, fire brick, fire clay, magnesite brick and coal. Until now the refining has been done at Bayonne, New Jersey, adjacent to the great oil refineries and chemical plants.

In the ordinary process the ore mined in the Sudbury district by the International Nickel Co. is transported to the smelter at Copper Cliff, and is there smelted by successive stages into a product known as copper-nickel matte, containing approximately 55 per cent. nickel, 25 per cent. copper and 20 per cent. sulphur. All of this matte has been shipped to the Bayonne refinery, where the nickel and copper have been separated from each other, the copper being advanced

to the form of electrolytic copper and sold in the market.

The shipment of nickel matte is analogous to that condition existing throughout the copper industry of the United States, in which it is the general practice for the copper producers to bring their products to the stage known as blister copper at a smelter close to their mines, and then transport the blister copper to some central refinery, advantageously situated where the supplies and the power necessary for its economical subsequent refining into a marketable product are cheap, in many cases this distance being thousands of miles.

Nickel, after being separated from the copper, is refined to a high degree of purity, of approximately 99 per cent., and sold to consumers in the United States, Canada and foreign countries.

Nickel is not sold by the company in the form of a finished article of merchandise reaching consumers directly. It is in the form of a crude metal that is alloyed with other metals and then fabricated into ingots, bars, sheets, strips and other similar metallic products, from which a finished article that reaches the consumer is made. Contrary to general belief, nickel production no longer depends upon naval armaments or martial requirements. Nickel steel in varied forms is used in a wide range of industrial operations, as well as in the manufacture of ordnance and projectiles.

The property of toughness which nickel imparts to steel has rendered its adoption for industrial purposes of expanding importance. Large quantities of plate were used in connection with the reconstruction of the Quebec bridge; the construction of the Manhattan and Queensborough bridges in New York city; the St. Louis bridge over the Mississippi; the Kansas City viaduct and bridge over the Missouri; the Emergency dam, locks and spillway in the Panama Canal, and in many other smaller structures. Nickel has entered into all sorts of railway materials, marine engines and propeller shafts, and a thousand and one lines of manufacturing trades. Armor plate, protective deck plates, large and small guns, armor piercing projectiles, gun shields, etc., contain nickel, but they constitute a small portion of the market for the metal. Manufacturers of alloyed metals—German silver manufactures, for example—cover a large field. In their products, copper-nickel and zinc form component parts. These alloys vary in their nickel contents according to their uses and to the whiteness and softness of the metal to be produced. They enter into hardware and plumbing supplies, tableware, dairy machinery, railway car fittings, electrical resistance materials, cartridge shells, bullet jackets and coinage, both in German silver and pure nickel. The non-corrosive qualities of pure nickel make it specially desirable for cooking utensils, surgical instruments and like purposes. Monel metal—the natural nickel-copper alloy, has found a large market for many uses. Nickel was introduced into the manufacture of the Edison storage batteries, and is much sought in the automobile trade.

SILVER STOCKS IN NEW YORK

Boston, Jan. 21—Approximating 3,000,000 ounces of silver at New York and San Francisco represents the holdings of the silver sales agencies at the present time according to estimates of the best posted interests. In the closing months of 1915 the accumulation got as high as 7,000,000 ounces, but a spurt, which lasted about two weeks, took away about 4,000,000 ounces in that time. This metal was shipped abroad.

DOMINION COAL

The corrected totals of the Dominion Coal Company's production in 1915 are as follows. The production of 1914 is given for comparison.

	1915	1914
Glance Bay Collieries	4,608,979	4,287,717
Springhill Mines	400,791	417,406
	5,009,770	4,705,123

Increase over 1914: 304,647 tons.

The output for January will be around 390,000 tons from the Glance Bay mines and 38,000 tons from Springhill, comparing with 256,000 from Glance Bay and 31,000 from Springhill in January last. If these figures are realized the first month of 1916 will show an appreciation in production of over 140,000 tons compared with the first month of 1915. This large production has become possible because the collieries are working steadily every day, a very unusual condition in January. Last January the mines were working only intermittently, and at very little over half capacity.

Practically all the coal that is being mined is also being shipped, and only small quantities are being stored in banks.

Taking Nova Scotia as a whole the production and shipments in January 1916 will be the largest in the history of coal mining in the Province. It may also be remarked that it is the first time that the Nova Scotian collieries have been able to show what they could do in January, because for the first time, at this season of the year, the demand has been about equal to the supply.

BETHLEHEM STEEL

Bethlehem Steel common sold at \$600 in October, when predictions were freely made that the European war would be over by spring of this year.

It is now selling below \$500, with a \$30 dividend to come of this year, and prospects that there will be no termination of the war before fall. By that time Bethlehem Steel will have practically completed its present European contracts, in which case the most optimistic forecasts of earnings for 1916 will be realized. It means that Bethlehem will earn for its common stock this year \$400 a share or more.

If the European war continues into the latter part of the year, long before then the Bethlehem Co. will be deluged with another big batch of foreign war orders, and estimates of earnings for the year 1917 will be in order.

It is expected that 9,000,000 shells will be completed and delivered in the first ten months of this year. Estimating \$6 as profit per shell, earnings on these 9,000,000 shells alone would reach \$54,000,000.

With two months of the year to go, and profits from guns and other classes of ordnance, rails, structural and commercial steel, estimates of \$400 a share upward for the common in 1916 are not to be wondered at.

Pres. McGregor of Union Iron Works of San Francisco has been in New York consulting with Bethlehem Steel officials relative to enlargement of the Union plant, which is a subsidiary of Bethlehem Steel. Vice-Pres. Snyder of Bethlehem Steel Corporation has returned from inspection of the Union works.—Boston News Bureau.

HARGRAVES

According to a Toronto Mining Broker the Hargraves is under option to New York interests, with every chance of the deal being consummated early in February. The work on this property in the past has been chiefly on veins which were not highly productive. Some good ore was taken out near the Kerr Lake boundary.

U. S. OIL PRICES

Houston, Tex., Jan. 21—Magnolia Petroleum Co., Pierce-Fordyce Oil Association and Bonner Oil Co. advanced gasoline, tank wagon basis, and at filling stations, two cents a gallon to 19 and 21 cents, respectively. Kerosene prices have been advanced one cent a gallon to 12 cents, and naphtha two cents a gallon to 17 cents, tank wagon basis.

Neither Gulf Refining Co. nor Texas Co. has raised prices to meet the new schedule, but both are expected to do so before the end of the week. Demand for all grades of oil is exceptionally strong. Cold weather apparently has no effect on consumption of gasoline, and all companies report a capacity business.

Independence, Kansas—Prairie Oil & Gas Co. advanced price of Mid-Continent crude 5 cents to \$1.25 a barrel.

INTERNATIONAL NICKEL

"International Nickel directors meet for action on the common dividend February 7, and it is expected that an extra dividend will be declared, in addition to the regular 5 per cent. Little credence is given in Wall Street to the report that the Canadian Government is contemplating action that would result in the company being forced to refine its ore in the Dominion. This question has been discussed several times, and the company has always succeeded in convincing officials of the economies that are possible in refining the ore at its Bayonne, N.J., plant. There are two reasons due to the war, why Canada might consider such a change. The first would be to prevent Great Britain's enemies from obtaining the metal which in its raw state, was produced in Canada. Second, to prevent an inflation in the price which would hinder its use in the production of munitions, automobiles and other necessities of war."—*Financial Times*.

APEX.

The shareholders of the Apex Mining Company at a meeting Monday, Jan. 24, in the offices of Sir Henry M. Pellatt, unanimously ratified a bylaw authorizing the directors to sell 699,991 shares of treasury stock at not less than 15c a share. The shareholders are to be given the privilege of subscribing pro rata to this issue up to Feb. 15. It was announced at the meeting by Mr. A. M. Bilsky, who presided, that a brokerage house in Montreal had signified its intention to deal along these lines for this block of stock.

BOSTON CREEK.

Boston Creek, Ont., Jan. 20—The Miller Independence Mining Syndicate has completed the installation of boiler and machinery and the work of getting the plant in shape is proceeding satisfactorily. Up to Saturday ten barrels of ore worth approximately \$15,000 was in the ore house.

It is reported here on good authority that the Richardson, Albright Papisimakes Mining and Development syndicate holdings have changed hands, the price being \$200,000.

ADANAC

An important strike at the Adanac mine, south west of the Temiskaming, is reported. According to the reports received rich ore was encountered in sinking a winze from the 200 ft. level.

TRIUMPH

The Triumph Mining Co., has taken over and is developing the Success company's property near the Vipond mine.

THE METALLURGY OF CANADIAN COBALT ORES

II. LOSS OF SILVER IN CHLORIDIZING SPEISS

By Ralph W. Bridges

The Canadian Copper Company of Copper Cliff, Ontario, was one of the pioneers in the successful smelting of Cobalt ore from the Northern Ontario mines. As early as 1905, they had purchased a few cars of high grade ore and were doing experimental work to determine the best methods of recovering the metals cobalt, nickel, silver and arsenic.

By direct smelting 80% to 85% of the silver was easily obtained in the form of crude silver buttons, but the remaining 15% to 20% was held up in the speiss along with the cobalt and nickel.

The average assay of the metal contained in 12 lots of speiss, shown in the first part of Table No. 3, is:—

Silver 1581 oz. per ton; Arsenic 26.29%; Cobalt 18.76%; Nickel 7.82%; Iron 20.15%

This analysis shows the complex nature of the material and indicates the difficulty of the metallurgical problems to be encountered in separating the various metals. At first this speiss was sold to lead smelters, where it was smelted along with lead ore. Thus the silver was recovered while the other metals were lost in the slag.

The writer of this article was in charge of the experimental work at the cobalt plant at Copper Cliff when it was decided to make a thorough investigation of chloridizing, leaching out, precipitating and refining the silver to be found in the speiss.

As the whole proposition would be impracticable if the loss of silver was large in the roasting, the first thing to do was to determine the loss of silver during the roasting process.

This thesis deals with the experiments which were conducted to determine this loss.

Roasting was first done on a small scale, using the muffle furnaces which were in the laboratory for the fire assay work. Two sets of roasts were made, mixing the speiss with 15% salt in the first and with 20% salt in the second. The weight of the speiss was the same in each case, i.e., 4000 grams ground to pass 40 mesh. Each charge was roasted for 10 hours at dull red heat and rubbed often enough to prevent lumps from forming. The results of these experiments are shown in Table No. 1. The silver content, before and after roasting, is figured just as if each

gram represented a pound. This makes the laboratory experiments easily compared with those conducted on a larger scale.

By increasing the salt from 15% to 20% the volatile loss was raised from 1.88% to 3.27%, or almost doubled.

As no provision was made for collecting the dust and fumes given off from the small muffle furnaces the writer determined to run two 5 ton lots in our Edwards furnaces, which were equipped with flue dust and fume condensing chambers. 15% of salt was used and with the addition of the silver contained in the flue dust the loss was only 1.18% or very reasonable. (See Table No. 2).

Arrangements were now made with the Orford Copper Company to purchase the speiss as chloro-speiss, for a run of three months. It was determined to keep a complete record of the material charged and discharged from the roaster and at the end make a careful clean-up of flue dust, crude arsenic, etc., and credit their silver content to the experiment. The volume of material was so large in this case that the possibility of error was reduced to the minimum. Complete figures covering this three-months test are shown in Table No. 3. The speiss was milled to pass 40 mesh and 15% of salt was added as the speiss was charged to the ball mill. Twelve lots of green speiss were milled and roasted, having a total silver content of 377,255.81 oz. Nine shipments of chloro-speiss were made to the Orford Copper Company of Camden, N.J. Three lots of rejected chloro-speiss were returned to the process. All speiss which contained more than 40 oz. of silver insoluble in sodium hyposulphite was rejected. When the silver content of the flue dust and crude arsenic was added to the other roaster products there was a total credit of 376,140.97 oz. of silver, giving a loss of 1114.84 oz. or only 0.29%.

As a result of this final test the chloridizing of the speiss was shown to be a safe proposition and all the green speiss produced in the cobalt plant thereafter, was chloridized in the Edwards furnaces.

After more experimental work was done on leaching processes for the recovery of silver from chloro-speiss a hypo-leaching plant was built and put into successful operation thus making it possible to recover all the silver from the ore at the cobalt plant.

TABLE I.
Series A, Speiss Roasted in Muffle Furnaces with 15% Salt. (Weight in Grains).

Weight of Speiss No.	Weight of Salt	Total Weight	Wt. After Roast	Gain in Weight	Assay Silver Before R.	Assay Silver After R.	Silver Content Before R.	Silver Content After R.	Oz Silver Lost	Per Cent Sil. Lost
1	4000	600	4600	5082	482	903.5	709.0	1807	1801	6
2	4000	600	4600	5288	688	1221.6	897.0	2443	2373	70
3	4000	600	4600	5140	540	1221.6	927.0	2443	2382	61
4	4000	600	4600	5300	700	1221.6	908.0	2443	2407	36
								9136	173	1.88%

Series B Speiss, Roasted with 20% Salt.

1	4000	800	4800	5289	489	1486.9	1100.0	2974	2909	65
2	4000	800	4800	5241	441	1060.0	776.0	2120	2034	86
3	4000	800	4800	5026	226	1060.0	812.0	2120	2041	79
4	4000	890	4800	5290	490	1060.0	773.0	2120	2045	75
								9334	305	3.27%

TABLE II.

Speiss Roasted in Edwards Furnace with 15% Salt. (Weights in Pounds)

No.	Weight of Speiss	Weight of Salt	Total Weight	Wt. After Roast	Gain in Weight	Assay Silver Before R.	Assay Silver After R.	Silver Content Before R.	Silver Content After R.	Oz Silver Lost	Per Cent Sil. Lost
1	10,000	1500	11500	12295	1195	1182.0	917.6	5910	5641		
	Weight of flue dust, clinker, etc			3176			115.0		183		
								5910	5824	86	1.46%
2	10000	1500	11500	13025	2525	1092.6	816.9	5463	5320		
	Weight of flue dust, clinker etc.			1146			164.7		94		
								5463	5414	49	0.90%
								11.373		135	1.18%

TABLE III.

Results of Three Months Test of Roasting Process

Speiss Charged to Roasters

Lot	Dry Weight	Co.	Assay		Ag.	Cobalt	Nickel	Metallic Content	
			Ni.	As.				Arsenic	Silver Oz.
212	43715	17.62	10.00	21.30	1648.43	7703	4372	9311	36039.30
213	69838	19.18	10.13	25.20	1293.00	13395	7095	17599	45150.27
214	53634	14.82	6.70	23.85	1962.65	7949	3593	12792	52632.39
215	68917	19.24	5.85	30.35	1653.43	13259	4031	20916	56974.71
216	33043	19.70	7.10	22.75	1702.45	6509	2346	7517	28127.03
217	51790	20.86	7.54	27.65	1436.71	10803	3905	14320	37203.61
218	48715	19.03	7.56	27.75	1472.16	9270	3683	13518	35858.14
219	31940	18.83	8.35	28.05	1292.30	6014	2667	8959	20638.03
220	12320	19.61	9.44	29.85	1556.18	2417	1164	3679	9590.74
221	10811	18.02	6.86	24.95	1598.17	1948	742	2611	8638.91
222	10757	17.97	7.77	23.65	1695.90	1933	836	2544	9121.40
223	41683	19.84	6.95	27.90	1788.80	8270	2897	11630	37281.28

377255.81

Credits for the above roasting; 9 lots of Chloro-Speiss shipped to Orford Copper Co., 3 lots of rejected Speiss, Flue Dust and Crude Arsenic.

156	38066	15.96	8.77	14.03	1334.50	6975	3338	5341	25399.54
157	56284	16.35	8.75	13.95	1189.90	9202	4925	7852	33401.74
158	46407	14.17	7.39	10.10	1534.20	6576	3429	4687	35598.81
159	49941	15.95	6.07	22.20	1365.90	7966	3031	11087	34107.21
160	44447	16.76	6.12	15.35	1525.40	7449	2720	6823	33899.73
Reject	50505	14.86	6.70	20.20	1329.10	7505	3384	10202	33562.07
161	52371	17.71	6.74	16.90	1360.30	9275	3530	8851	35633.23
162	50077	17.91	6.98	13.75	1304.37	8969	3495	6886	32658.82
163	49070	17.02	7.06	22.85	1240.30	8352	3464	11212	30430.76
164	41166	17.42	6.45	23.50	1544.80	7171	2655	9674	31796.62
Reject	46465	14.95	5.92	23.20	1197.70	6947	2751	10770	27825.57
Flue dust	3305	18.42	2.33	15.10	669.50	609	77	499	1106.35
Reject	30845	15.44	6.87	21.40	1267.30	4762	2119	6601	19544.93
Crude Ars.	16781	3.90	2.08	52.30	211.50	654	349	8771	1774.59

376140.97

Loss in Silver 1114.84

Per cent loss 0.29%

MINING IN BRITISH COLUMBIA IN 1915

By E. Jacobs.

The mining industry of British Columbia showed improvement in 1915 over results obtained in 1914. An estimate of total value of the mineral production of 1915 places the amount at \$29,979,000, as compared with \$26,388,825, which was the revised total on official record of the value of the production of 1914. The increase in value, therefore, appears to have been \$3,490,175. However, since there were differences in average prices of some of the metals, this does not show the actual position, which is better indicated in the table that follows, giving the estimated quantities of minerals produced (save only as to miscellaneous products) and exhibiting the year's changes in totals of production of individual minerals.

Estimated Mineral Production of British Columbia in 1915.

Mineral.	Quantity.	Increase or Decrease over 1914.
Gold, placer	oz. 34,500	I. 6,250
Gold, lode	oz. 257,690	I. 10,520
Silver	oz. 3,670,144	I. 67,964
Lead	lb. 45,306,000	D. 5,319,043
Copper	lb. 57,382,294	I. 2,372,595
Zinc	lb. 11,940,000	I. 4,073,533
Coal	tons, 2240 lb. 1,552,000	D. 258,967
Coke	tons, 2240 lb. 248,424	I. 13,827
Miscellaneous products	\$2,000,000	D. \$ 852,917

As the year 1914 was not an ordinary one, for the reason that war conditions brought about the closing in August of many metalliferous mines, some of which were operated during the greater part of 1915, the comparison of results obtained in those years respectively, is hardly a fair one. On the other hand the general position was much more favorable in 1913, so that comparison with that year's production would also be on inequitable basis, in this case against 1915. Yet, this notwithstanding, the following changes in 1915 as compared with 1913 may be stated. Placer gold I. 9000 oz.; lode gold, D. 14,564 oz.; silver, I. 204,288 oz.; lead, D. 10,058,677 lb.; copper, I. 10,921,989 lb.; zinc, I. 5,181,232 lb.; coal, D. 585,483 tons; coke, D. 37,621 tons; miscellaneous products, D. \$1,198,100. While these figures show that there were several large decreases, there were substantial increases in other minerals that in point of money value went far to compensate for the decreases, so that, on the whole, last year does not suffer very much by this second comparison.

Gold. Of the total of 34,500 oz. of placer gold from the whole province, the proportion credited to Cariboo district is 13,750 oz. and that to Cassiar district 18,500 oz., of which latter 17,000 oz. is estimated as Atlin's share and 1500 oz. that of Liard and Stikine divisions of Cassiar. Of the remaining 2250 oz., the apportionment is 500 oz. to Fort Steele division of East Kootenay; 400 oz. each to Omineca and Similkameen; 250 oz. each to Lillooet and Nelson; and 450 oz. is the total of several smaller producers.

Lode gold came in largest part from Rossland mines, which are estimated to have produced fully 60 per cent. of the province's total of nearly 258,000 oz.; Boundary district mines, excluding Similkameen, came next with a little more than 17 per cent., including about 37,000 oz. from the Granby Co's mines, nearly 4000 oz. from the B.C. Copper Co's mines, and 2600 oz. from the Jewel mine. The Hedley Gold Mining Co's Nickel Plate mine, Similkameen, made its customary annual production of between 38,000 and 40,000 oz. Mines in Nelson division of West

Kootenay yielded between 8000 and 9000 oz. about one-half of which came from the Queen mine, Sheep creek, while the Motherlode, in the same camp, and the Relief, at Erie, added appreciably to the total of this division. From mines near the Pacific coast came fully 10,000 oz., of which nearly one-half was from the Granby Consolidated Co's Hidden Creek mine, near Observatory Inlet, and the remainder chiefly from the Marble Bay mine, Texada Island, the Rocher Deboule Co's copper-gold mine in the Skeena country, and the Engineer gold mine near Atlin.

Silver. Of an estimated total of 3,670,000 oz. of silver for the province, it is thought that between 2,200,000 and 2,300,000 oz. was produced from mines in the Ainsworth-Slocan district of West Kootenay, roughly rather more than 1,900,000 oz. from Slocan mines and than 300,000 oz. from Ainsworth mines. It seems probable that when the revised returns shall be in it will be found that the 1915 production of silver from these mines was larger than that of 1913 notwithstanding that the latter year was free from war and market troubles and too, had the benefit of a higher average price for the year than did 1915. Probably more than 40 per cent. of the Slocan total came from the Standard mine, near Silverton; the Hewitt-Lorna Doone in the same camp was next with an output of several hundred thousand ounces of this metal, and then the Surprise mine near Cody with between 200,000 and 250,000 oz. More than a dozen other mines in Slocan and half a dozen in Slocan City division together contributed to the total output of the district, from a few hundred ounces each from some small mines up to the considerable combined production of the Rambler-Cariboo, Lucky Thought, Slocan Star, Ruth Hope, and Mountain Con.

Of the Ainsworth mines, the Consolidated Co's No.1 is estimated to have produced in excess of 200,000 oz. while the Utica, Cork-Province, Bluebell, and the Retallack Co's mine together added more than half that quantity, and half-a-dozen others each also yielded silver.

By far the greater part of the 600,000 oz. estimated as the production of East Kootenay mines was from the Consolidated Co's Sullivan mine, while the same company's St. Eugene mine yielded a few thousand ounces and the Monarch near Field, in the northern part of this district did likewise.

Boundary district mines produced a much decreased quantity of silver as compared with other recent years. Their total last year appears to have been less than 300,000 oz. and that notwithstanding that the Granby Co's mines, with a total of about 195,000 oz., did a little better than in 1914. The Union mine, in Franklin camp, probably produced 25,000 oz., but this is a surmise. Other Boundary producers were the E.P.U., Mother Lode, Jewel, and Skylark, all near Greenwood, and the Sally up the west fork of Kettle river.

Next in quantity from one district was Skeena, with about 167,000 oz. from the Granby Co's Hidden Creek mine, 22,000 oz. from the Rocher Deboule Co's mine, and approximately 50,000 oz. from several mines in the neighborhood of New Hazelton.

Rossland mines are estimated to have produced about 156,000 oz., of which nearly 25,000 oz. was from the Le Roi No. 2 company's Josie group and the large remainder from the Consolidated Co's Centre Star and Le Roi groups of mines.

The output of mines in the lower Coast district was about 72,000 oz., of which quantity the Britannia's proportion was 55,000 oz. and that of the Marble Bay mine, on

Texada island, more than one fourth of that amount. Other parts which yielded much smaller quantities of silver were Trout Lake and Nelson divisions, Camp Hedley, and Northeast Kootenay.

Lead—Mines in the province producing lead in considerable quantity are not nearly so numerous as those from which gold or silver, or both these metals, are obtained. Of the total of nearly 42,000,000 lb. estimated as the output in 1915 quite 30,000,000 lb. is put down as having come from the Consolidated Co's Sullivan mine, in Fort Steele division of East Kootenay.

Slocan mines do not seem to have made anything like so good a showing as in other years, their total for 1915, estimated at about 7,000,000 lb., being, seemingly, less than one-half of that of either 1914 or 1912 and than one-third that of 1913. The surprise mine appears to have made the biggest production of lead in the district last year, estimated at between 1,600,000 and 1,700,000 lb., with the Rambler-Cariboo next as regards quantity; probably the Slocan Star and the Standard exceeded 1,000,000 lb. each, with the Hewitt-Lorna Doone mines of The Silverton Mines, Ltd. next with more than 500,000 lb. and the Ruth-Hope between 400,000 and 500,000 lb. Among at least a dozen smaller producers, the Wonderful produced most lead, next there was the Lucky Thought, and then the Wakefield and the Galena Farm, which last-mentioned mine only commenced production in November after having been closed for many years.

More than one-half of the estimated production of Ainsworth division is thought to have come from the Bluebell mine, but no returns were received, so this is a suggestion based on consideration of the average lead content of known earlier shipments of lead concentrate. About one-fourth of the Ainsworth total is regarded as having come from the Cork-Province mine; then come the Utica, No. 1, Early Bird, and Retallack & Co.

Nearly 1,000,000 lb. of lead came from the Emerald mine, near Salmo, Nelson mining division, and very much smaller quantities from three other mines in the same neighborhood.

Mines near New Hazelton in Skeena district, others near Ferguson in Trout Lake division, and the Monarch in Northeast Kootenay were also producers of lead, though not in large quantity last year.

Copper. The most striking thing in connection with the year's production of copper was that of a total output of about 57,500,000 lb., nearly 35,000,000 lb. was from Coast districts which, prior to 1914 had always been the chief sources of copper production in the province. In 1914 the Coast district had a total of 24,000,000 lb. against that of the Interior of 21,000,000 lb., but in 1915 the increase of the Interior was only 2,000,000 lb., while that of the Coast was 11,000,000 lb. The consequence is that the Coast district is now far ahead of the Interior in the matter of present production of copper, and the prospects are that it will hereafter considerably increase its lead in this direction. The Granby Consolidated Co's Hidden Creek mine, near Observatory inlet, in 1915, made an output of little less than 662,000 tons of ore from which rather more than 21,800,000 lb. of copper was recovered. The Rocher Deboile Copper Co's mine shipped to Anyox 14,500 tons of ore that is estimated to have yielded a total of nearly 2,200,000 lb. of copper. The output of the Skeena country, therefore, was about 24,000,000. The Britannia mine, in Vancouver mining division, produced approximately 10,000,000 lb. and the Marble Bay mine, Texada island, may be credited with well on for 1,000,000 lb. These several amounts together make up the 35,000,000 lb. estimated as the copper production of the Coast district in 1915.

In Boundary district, the Granby Co.'s output from 1,035,000 tons of ore was about 16,046,000 lb. of copper;

the British Columbia Copper Co. produced 1,470,000 lb. The production of Rossland mines is estimated to have been 4,700,000 to 4,800,000 lb., that of Kamloops and Nelson between them nearly 200,000 lb. Rossland and Boundary each made an increase of not less than 1,000,000 lb. over their respective totals for 1914.

Zinc. While the total output of zinc is believed to have been not less than 11,940,000 lb., it is thought likely final returns will show this to be somewhat less than the actual production. Nearly all zinc figures are estimates, few returns having been received from shippers, though information from other sources warrants the conclusion that production was about as here stated. Zinc occurs in association with lead in the ores mined at the Bluebell, Cork-Province, and Utica mines, in Ainsworth division, but no account of these has been taken in making up the estimate, although it is known that some zinc ore was shipped from the Utica. Retallack & Co's mines at Whitewater are taken to have shipped ore that yielded 600,000 to 700,000 lb. Slocan mines from which zinc may be expected to be produced in larger quantity in 1916 than in 1915 are the Galena Farm (the concentrating mill at which was started late last year), Hewitt-Lorna Doone, Lucky Jim, Rambler-Cariboo, Ruth-Hope, Slocan Star, Standard, and Surprise with others in course of development that will probably add to the total production now that, through the enterprise of Mr. J. P. Keane, a custom concentrator is being operated in the neighborhood of Rosebery, Slocan lake. Approximate figures of production in 1915 from Slocan mines are—from the Standard mine 4,000,000 lb., the Surprise between 2,000,000 and 2,500,000 lb., and about 3,500,000 lb. as the total from the Galena Farm, Lucky Jim, Silverton Mines, Ltd. (Hewitt-Lorna Doone), Rambler-Cariboo, and Slocan Star. There is one fact that will tell in favor of 1916 to the disadvantage of 1915, namely, that there was last year much zinc product stored at Slocan mines awaiting sale that for this reason was not included in the production of the year, yet which is either now being shipped to the United States or will shortly be, and so will do to swell the total of production to be credited to 1916. One instance may be mentioned here; the zinc in concentrate stored at the Slocan Star mill has been variously estimated at from 10,000,000 lb. upward and late in the year this was sold, but, of course delivery will be in 1916, consequently this year will have the benefit of what was actually last year's production to the extent indicated.

Zinc carbonate ore was shipped from the H. B. mine, on Deer Creek, about ten miles from Salmo, in Nelson mining division, in quantity sufficient to make it appear that a production of between 1,000,000 and 1,500,000 lb. of zinc was made there. Then shipments of zinc ore from the Monarch mine, in Northeast Kootenay are reported to have been in large enough quantity to suggest an output of more than half a million pounds of zinc. From these two sources, then, there seems to have been a total output of approximately 2,000,000 lb. of zinc. So far as known, there was not any commercial production of zinc elsewhere in the province.

Other Metals. Some antimony ore was taken to Three Forks, Slocan, from the Alps-Alturus claims, situated high up on a mountain above a creek tributary to the north fork of Carpenter Creek. One carload was shipped to England, but there has been a long delay in receiving returns. A second carload has quite recently been reported to have been shipped to Chicago. Years ago a test shipment from the same property was made to Trail, but the value of the mineral at that time was too low to make mining the ore profitable.

Iron occurrences in the province do not appear to have been further developed in 1915, nor was there any commercial production of the ore reported. Molybdenum was

talked about and some newspaper statements concerning it made pleasant reading, but there was no production worth mentioning. A little platinum was recovered with gold on Tulameen river and tributary creeks; a statement made last October in the district to the writer was in effect that a branch bank at Princeton had during the season purchased more than \$1000 worth of platinum from Tulameen placer-miners.

Coal and Coke. An estimate made in December placed the gross production of coal at 2,060,804 long tons. In January corrected figures were received from one of the sources of information, with the cheerful intimation that "a mistake of 100,000 tons was made in the figures sent earlier." Accordingly the earlier estimate was that much out, gross production having been 1,960,804 tons, as now estimated. The exact production is not yet known, but it will be found to be about the quantity last above stated. Deducting 408,804 as the approximate quantity made into coke, a net production of 1,552,000 long tons may be regarded as close to what the official revised figures will be when arrived at later.

The net production of Vancouver Island mines is now estimated at 955,940 tons, as follows:—Western Fuel Co's mines, 411,470 tons; Canadian Collieries, Ltd's mines, 370,936 tons; Pacific Coast Coal Co's mines, 127,500 tons; Vancouver-Nanaimo Co's mine, 46,034. Nicola Valley mines produced 88,385 tons, of which 54,500 tons was from the Middlesboro colliery, 32,820 tons from the mine of the Inland Coal and Coke Co., and 1065 tons from that of the Pacific Coast Colliery Co. In Similkameen district, the Princeton Coal and Land Co. produced 12,675 tons. East Kootenay's net production is placed at 495,000 tons, of which 52,955 tons was from the Corbin Coal and Coke Co's mines and 442,045 tons from those of the Crow's Nest Pass Coal Co. In addition, the last-mentioned company made about 355,000 tons into coke.

Coke production is estimated at 248,424 long tons, of which 239,178 tons was made at the ovens of the Crow's Nest Pass Coal Co. at Fernie and Michel, and 9,246 tons at those of the Canadian Collieries (Dunsmuir) Ltd., at Union Bay, Vancouver Is'and.

Structural Materials. The value of building and other structural materials constitutes by far the largest part of the amount shown as an estimate for "miscellaneous products." No details are yet available, but taking the proportions of the 1914 production of such materials as a guide, it may be assumed that of the \$2,000,000 estimated as the total value for 1915, fully 30 per cent, was that of portland cement manufactured in the province, 15 per cent. that of clay products, a similar percentage for sand and gravel, five per cent. for lime and limestone and the remaining 35 per cent. for building and other stone and rock.

Other Minerals. Mica occurs in the northern part of Revelstoke mining division, oil in the extreme south-eastern part of Kootenay district, and some others of those usually included in mineral production, but there was not any commercial production of these in British Columbia in 1915.

MCINTYRE-PORCUPINE MINES

Under date of January 18, President A. M. Hay, gave out the following information to shareholders of McIntyre-Porcupine Mines Ltd:

Production and development operations for the quarter ended 31st Dec., 1915, were as follows:—Tons Milled 26,160; Value per ton \$7.39; Gross value \$193,261; Recovery \$184,233—95.42%; Operating cost \$108,748—\$4.16 per ton; Operating profit \$75,485.

At No. 4 Shaft on the south side of the lake there have been no recent developments of importance in the workings

which continue to give a steady production of milling ore. This shaft, which is now 600 ft. deep, will be sunk to a greater depth in the near future. During the period there have been several important developments in the workings at No. 5 shaft which has been sunk to a depth of 700 feet. Some extensive ore bodies have been located and are now being opened up on various levels. On the fourth level a vein 15ft. wide assaying \$8.00 per ton has been cut to the north of No. 5 vein and is either a new vein or an extension of No. 5, on which a large body of ore had already been opened up on this level. On the fifth level No. 5 vein in west drift is at present 25ft. wide, with an average value of over \$10.00 per ton. The continuation of this vein to the east of the cross-cut has been picked up where a fault was encountered displacing the ore about six feet. On the sixth level a cross-cut is being run to the north to intersect a vein recently cut by diamond drilling from the station on that level. No development work has yet been attempted on the seventh level owing to the present inadequate hoisting facilities, which will, however, shortly be improved. By diamond drilling from this level at an angle of 37 degrees, an orebody has been cut at a vertical depth of about 750 ft. from the surface, nineteen feet in width and showing by assays an average value of over \$18.00 per ton.

McIntyre Extension. This shaft is now down 985 ft., and will be continued to a depth of 1060 ft., in order to make provision for an ore pocket and sump. A cross-cut will be driven at the 1000 ft. level towards the McIntyre No. 5 shaft. This work will explore the ground between the two shafts and enable the workings of the two properties to be connected up for more economical operation. It should also intersect at that depth the ore bodies above referred to on the McIntyre property to the north of No. 5 shaft, which will be development work of very great importance.

McIntyre-Jupiter. The raise has been completed from the 300 to the 200 ft. level at No. 1 B shaft which will be used as a working shaft for the present. A new head frame embracing a crushing and sampling plant is being installed and the new compressor plant and mining equipment has been shipped and should shortly be on the ground. It is expected that active mining operations will be commenced by the time that the McIntyre new mill-unit is ready to receive and treat ore from this property.

Mill Construction. The extension to the mill building has been completed, but serious delays have been met with in the shipment of most of the material. Cyanide tanks are now in place, and most of the mechanism and piping has been installed. The tube mill is now in transit and shipment of the ball mill has been promised within a few days. It is expected that the new unit will be ready to operate about the middle of February, when the total capacity of the mill will be 450 tons per day. The increased milling capacity and the higher values to be expected from the ore bodies being developed on the lower levels should greatly increase the company's earnings during the present year.

In order to embrace a full period of twelve months from the date of the last Report and Balance Sheet issued to Shareholders, the Fiscal Year of the Company will be closed on the 31st March next, and the Annual General Meeting of Shareholders will be held in May.

DUPONT

Wilmington, Del.—Alfred I. du Pont, the deposed former vice-president of E. I. du Pont de Nemours & Co. and his associates have sent telegrams to the company's stockholders asking them not to send proxies for the annual meeting and election to President P. S. du Pont and other officers until a court decision has been made on the suit between the two factions that is now on trial.

INVESTIGATION OF BITUMINOUS SANDS IN NORTHERN ALBERTA

By S. V. Ells*

Since the advent of the fur traders during the eighteenth century, deposits of bituminous sand (heretofore referred to as "tar sand") have been recognized in Northern Alberta. These deposits are probably the largest of the kind in the world, yet, until recently, practically nothing has been known regarding their true economic importance.

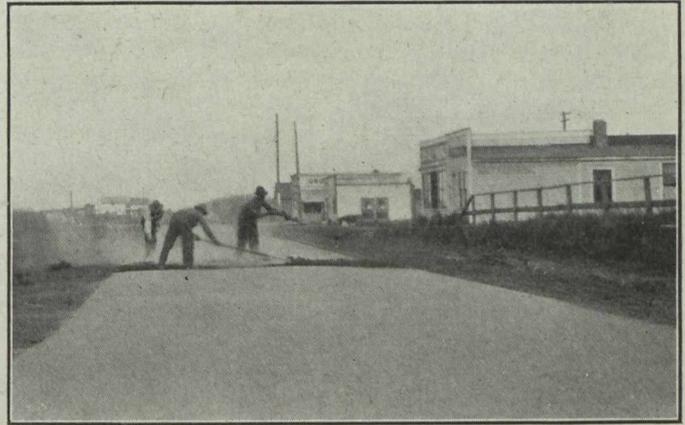
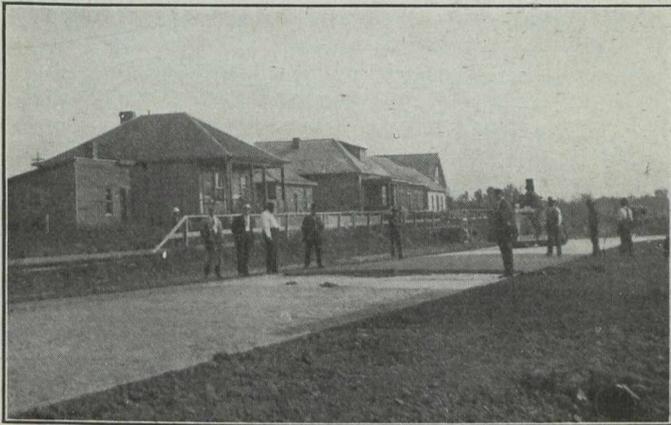
In 1913 a brief reconnaissance of the deposits was made, during which upwards of two hundred and fifty individual outcrops were measured, and over 100 samples secured.

Following this preliminary examination, the writer suggested that a section of experimental pavement be laid. It was felt that such a pavement would illustrate in a practical manner the value that should attach to the Alberta deposits as a possible source of a suitable paving material. During 1914, a quantity of the bituminous sand was, therefore, mined and shipped to Edmonton. During the past season, this material was laid as a pavement in Edmonton. This pavement comprised sections

sheet asphalt mix, the resulting aggregate was further modified by the addition of clean and graded sand; in the case of the bitulithic mix, by the addition of clean sand and graded crushed gravel. In the case of the bituminous concrete, fine grained bituminous sand only was used, and was modified by the addition of graded crushed gravel and of clean sand. This manipulation also reduced the somewhat high percentage of asphalt cement present in the original material to the final percentage desired in each case.

In heating and mixing the materials, a heated rotary mixer was used. This mixer consists essentially of a revolving, jacketed drum, set on trunnions above a fire-box, and connected to the engine by shafting and gears. The inner surface of the mixer drum is fitted with baffles so arranged that a thorough mixing of charged materials is assured. Convenient charging and dumping facilities are provided.

In actual operation, and prior to charging, the drum was



Experimental pavement at Edmonton, laid under direction of S. V. Ells, of the Mines Branch, to demonstrate use of Alberta's bituminous sand deposits.

of three types of surfacing, viz., sheet asphalt, bitulithic and bituminous concrete.

As a site for this pavement, a section of Kinnaird Street, immediately south of Alberta Avenue, was selected. The traffic along this part of Kinnaird Street is such as will give a pavement a fairly severe test, and may be classed as heavy. Apart from a considerable volume of fast automobile travel, it includes vehicles which carry loads up to eight and ten tons.

Deposits of bituminous sand in Northern Alberta may be grouped in two classes, viz.:—(1) Deposits in which bitumen is combined with a coarse mineral aggregate; (2) Deposits in which bitumen is combined with a fine mineral aggregate.

The trial shipment used in the construction of the Edmonton pavement comprised both fine grained and coarse grained varieties, and, from a consideration of analyses of the crude material, three outstanding features were at once apparent:—(1) High penetration of asphalt cement; (2) Unbalanced mineral aggregates; (3) Excess of asphalt cement, (15%).

The effect of unduly high penetration was modified by partial distillation of the more volatile fractions. The unbalanced aggregates of coarse and fine bituminous sand were partially corrected by combining the two in a proportion of two of fine to one of coarse. In the case of the

usually preheated to a temperature of 250°-300° F. The bituminous sand was then wheeled in barrows to the loading platform, and the drum charged. During the first period of heating, the drum was kept closed by means of a damper. When, however, the bituminous sand had reached the desired temperature (400°-410° F) the heat was turned off, and the damper removed. The mix was then allowed to remain in the drum for a further period of 8 to 10 minutes, during which time the lighter hydrocarbons passed off freely as vapor.

Analyses of samples of the finished pavement indicate some room for improvement in the balancing of the mineral aggregate. In this respect, however, there should be no real difficulty in making desired modifications. The penetration of the asphalt cement is high. With a properly balanced aggregate this does not necessarily indicate a source of weakness.

The wearing surface mixture reached the street at an average temperature of 325° F., though the temperature of occasional loads was 350° F. It was immediately spread on the 6" concrete base with hot shovels and hot rakes.

Owing to the somewhat light nature of the contained asphalt cement, it was found necessary to exercise care in rolling. The best results were obtained by first rolling with a light (15 lbs. per linear inch width of tire) hand

*Mines Branch, Ottawa.

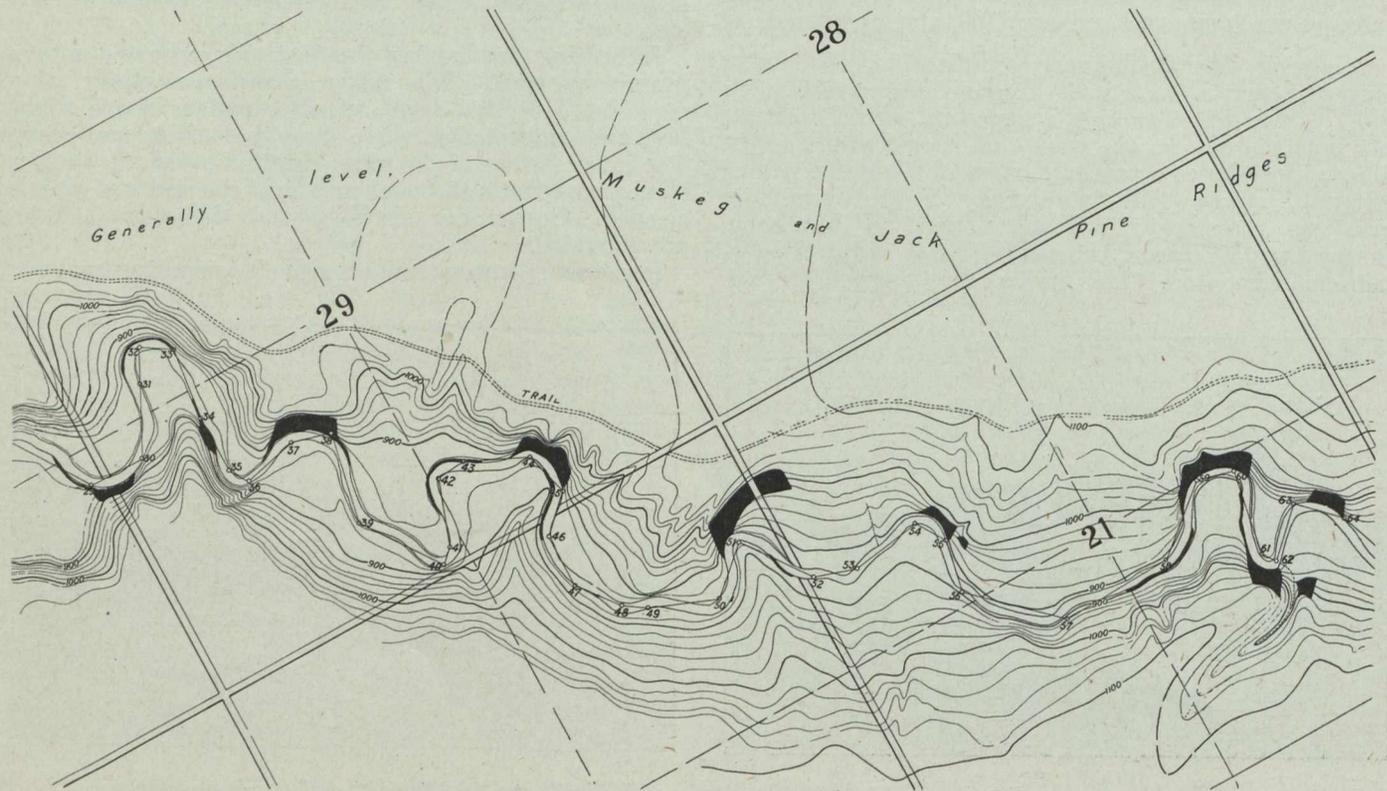
roller almost immediately after the wearing surface mixture had been spread. As soon as the temperature permitted—usually within three hours—a small quantity of Portland cement was sprinkled, and the surface thoroughly compacted by means of a 7-ton roller (250 lbs. per linear inch width of tire).

In the case of the bituminous concrete and bitulithic, the usual flush coat, with $\frac{1}{4}$ " stone screenings, was spread upon the surface, and all superficial voids filled.

The experimental pavement referred to above was opened to traffic on August 26th, 1915, and up to the present time, (December 20th), is in a satisfactory condition. It is obviously quite possible that defects may develop in this initial work with new and untried materials.

in considering past attempts, the writer considers that under favorable conditions, commercial extraction as applied to the McMurray deposits will be found practicable. Further, it should be remembered that, owing to freight and other charges on imported asphalts, extraction in Alberta would be on a much more favorable basis than has, for example, been the case in California where competing residuum can be sold at a very low figure.

It is of importance to note that, in December, 1915, grading along the Alberta and Great Waterways Railway was practically completed as far as the proposed terminus at McMurray townsite. In descending into the Clearwater valley near McMurray, railway cuttings have been made at three points in the bituminous sand itself. With-



Example of topographic maps recently completed by S. C. Ells, illustrating typical mode of occurrence of bituminous sand deposits in Northern Alberta. All streams tributary to the Athabaska river in the McMurray district have been mapped in this manner. The maps were originally drawn on a scale of 1 inch equals 400 feet, but have been reduced to the present scale of 1 inch equals 1000 feet.

Outcrops of bituminous sand are almost altogether confined to slopes of older valleys, and to cut banks along present water courses. Elsewhere the surface of the country is level, and represents a plain.

On the maps, outcrops of bituminous sand are indicated to scale, at certain points. It should however, be remembered that these outcrops represent a single deposit which is practically continuous throughout the whole area.

Nevertheless, there are strong indications that, with minor modifications in manipulation, Alberta bituminous sand can be successfully adopted as a basis for satisfactory asphaltic pavements.

From a comparative study of cost data based on the use of Alberta bituminous sand and of imported asphalts, it appears that the application of the former in the crude state will be restricted within comparatively narrow limits in Western Canada. Indeed, extensive development of the McMurray deposits will probably depend on the commercial application of an extraction process whereby the bitumen can be marketed in a more or less pure form. Such a process would doubtless ensure for the McMurray product a wide market, not only as a paving material, but in many other recognized applications for high grade bitumen.

At various places in the United States during the past twenty-five years, the commercial extraction of bitumen from bituminous sands and sandstones has been attempted. Owing to various recognized causes, none of these attempts have met with commercial success. Nevertheless, in view of the various factors that must be taken into account

in a radius of one mile of the terminus of the road, a number of other outcrops are readily accessible. It is expected that track laying and ballasting will be completed during the winter and summer of 1916. The distance from Edmonton to McMurray over the new railroad will be approximately 305 miles.

In a pamphlet recently prepared by the writer, reference was made to the occurrence in the McMurray district of certain of the higher grade clays. In addition to deposits there noted, samples secured during the past season indicate the presence of stoneware clay, suitable for the manufacture of pottery, such as jugs and crocks, or for sewer pipe.

During the past season, topographical mapping of the area underlain by bituminous sand was also carried on. On this map are shown extent and position of individual outcrops, as well as thickness and extent of overburden. The map also indicates those areas which may most advantageously be developed, and will serve as a basis for an approximate estimate of the total tonnage of bituminous sand available.

SURF INLET GOLD MINE

"The Province", Vancouver, printed the following in its issue of Jan 1:

With the payment of \$150,000 to the Surf Inlet Company of this city by the Tonopah-Belmont Company of Philadelphia, ownership in one of the great gold mines of the province passed from Vancouver hands to mining men from across the line. Mr. Fred M. Wells, the mining engineer who first realized the potential possibilities of the Surf Inlet as a gold producer, and who put in four years of his life developing the property before it was taken over by the Philadelphia company, is in the city to-day. He states that while he will participate in the first payment along with the other large stockholders in The Surf Inlet Company, he likes the clause which allows the original company a one fifth interest in the property, irrespective of the sale.

The option which the Tonopah-Belmont Company held expired to-day but the cash payment of \$150,000 was paid to-day, guaranteeing to the public the real success of the enterprise.

The camp was first developed by Victoria men and although they sold out at an early date and probably without reaping the fullest reward for such pioneer work, still it will give them satisfaction to know that through their efforts a gold camp of great promise has resulted.

Closely following the Victoria men's operations, Mr. E. A. Cleveland of this city became interested and made a serious and well-directed effort to develop what is now the Surf Inlet mine, but through the failure of adjacent properties the camp was given such a black eye that it became impossible to secure necessary capital and operations on his property were also closed. While it has been a long wait for Mr. Cleveland, the results of his early mining venture have been very profitable, for aside from the good cash figure which he has already received, he is one of the heaviest holders of shares in the present Surf Inlet Company.

During the early development of the camp the ore was mined and packed to salt water on horses and shipped to the smelter for treatment. Although the ore contained good gold values the cost of handling was so great that it resulted in a loss and discouragement and finally closing down the works.

After lying idle for several years the camp was brought to the attention of Fred M. Wells and A. B. Clabon and resulted in Mr. Wells making a trip to the camp and thoroughly examining several of the properties. Mr. Wells was very favorably impressed with the possibilities of the mines and in the interest of himself and Mr. Clabon secured an option on the group, known as the "D. L. S." group and owned by Mr. E. A. Cleveland of the firm of Cleveland & Cameron of this city. With the object of developing the property a company was formed, composed of local Vancouver business men and known as the "Surf Inlet Gold Mines Limited."

The development of the mine was placed in the hands of Mr. Wells and during the following four years about \$100,000. was expended. The result of this work was to prove the ore to a depth of about 500 feet and a continuous length of several hundred feet along the vein, demonstrating its value and size to that depth.

Realizing the necessity of still further development and the building of a milling plant, involving large capital, the local company decided to be relieved of this responsibility and gave an option to the Tonopah Belmont Development Company of Philadelphia. This company is made up of a group of wealthy Philadelphia men with Mr. Clyde A. Heller as president. They own and operate some very large mines, including the noted Tonopah-Belmont mines

of Tonopah, Nev., and have been most conspicuous by their successful operations.

Work on the option began about May 1, 1914. The equipment at the mine necessary for the work consists of a power plant of two 50-horsepower boilers, a ten-drill compressor, an electric plant for lighting, blower for ventilation, small hoist, etc.

As the mine is 6 miles from salt water, roads had to be constructed, gasoline boats put on the lakes, besides the fine ocean-going power cruiser "Full Moon," purchased from Mr. Knox Walkem of this city, to assure communication at all times with the outside.

All operations at the mine were placed in the hands of Mr. F. W. Heller, mining engineer. A working force of about 50 men have been engaged up to date. A very complete set of buildings were erected, consisting of comfortable bunkhouses, cook and dining houses, powerhouse, blacksmith's shops, office building, assay office and cottages for men, forming in all quite a neat group of buildings, which, when brightly illuminated with electric lights, reminds one of some of the old-time gold mining days of other camps.

Up to the present the company has done about 6000 feet of development. While some work was done in the upper workings the greater part consisted of opening up a new level by a tunnel nearly 3000 feet in length, which cuts the ore body about 500 feet below the old workings, and nearly 1000 feet from the surface. The orebody was encountered on the low level in July, and since that time several hundred feet of ore has been developed, which, from its great size and high values will soon make the mine famous by its production of gold bullion.

Development work will continue on the mine, and a large mill will be built at once, together with development of a hydro-electric power plant for operation of mine and mill.

"While the Tonopah people are to be congratulated on the success of their first business undertaking in British Columbia," said Mr. Wells this morning, "we are glad to say the Vancouver owners who first developed the property hold an enviable place in the future of the mine, for besides the cash received, the Surf Inlet Company retain a fifth share in the future profits of the mine.

"The successful development of the Surf Inlet mine, solely by local business men, is a real object lesson for the people of this city to think about. Situated as we are in the centre of a great undeveloped mining country, there is no reason why a fair portion of the money available for new enterprises should not be devoted to the development of our own mines. Especially does this idea apply to the initial development of prospects. Like all other classes of business it is essential that experience and good judgment guide the operations."

The directors of the Surf Inlet Gold Mines Limited are Col. J. Duff-Stuart, president; E. A. Cleveland, vice-president; A. H. Wallbridge, treasurer; A. H. MacNeill, K.C., Jonathan Rogers, W. B. Burnett, M.D. and B. G. Hawkins, secretary.

MAXIM MUNITIONS.

New Haven, Jan. 21—Maxims Munitions Co. plant here will resume operations on Friday of this week. Installation of machinery from one of the company's plants in Derby occasioned the temporary cessation of work in the main plant here.

The corporation expects to receive a part of the big contract from the Russian Buying Commission for machine guns.

Engineers are making plans for the erection of a new building close by the main plant where company expects to turn out ammunition.

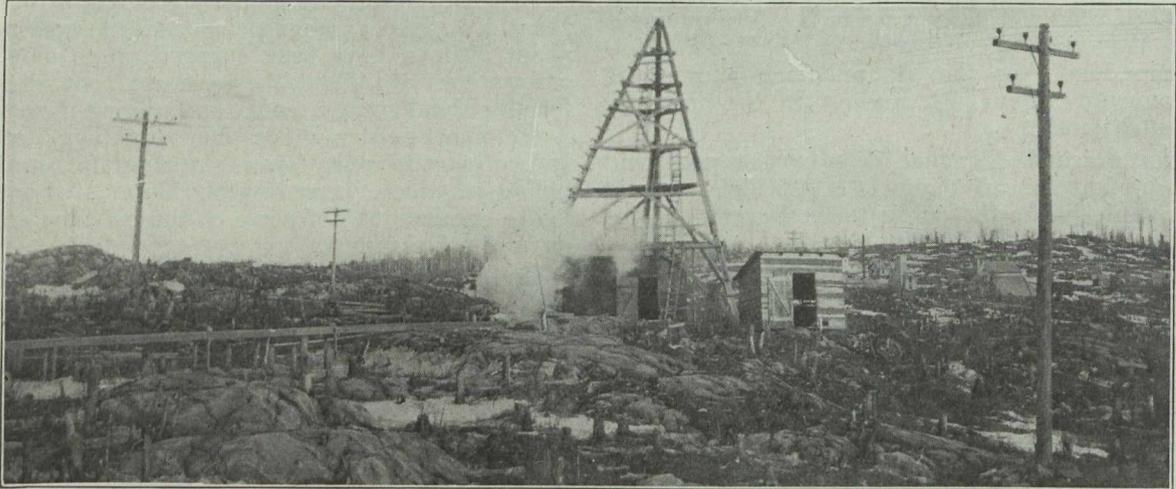
CORE DRILLING AT THE HOLLINGER

By Albert M. Brown

The rapid growth of the Northern Ontario gold mines has formed one of the sensational features of mining history in the past few years. One of the most interesting and successful of these properties is the Hollinger Gold Mines, Ltd., of Timmins, Ont., Canada. Starting operations in 1911 by milling 1,000 tons of ore, valued at \$46,082.00, it has jumped ahead, until, during the year

depth of 500 feet. Owing to its light weight and the fact that it may be dismantled if desired, it is easily pulled up into the high, narrow stopes and there set up.

The "S" drills are of small size and compact, especially adapted to work in drifts where space is limited. The drill rods and core barrels on all these machines are five feet long, permitting operation in cramped space without



Core Drilling at the Hollinger Mine

1914, 208,936 tons of ore was milled, carrying a valuation of \$2,688,354.00. Up to July 1, 1915, the total dividends paid by the company have amounted to \$3,600,000.00.

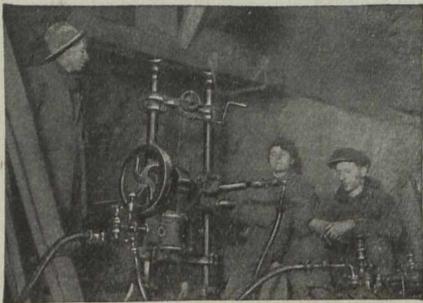
The use of core drills has been of great assistance to the management in carrying on the rapid development of the property; and several ore bodies which had been missed by the ordinary methods of cross-cutting have been subsequently located by diamond drilling.

The company carries on diamond drilling underground as a regular part of the routine work. Vein walls are prospected for branch veins by means of series of short horizontal holes, and extensions to veins which appear to have pinched out are sought for by similar means. Up to October 7, 1915, 21,344 feet of core drilling has been performed at the property.

For assistance in determining the best method of development, four Sullivan diamond drills are employed. Two of these are class "S," having a capacity of 700 feet in

the necessity of cutting a station to operate the drill. The underground machines are run by compressed air.

The Hollinger Company, in addition to its underground drilling, has undertaken to determine the extent of its



Sullivan "E" Core Drill in a Drift at Hollinger Mine

depth and removing a 15/16 inch core. A third is a class "E" machine, mounted on jack screws and employed in the narrow stopes for testing the various pockets of ore, which often occur on the main vein. The "E" drill takes out a core 15/16 of an inch in diameter and will drill to a



Sullivan "B" Core Drill at Hollinger Mine

veins at depth, and for this purpose during the past year employed a Sullivan class "B" diamond core drill having a rated capacity of 3,200 feet. This drill removes a core 1½ inches in diameter and uses 10 foot drill rods. It is operated by compressed air.

The hole was started across the property at an angle of 60 degrees from horizontal. It was bored to a depth, measured along the drill hole, of 2,000 feet, the vertical depth at this point being 1,425 feet. The angle of the hole flattened as its depth increased, so that at its final depth it was advancing at an angle of 45 degrees with the surface. The total variation in the 2,000 feet was therefore 15 degrees. The tendency of angle holes to rise is well known and was allowed for by the management.

The 2,000-foot hole was put down in a little less than three months. The average run, working two twelve-hour shifts per day, was 40 feet in 24 hours. The longest run in a single day was 55 feet. A tripod 50 feet in height was erected over the drill hole and the rods were hoisted in 30-foot sections, so as to save time in hoisting and lowering. Due to the use of this high tripod, it was also possible to substitute a 20-foot double tube core barrel for the ordinary 10-foot barrel. By the use of this special core barrel, which consists of two barrels in reality, one being an inner casing on ball bearings to protect the core from the wash-water and the jar of drilling, from 85 to 90 per cent of the core was recovered from the hole.

The "B" diamond drill is equipped with a Sullivan single cylinder hydraulic feed, an important feature in deep drilling such as this, as it is very sensitive, permitting the operator to adjust the feed accurately to the formation of the ground, which in this vicinity is very broken and variable. The country rock, through which the drill passed in the work, was a soft schist, whereas the vein material was the gold bearing quartz, very hard in comparison. The hoisting gears are proportioned for a heavy line of rods, the drum making one revolution to 39 of the engine. For shallower holes and lighter loads, direct gearing in the ratio of one to 13 permits a more rapid hoisting speed. One revolution of the drum winds up about six feet of the rope.

PORCUPINE AND COBALT DIVIDENDS IN 1916.

Under date of January 26, the "Toronto World" which has lately been devoting considerable space to mining news, prints the following comments written by Mr. Dick Pearce:

How long it will take the gold mines of northern Ontario to pass the annual dividend record of the silver mines is a question that is causing considerable interest in mining circles.

Cobalt mines paid up to the end of last year over sixty millions in dividends—to be exact, \$62,100,827. This record dates from the first year of operation, as it does not take long to get a property in shape for shipping the white metal. Dividends last year of silver companies totaled \$4,289,039 and gold companies \$2,277,187.

Twenty-five incorporated companies have paid dividends out of Cobalt, while private corporations accounted for \$3,825,000 out of the total. Last year twelve companies paid dividends, and bonuses of private corporations amounted to \$175,000. The Nipissing mine has paid \$13,840,000 in dividends or about as much as the next two companies on the list.

Ten companies have paid back their capitalization. The Hudson Bay has paid its capitalization back 250 times. The Beaver has paid 295 per cent.; Buffalo, 282 per cent.; Nipissing, 224 per cent.; Crown Reserve, 196 per cent.; Seneca-Superior, 205 per cent.; McKinley-Darragh, 205 per cent.; Kerr Lake, 199 per cent.; Coniagas, 196 per cent., and Trethewey, 108 per cent.

The highest dividend payer last year was the Seneca-

Superior with 70 per cent. Nipissing was next with 20 per cent., followed by Coniagas with 15 per cent.

So far only one Porcupine company, the Hollinger, is paying back its capital. The total disbursement to the end of 1915 was 139 per cent., involving \$4,170,000. The Hollinger is now on a dividend basis of 52 per cent. per annum, or \$1,560,000. The Hollinger was the largest dividend payer last year among the gold and silver mines, Nipissing following with a disbursement of \$1,200,000.

The Dome started on a 20 per cent. basis last year and paid a half yearly dividend of 15 per cent. amounting to \$400,000. This year's disbursement will be \$800,000 and it is possible that a bonus bringing disbursements well over the million mark may be made. The Dome last year milled 317,873 tons of ore, recovering \$1,307,322 in gold. This year the production will be greatly increased.

The Porcupine Crown paid 12 per cent. last year and it is unlikely that any change will be made. The mine runs along smoothly, steadily producing gold.

The Tough-Oakes mine was put on a 10 per cent. basis last year. Only one-quarter yearly dividend was paid in 1915. The second was paid this month. The Tough-Oakes is the first gold mine in northern Ontario outside of the Porcupine district to pay dividends. On a 10 per cent. basis the 1916 disbursements will be over \$260,000.

Col. Hay stated to The World representative that if developments at the mine continue, McIntyre will be on a dividend paying basis this year. McIntyre's attention has been given to making the property into a big mine rather than paying dividends. In the long run this will be a good thing for the company, as it places it in a position to mine advantageously.

Without counting in the possibility of a dividend from McIntyre the gold mines of northern Ontario will pay close to three million dollars in dividends during 1916. Added to this the probabilities of increased dividends by the gold mines are well worth taking into consideration.

On the other hand, Cobalt is a problem. It is doubtful if 15 companies will pay dividends this year, but some will increase.

On the whole it would almost be safe to say that Cobalt dividends would decrease in 1916 while the gold mines will make increased disbursements.

L. S. IRON ORE TRADE.

Iron Ore says; The Steel Corporation has made contracts with vessel interests for the carrying of iron ore from its Lake Superior mines for a period of five years a certain tonnage to be carried annually. As these contracts are made outside of its own big fleet they show that the big steel maker expects to have a big tonnage to handle in the years to come. It's a pretty favorable indication that business is expected in considerable quantity above the carrying capacity of the corporation's fleet of ships.

Vessel interests look forward to a fine business in the coming season of navigation on the Great Lakes. Contracts already made insure this, the advanced price for carrying ore over 1915 rates being 10 cents from the head of Lake Superior.

GERMAN INFLUENCE IN METAL MARKETS.

New York copper men believe that report from London that British government would shortly seek information about stock-holders and business connections of certain firms in the United States foreshadows an effort by England to wrest from Germany her powerful influence on metal markets of the world. Strength is given this belief by decision rendered a few days ago in Court of Appeals, London, in case dealing with the Australian zinc situation. Under this ruling precedent was given English holders of contracts to deliver ore to German refineries to break their agreement permanently.

THE BURNS CLAIMS SHAW TP.

Under date of Jan. 22, "The Porcupine Herald" prints the following extracts from two reports on the Burns' claims in Shaw township:

"These claims are situated in the south eastern part of the Township of Shaw, in the Porcupine Mining Division, District of Nipissing, Ontario. There are three claims, numbered 13890, 13891, and 900P. "The first two have been surveyed and contain about 40 acres each. 900P has not yet been surveyed but contains approximately thirty acres.

The claims in the winter are reached by sleigh road from Porcupine to what is known as the Hudson Bay Camp, a distance of 5 miles. From here there is a well beaten trail to Kings Landing on the Redstone River, a distance of four and a half miles.

"From here the trail runs up to Redstone for three miles, and then one and a half miles overland to the property. The end of sleigh road from Porcupine is four miles in a direct line from the property. Little development work has been done beyond stripping.

"The principal vein is of quartz impregnated with iron pyrite and showing occasional free gold. It has a strike slightly west of north, and has been traced pretty well through the two claims, 13890 and 13891. It runs through the centre of these claims. The average width is probably twelve feet and it has been stripped across in several places.

"A sample taken across 11 feet 4 inches gave an average of \$13.85 in gold per ton. This sample was taken in sections and the values appear to be evenly distributed throughout the vein.

"Another vein is of quartz and is a foot in width. It runs parallel to the main vein and has been stripped for a couple of hundred feet and traced for that much more. Free gold shows here and there all along where it has been stripped. At one point a pit four or five feet deep has been sunk on it, and free gold shows in the bottom. This is the only point on this vein where any shots have been put in.

"Several other quartz veins, some carrying free gold are said to have been found on these claims, but owing to the deep snow we were unable to see them.

"The main shaft is a wide one and carries good values. The ore from a vein this size can be extracted cheaply, and the greater part of the gold is free. The vein is persistent in length, and if the values continue with depth, as they so far have done in this district, the property will undoubtedly make a mine."

Since the report was written development work has been done and a two stamp mill put in operation.

MILLER-INDEPENDENCE.

Timmins, Jan. 22—The last payment for the McDonough claims at Boston Creek has been made, and Mr. G. J. Miller has the deeds. Mr. Miller was in town on Saturday on his way to the Miracle Mine from Dayton, Ohio, and showed some beautiful samples of telluride and gold ore from the Miller-Independence mine.

The mill has been built under the supervision of Mr. Adams, late of the Dome staff, and another boiler went into the property last week.

The Dodge crusher is in place and milling operations will start shortly. The gold will be saved by amalgamation over 12 foot tables, and the concentrates will be shipped to the States.

About twenty men are now working at the mine and all the camps are built. Up to date six veins have been uncovered, but most of the work and the sinking is being done on the original veins which carry very high value.

The Miracle mine, of which Mr. Miller is also president, will start milling operations the latter part of February.

A small gang of men have been working under Captain Ransome and some very good ore has been encountered at the 70 foot level.—Porcupine Herald.

GRANBY CONSOLIDATED

Boston—Granby Consolidated proposes to reduce par value of its shares from \$100 to \$25 and to issue four shares for one. It is believed the new shares will become more popular as trading units.

Granby originally had 1,350,000 shares of \$10 par which several years ago were changed to 135,000 shares of \$100 par.

Boston was the original trading centre for Granby shares and practically all transactions have taken place in this city, notwithstanding the fact that the company maintains its office in New York, its shares are listed there and its actual management is conducted from that city.

The year 1915 was a good one for Granby but as its fiscal year does not end until June 30, figures for a twelve-month will not be available until the coming fall.

As with all new plants, there were delays and disappointments encountered at the new property at Hidden Creek but recent results have been very satisfactory.

In December the new Anyox smelter treated 72,000 tons of ore, which was larger than expected, as the cold weather makes continuous operation very difficult in the winter months. The cost of producing copper at this plant is now 8½ cents a pound, but with normal operations after the winter, an 8-cent cost is looked for.

Dividend requirements at the current rate of \$6 per annum can be more than supplied from operations at the old Grand Forks plant where costs have been showing an advancing tendency. No better than 11 cents a pound can be hoped for at that property but so long as copper holds at or near its present high level this department of the company's operations can be made to give an excellent account of itself.

Granby is expected to increase its dividend before the end of its current fiscal year—probably during the second rather than in the first quarter of 1916.

A special meeting will soon be called to vote on reduction of par value.

GEOLOGICAL MAPS

We have received from the Geological Survey, Department of Mines, Ottawa, the following recently published maps, copies of which may be obtained on application to the Department.

Map 147A, Cranbrook, Kootenay District, B.C.

Map 142A, Field, Kootenay District, B.C.

Map 116A, Southwestern Ontario.

Map 111A, Vananda, Texada Island, B.C.

Map 110 A, Prescott, Paxton and Lake mines, Texada Island, B.C.

Map 41A, Duncan Sheet, Vancouver Island, B. C.

Diagram of city of Montreal and vicinity, showing location of artesian wells.

CROWN CHARTERED.

The "Porcupine Herald" hears on good authority that a syndicate has optioned the Crown Chartered mine, and that the Porphyry Hill property is optioned to the Northrup Syndicate until February 1st.

McAULAY-BRIDGE CLAIMS OPTIONED.

Timmins, Jan. 22—The McAulay-Bridge claims in Bristol have been optioned to Col. Hay, president of the McIntyre Porcupine Mines.

GERMANY AND THE METAL TRADES.

Opinion differs as to how far Germany will be able to stem and surmount the prejudices of the world when the war is over. Will she be shorn of many of her commercial and economic advantages or will she be able to recoup some of her present losses by trade aggression? Her grip upon the dye industry, her prominence in the realm of shipping and her dominance of the metal trades are among the strongest of her bulwarks threatened.

Complete readjustment of relations existing between German metal houses on one hand and mining and smelting corporations, largely British owned and controlled, on the other, looms forth as one of the results of the European war. The heretofore powerful influence of the Frankfurt and Hamburg concerns may thereby be eliminated. Tangible steps along this line have already been taken by the British government and courts and the effect will ultimately be felt in the United States where these German houses have affiliations and through which copper in former years and zinc concentrates at the present time come to the United States.

Through its "trading with the enemy" bill Great Britain has been working out a plan whereby some of the largest London metal firms, which before the war were closely allied with German firms, could be placed under government supervision. The Court of Appeals in London has just rendered an important decision making possible the abrogation of contracts between English owned mines and German metal houses even after the end of the war.

Another step in this direction comes in the request of the British government for metal concerns in London to file specific data as to ownership, identity of clients and other pertinent business secrets. A year or more ago there was an investigation of some of the metal houses, notably Henry R. Merton & Co., one of the largest in the world. A list of stockholders indicated that a very large part of its shares, if not control itself, was held in Germany. The company had 25,000 outstanding preferred shares and ordinary 70,000 shares. The largest blocks were held by Germans, as shown below:

	Ordinary
Metalbank-Metallurgischegesellschaft	18,600
Metalgeseellschaft	11,875
Schweizerischegesellschaft fur Metalwerke	11,875
Merton Metallurgical Co.	1,240

An appeal taken by Aron Hirsch & Sohn of Halberstadt, Germany from a lower court decision which nullified its contract with the Zinc Corporation resulted in an affirmation by the Court of Appeals in London of the lower court decision. Thus the Hirsch firm has lost the contract, which would not otherwise have expired until 1919, for concentrates produced by the Zinc Corporation, one of the largest Australian zinc properties. This contract called for a minimum of 85,000 tons and a maximum of 95,000 tons per annum.

The United Metals Selling Co., Phelps, Dodge & Co., and the American Smelting & Refining Co. have long maintained branches or agents abroad including offices in London. Control of these companies has always been held in the United States, there being absolutely none other than American ownership and management.—Boston News Bureau.

DOMES EXTENSION

Timmins, Jan. 22—Capt. Anchor has returned to Porcupine and is now superintending the work preliminary to the re-opening of Dome Extension, and it is to be expected that new developments will be reported from the property itself within the course of the next fortnight.

Some of the most recent developments on the Big Dome point strongly to the probability that the big ore bodies of the Dome will be encountered on the Dome Extension.

CANADIAN SHELL MAKING

Gen. A. Bertram, president of the former shell committee of Canada, says in the Monetary Times: "The first order for shells from the English authorities was for 100,000 18-pounder empty shrapnel shells. It was a new venture for any Canadian manufacturing establishment and while the price of \$8.55 per shell may appear high in light of to-day's experience, yet at about the same time an order for 1,000,000 18-pounder shrapnel shells was placed in the United States at \$10 per shell. To the credit of Canadian manufacturers, they have completed 3,000,000 shells at average cost of \$6.50 and the United States concerns have not yet completed their order and are asking extension of time.

"Total number of shells placed has been approximately 22,000,000; materials and quantities used: Steel, 800,000-000 pounds; brass, including copper and zinc, 44,865,617 pounds; copper, 21,595,832 pounds; lead, 101,758,327 pounds; tin, 1,447,708 pounds; resin, 10,037,506 pounds; powder, 4,094,531 pounds; cordite, 9,649,990 pounds; nitrocellulose powder, 3,750,000 pounds; trinitrotoluene, 10,690,000 pounds.

"Monthly output of shells, 1,100,000; labor employed, approximately 80,000 to 90,000 men, including skilled and unskilled labor. There are also 1500 inspectors.

"As the business developed in Canada, as experience was gained, we were enabled to greatly reduce cost production, so much so that on our present contracts we expect to save the imperial exchequer probably \$30,000,000 as between price of the original orders and prices now being paid manufacturers.

"One measure of satisfaction we shall always have—namely, one of the largest industries in America to-day, which will mean a productive output to the end of August of over \$350,000,000.

THE MURDER OF AMERICAN MINING MEN.

At the meeting of the Board of Directors of the American Institute of Mining Engineers, Jan. 21, 1916, the following resolution was passed:

RESOLVED That this Board has learned with indignation and sorrow of the unprovoked and brutal murder of eighteen American citizens on January 10th, in the State of Chihuahua, Mexico, and laments especially the death of Messrs. C. R. Watson, C. A. Pringle, H. C. Hase and W. J. Wallace, who were members of the American Institute of Mining Engineers. As these men and their companions were engaged in the lawful prosecution of their work, we trust that nothing will be allowed to prevent or delay appropriate action by our Government concerning the outrage by which they lost their lives.

RESOLVED that the sincere sympathy of this Board and of all the members of the Institute is extended to the families and friends of Messrs. C. R. Watson, C. A. Pringle, H. C. Hase and W. J. Wallace.

AND BE IT FURTHER RESOLVED that a copy of this resolution be sent to the Secretary of State of the United States, be published in the Institute Bulletin, in the press, and be sent to the families of the deceased members.

CANADIAN MINING INSTITUTE.

A meeting of the Toronto branch of the Canadian Mining Institute was held at the Engineers club, Saturday, Jan. 15. There was a lively discussion of the nickel question, many members taking part. The speakers expressed hopes that nickel refining in Canada will soon become a fact.

PERSONAL AND GENERAL

Mr. T. B. Williams, Engineer for The Canmore Coal Co. of Canmore, Alberta, has returned to the west after spending a month among his friends in Ontario.

Mr. A. A. Hassan has opened an office at 203-204 Riggs Building, Washington, D. C., for geological and mining engineering work. He has been prospecting with diamond drills gold deposits in Montgomery Co., Maryland.

Mr. J. B. Tyrrell has returned to Toronto from Porcupine and will sail on Feb. 9 for England.

Mr. Robert Bryce is at Sheridan, Montana, and expects to be there for a few months.

Mr. B. Neilly was in Toronto last week.

Mr. C. A. Foster of Haileybury has been in Toronto in connection with litigation over property at Kirkland lake and the arrangement of other matters which should result in increased activity in the mining districts along the T. & N. O. railway.

Mr. T. H. Rea is in Toronto. He is making headquarters in Chicago.

Mr. David Sloan formerly manager at the Rea mine was in Toronto last week.

Mr. G. C. Bateman is in Toronto.

Mr. T. W. Gibson and Dr. W. G. Miller, members of the Ontario Nickel Commission, have returned to Toronto after a visit to Cuba in connection with the nickel investigation.

Col. A. M. Hay, president of McIntyre-Porcupine mines, is at the property.

BOOK REVIEWS

Monetary Times Annual Statistical Review and outlook number. Edited by Fred W. Field, Published by Monetary Times Printing Co., Toronto. Price 50 cents.

This volume tells the story of an exceptionally interesting year in Canadian affairs. The great effects of the war on all industries and the ways in which Canadians have met the many new problems are set forth in an excellent series of articles by well known men. The larger part of the book is devoted to banking, bonds and investments, and insurance. Forty pages contain information classified under the heading "industrial." In these pages appears information concerning the mining industry. The Nova Scotia Steel and Coal Company is dealt with in a special article, and Mr. T. W. Gibson contributes some notes on nickel.

Heaton's Annual 1916—Commercial handbook of Canada and Boards of Trade Revenue. Published by Heaton's Agency, 32 Church St., Toronto.

This is the twelfth annual edition of a useful handbook. It enables one to find information which is not readily available, and buried in many diverse publications. The section headings are: official directory, correspondence, financial, commercial regulations, registration offices, credit reports, transportation, banking towns, customs, where to find it, towns and local opportunities, general information, agricultural districts and crown lands regulations, and tables.

A notable part of the book is the section "where to find it." This should prove a handy reference, enabling one easily to obtain information on diverse subjects.

INTERNATIONAL NICKEL.

New York, Jan. 25—In three months ended Dec. 31 last International Nickel Co. had a balance equivalent to about 7% on the common stock.

In the first nine months of the current fiscal year, after allowing all charges for depreciation, mineral exhaustion and preferred dividends, the company earned about 20% on the increased amount of common stock. Thus the full year's cash dividends were earned in nine months.

Gross earnings in the quarter ended with December were greater than any previous quarter in the company's history. It is expected the last half of the fiscal year will show gross earnings fully 50% in excess of gross for the first six months, with commensurate gain in balance for dividends.

Cash balance at close of fiscal year March 31, if no extra dividend is charged out in the meantime, will approximate 25% on the common stock. There is reason to believe that common shareholders will receive substantial extra cash dividend in the near future.

BOSTON CREEK.

Cobalt, Jan. 22—A new vein has been found on the property of the Miller Independence mine at Boston Creek. It strikes directly across the first discovery made. At one point where it has been uncovered there is a width of several feet of quartz, and in this quartz there is a good deal of free gold and sulphides. It is, moreover, not as flat an ore body as the first discovery.

A shaft is being sunk on the original discovery. Owing to the character of the ore body there has been some difficulty in following it. It has been in and out of the shaft once or twice already in the short distance to which the shaft has been sunk now.

A boiler has recently been taken in over the trail from Boston Creek, and, as a compressor and other equipment, including a small Nissen stamp mill purchased from the Dome, preceded it, the Miller Independence should soon be working under steam. The thick crust which formed on the snow last week made the breaking of roads quite difficult for some time, but the passage of the boiler over the trail from Boston Creek should make it quite good for the rest of the winter.

Some ore has already been bagged from the original discovery, and taken to an ore house which has been erected.—The Northern Miner.

ACCIDENT AT DOME MINE.

Timmins, Jan. 22—At five minutes to twelve 3 workmen lost their lives last night by a fall of muck on which they were standing in No. 3 shaft, precipitating them with the rock a distance of some 140 ft. to the 600 ft., level. The name of the deceased are: Mike Cahill, J. H. Smeltzer and Bernardin Deshais. Mike Cahill is well known in the camp since the early days and is an expert miner.

J. H. Smeltzer, whose wife lives in South Porcupine comes from Guelph, Ontario, and B. Deshais comes from Three Rivers and has a brother working at the Tough-Oakes mine. From enquiries it seems that the chute was hung up in the raise and a pipe driven into the pile was to be filled with powder to loosen it up. The end of the pipe had been battered up with hammerings and had just been sawn off when without any warning the mass fell to the bottom carrying the above deceased with it. H. Charette W. Asseltine, and H. Lajetnesse, were also on the edge not two feet away and had a narrow escape. An inquest will be held—Porcupine Herald.

SPECIAL CORRESPONDENCE

NEWFOUNDLAND

Copper. The first copper ore for the new smelter, has just been landed at the dock yards of the Reid Newfoundland Co. from the S. S. Newfoundland which ship arrived from Little Bay Mines early in the week. It is the first cargo of ore that has been shipped from these mines since 1900, when work was abandoned. This cargo of ore was taken from the dumps of which there are upward of ones hundred thousand tons lying on the surface and which can be handled very cheaply. Several tons of this ore in large pieces weighing from three to five hundred pounds is on exhibition at the dock yards and in some of the store windows along the street. One particularly large block of ore is exhibited in the window of Bishop & Sons. It weighs from three hundred to five hundred lb., and Mr. McKay, President of the smelting company informs us this piece alone is worth \$75, and he says there are tens of thousands of tons of high grade copper ore in the dumps at the mines equally as good as the samples on exhibition.

The smelter is now about completed, and the work of smelting the ore will commence at once. The enterprise is being watched very closely by the mercantile and mining classes of the country, and on the success of this undertaking, which will be a good test of the smelting of ore by electrical process, will depend the introduction of a system of small smelters, which is so very much needed in Newfoundland to make mining a success. It is a system similar to this which has prevailed in the Western States, and has made mining the success it is in that country.

With the success which we have every reason to hope Mr. McKay's smelter will attain, there is every reason to expect that the Government of Newfoundland could be induced to erect a few small smelters in the mining districts and thus encourage an industry which has given so much wealth to the world. With a system of small smelters established throughout the country every man who owns a mining claim can go to work and develop same. It needs comparatively little capital to do this, and every pound of copper which he takes from his property, can be converted into cash at the smelters. In this way some hundreds of very valuable copper properties which are simply being retained from year to year by individual owners, by the paying of the necessary mineral fee to the Department of Agriculture & Mines, would be developed into very profitable industries, to the advancement of the country and the betterment of its people.

Coal Famine. A very serious problem faces Newfoundland this winter in the matter of a supply of coal for its people. The question has become most serious, so much so that the Government was obliged at the beginning of the year to commandeer every ton of coal within the city of St. John's. The shortage of supply is owing to no available shipping for this trade.

Newfoundland gets all her coal from Sydney, C. B., with the exception of an occasional cargo from the old country, and some hard coal from Philadelphia. In other years we had a fleet of Steel Ships (Sealing Ships) which brought all the coal that was needed, and in addition to what was required for the trade and domestic requirements large stocks were kept on hand to supply any foreign going ships, especially during the fall and winter months. On account of the war however, this magnificent fleet of steel ships (seven in all) were sold to the Russian Government to be used in the White Sea as icebreakers, and thereby Newfoundland was deprived of the shipping which gave her an assured supply of coal. When the New Year came in there was held in stock in this city only about 4000 tons of coal for all purposes, and this amount held by three coal merchants, others sold out completely during Christmas

week. The price, which was \$7.60 per ton for soft coals, before the end of the year, jumped to \$10.80 per ton the second day of the New Year. It was then the Government stepped in and took charge of the supply, and instead of permitting the exorbitant price of \$10.80 to be charged reduced the price to \$8.00 per ton. The coal merchants threatened not to import any more coal if they were restricted in their charges. Matters then became grave, so much so that the Government were obliged to look to the British Admiralty for a large collier to bring a few cargoes of coal from Sydney. At present no collier is available, but will be later on.

In the meantime the Government has succeeded in getting a large steamer—the S. S. Alconda from Harmsworths of England, which ship is due in Sydney about January 20th, and due here January 26th, with 6000 tons of coal. In addition the Government has also chartered a large steamer from New York and she will be engaged for several months in the coal trade and together with the help of the colliers to be loaned by the Admiralty a little later on, the fear of a coal famine will be averted.

In view of such a calamity as a coal famine being merely averted from the country, the matter of the development of Newfoundland's coal deposits, is a subject which should engage the very earliest and most careful consideration of the Government of Newfoundland and her people too. That Newfoundland should be depending on any country for a coal supply, when she has abundance of coal within her own bounds, shows negligence and utter disregard for the welfare and advancement of the country not on the part of any one particular Government but all of them, and the apparent indifference and apathy of those of our people who should have interested themselves before to-day in a matter of such vital importance to the colony. In an article which I am preparing for the next issue of the Canadian Mining Journal I hope to show from data in my possession and the reports and opinions of some of the best mining authorities, that Newfoundland in addition to possessing inexhaustible supplies of iron and copper ores has also vast deposits of coal. "Show me a Geological map of a country, said the great Dr. Buckland, and I can point out where its future prosperity lies, and where its manufacturing and kindred industries will be established." This applies particularly to the country that is fortunate to possess supplies of coal.

Iron Ore. Work on the iron mines at Bell Island is going ahead full speed. Full crews of men are employed night and day, and immense piles of ore are being stacked for early shipment, as soon as navigation opens.

PORCUPINE AND KIRKLAND LAKE

LaBelle. The steam plant at the LaBelle Kirkland Gold mines, at Goodfish is now running. It consists of a compressor which will run from six to seven drills; two 65 H.P. boilers and a big hoist. The shaft is now down to 130 feet and will be carried on without delay while a cross cut on the 100 foot level will be continued with all speed.

Premier. The Standard Porcupine Mine has been sold to a company called the Premier Gold Mining Company of Boston. The Standard has been closed down for a number of years. Recently it was purchased for a few thousand dollars from the liquidator by one of the principal shareholders. In the early days of the Porcupine camp, the Standard was one of the most spectacular surface discoveries outside the Dome, the Hollinger, and other well known properties. A plant was rushed in to the claim and set up and work carried on, on a considerable scale, though not with much intelligence. Some diamond drilling was done and a core containing a good

deal of free gold was found, but drifting underground was never successful in discovering where this core came from. The slump in the undeveloped Porcupine prospects came along and the Standard shut down and has been shut down ever since.

Lucky Cross. Several offers have been made for the Lucky Cross Mine at Swastika. One of these was by Col. Hay, and associates. At the time of writing no deal has been definitely closed although it is most likely to be finished at almost any time.

Apex. A meeting of the Apex Porcupine Mines will be held in Montreal next Monday. It will then be decided whether an offer of fifteen cents a share for a block of the company's stock will be accepted. In this case the property will be likely to start up soon.

West Dome. All financial arrangements to handle the further development of the West Dome have been completed, but it is most unlikely that anything will be done on the properties until much later in the year. At the present time the plant needs a great deal of overhauling and this can be carried out much more cheaply when the weather is milder.

Jupiter. The raise from the 200 to the 300 ft. level at the Jupiter mine has been completed and the new plant is now being installed. An ore-house is also being built. All the mine will be in good shape for active development by the time the additional unit of the McIntyre mill is ready to handle ore from this property.

McIntyre. The quarterly statement of the McIntyre Mine showed that for the period ending December 31st a profit of a little over \$75,000 was made. It also stated that at the 750 foot level the diamond drill running at an angle of 37 degrees had cut an ore body fifteen feet wide of eighteen dollar ore. The shaft on the McIntyre Extension which is to serve as the main working shaft of the McIntyre group is now down to about 1000 feet. From the 1000 foot level cross cuts will be run to connect with the No. 5 shaft.

This cross cut should be instrumental in opening up several known veins on the McIntyre, while connecting the two properties. The completion of the addition to the McIntyre mill has been delayed owing to the non arrival of the tube and ball mills.

The tanks for the cyanide plant have been installed and it is expected that the whole of the new unit will be ready about the middle of February.

COBALT, GOWGANDA AND SOUTH LORRAIN

Temiskaming. The next annual report of the Temiskaming Mining Company will show that there has been mined during the year, about 1,600,000 ounces. Of this 280,000 ounces consist of ore broken on the stulls underground. The annual report will also show that despite the fact that most of the drills were running in development, costs were very low. This is the more remarkable since during all the time when silver was at such a low price drills were pulled off all veins showing ore and put on drifts that had either been abandoned by the old management or did not then show any ore.

There have recently been some very favorable developments in the mine. Drifting on the vein which has been yielding such remarkable ore, another high grade ore shoot has been encountered about 75 to 80 feet away. This is on the 500 foot level. Between the two points the vein yields a good width of milling ore. A very interesting, though so far not very profitable discovery has recently been made on the Gans claim on the 500 foot level. A body of quartz stretches clear across the face of the drift. This quartz is for the most part almost barren but patches

of high grade ore and smaltite occur in it, which make it profitable to hand pick and to run through the mill. The management of the Temiskaming decided that they would also sink their shaft through the diabase sill to the lower contact with Keewatin. Accordingly the shaft is now down 900 ft. and will be continued at the rate of about 100 ft. a month. Waste from this work is being used to back fill old stopes on the upper levels of the mine.

Beaver. The Beaver shaft is now down to 300 ft. where a station has been cut, and sinking has commenced again. The diamond drilling which was done about a year ago on the Beaver indicated that the Keewatin below the diabase sill would be found at about a depth of 700 ft. Progress is being made at the rate of about 100 ft. a month in sinking so that some information on this very interesting development should be forthcoming in May or June. The striking of ore in the Keewatin below the diabase sill would have revolutionary effects upon the Cobalt camp.

The Ophir Cobalt is now being pumped out and tenders are being asked for the sinking of the shaft from the 300 to the 600 ft. level. This will be the first work undertaken by the company in their new scheme of development.

The LaRose Mining Company is running a diamond drill from the 350 ft. level of the new shaft to discover the depth at which the Keewatin will be encountered. Discoveries on the Chambers-Ferland and the Nipissing adjoining make the subject very interesting to the LaRose. Last year the LaRose production was about 1,150,000 ounces. This is a good deal better than was anticipated last year, since no new ore bodies have been found. Profits amounted to about \$225,000 for the year and expenses to about \$405,000.

Power. All mines in the Cobalt camp have gone on a flat rate of \$50 per H.P. since the beginning of the year. This arrangement has been made between the mining companies and the Northern Ontario Light and Power Company and it is considered to be a considerable reduction. Previously all kinds of rates were in vogue, running from \$45 to \$85 a H.P.; now they are all uniform.

The Genessee Mining Company has resumed work on the United States Claim, to the north of the East claim of the Chambers-Ferland. The shaft will be sunk to the 300 ft. level before any exploration work is undertaken.

The McKinley Darragh has commenced to sink a winze below the 250 ft. level on the Cobalt Lake fault. This is not the first time that the company has done work on the fault, but although a little ore has been found it has never been sufficient to pay expenses.

Copper from Cobalt. For the first time in its history, a copper shipment was made from Cobalt. This consisted of a car load of chalcopryrite ore from the Brewer and Price claim on the Montreal River, near Latchford. It was shipped by the Rand Syndicate to the States. The same syndicate is now working a copper prospect near the Sterling mine, a few miles west of mile post 76 on the T. & N. O. Railway.

The Crown Reserve Mining Company is sinking a winze on the large vein on the 500 ft. level. This vein was discovered some time ago, but the development was not rushed on it. Some patches of high grade ore have been found in it, but not sufficient to make it of paying grade. It is entirely in the Keewatin.

Trethewey. If the price of silver remains as high as it is to-day there is little doubt that the Trethewey will

commence work again, later in the Spring. There will be no hurry to start again, however, until the weather is moderate.

The South Bay Mining Company, working claims on Gowganda Lake is getting specifications and plans for the development of power at Gowganda. This scheme proposes the utilizing of the water of the East branch of the Montreal River. A tunnel will have to be bored for some distance from the East Branch to Gowganda Lake itself. Surveys are now being made and preliminary work undertaken. There are signs that Gowganda is not going to be so forsaken as it has been for the past two or three years. The Miller Lake O'Brien is working as usual and a fair body of milling ore has been found on the Millerett.

Barbara. On Wigwam Lake, the Barbara Silver Mines is setting up a plant. Mr. George Rogers has been in charge of the development of these claims for the past year and he has just returned from a trip to order machinery and other supplies in order to further develop the properties.

The Reeves-Dobie is now being worked by a Philadelphia Syndicate.

If the South Bay does persevere in its intention of putting in a power plant, it will undoubtedly induce many companies to resume.

COPPER.

New York—Developments in the copper market Friday Jan. 21, were sensational. Quotations for spot copper ranged above 25 cents a pound. One small lot of copper for February delivery sold as high as 30 cents a pound. This was an isolated case, and does not reflect actual market conditions. The large agencies made no sales above 25 cents, although opportunities presented would have enabled them to sell their product above that level.

It is the desire of the large producers to keep metal prices at a reasonable figure, and attempts to sell copper at what they regard as exorbitant prices will be discouraged.

With consumption running at a rate that has exhausted surplus stocks producers realize the seriousness of the situation, and their object is to stabilize conditions by holding prices at a level that will not discourage consumptive demand.

Boston, Jan. 24—Copper consumers were on the job early Saturday with telegrams and telephone communications with New York as a result of Friday's extravagant stories wired out from that city in relation to copper prices. There were sales Saturday for April shipment at 25½ cents a pound.

An old-time boom in the copper shares is one of the predictions made during the present bull market that have not come true. And this is not at all due to a lack of bull ammunition. The copper industry gained great benefit through the war demand for metal while the rise in the shares has not been more than average. Where the trouble lies is puzzling a good many persons, but it is obvious that the public has never warmed up to the coppers. A feature of this situation is the attitude taken by the Boston market in coppers. New England speculators have shown no more indication of enthusiasm over the market in coppers than have people of New York.

A question constantly asked is, why doesn't Boston come in? Boston was the centre of former bull periods in the copper stocks—and also lost enormous sums in the last big boom. People with a first-hand knowledge of the industry consider the disparity between trade conditions and the stock market as past all understanding.

GENESEE MINING CO.

It is the intention of Manager L. F. Steenman of the Genessee Mining Company to continue the present 60-foot shaft to a depth of 300 feet before crosscutting, and if ore is not located, to sink to 375 or 400 feet, a new blacksmith shop, hoist-house, powder and store houses are erected on the property, and a new shaft house will be built shortly. A small gang of men is now employed on the property, and it is the intention to prosecute development work energetically.

The owners of the Genessee are optimistic of the outlook, the recent developments at the Chambers-Ferland having enhanced the prospects for the Genessee. The management is making connection with the Chambers-Ferland air line, which work was completed this week. The property will be undertaken at once, and the pumping out of the shaft will be commenced as soon as the air is available for the purpose.

The shaft on the property was sunk on a 4-inch vein of low-grade, and the present known vein system, together with the possibility of encountering the rich ore from the Chambers-Ferland, has encouraged the Genessee to institute a policy of thorough development.—Cobalt Nugget.

COBALT SHIPMENTS

Cobalt, Jan. 22.—The present week is the first for some time in which there were no shipments of bullion from the camp. The ore shipments, however, were considerably higher. Six mines shipped seven cars and all went to Canadian smelters, with the exception of one from McKinley-Darragh which went to Perth Amboy, N.J. In the list Casey Cobalt is included, shipping one car from New Liskeard. Nipissing led in tonnage, shipping two cars, both of them going to Welland, Ont. The shipment figures show a total of 535,892 pounds shipped for the week ending last night, against 465,943 pounds shipped the week previous.

Ore shipments for the week were as follows:

MINE.	POUNDS.
Nipissing.....	130,728
LaRose.....	87,100
McKinley-Darragh.....	69,077
Mining Corporation, Cobalt Lake.....	86,609
Peterson Lake, (Seneca ore).....	83,492
Casey Cobalt.....	80,820
Total.....	537,829

Bullion shipments for the year, to date are:

	Bars.	Ounces.	Value.
Nipissing.....	214	251,675.15	142,196.75
Cr. Reserve.....	29	29,000.00	17,000.00

THE COPPER ORDER.

The following is a copy of the order issued by the British government setting a £100 (21 cent) limit on certain copper purchases:

I am directed to inform you that the minister of munitions considers it desirable to exercise a closer check upon the purchases of copper made by contractors to His Majesty's government for the purpose of carrying out munitions orders.

I am to request, therefore, that from the date of this circular you will observe the following rules in regard to such purchases:

- (1) Orders up to and not exceeding 50 tons may be placed in the usual way without reference to the ministry.
- (2) No order for "best selected" or "electrolytic" brands of copper should be placed at prices exceeding £100 per ton, without first consulting the director of materials, armament buildings.

MARKETS

NEW YORK MARKETS.
CONNELLSVILLE COKE

JANUARY 24th, 1916.

Furnace, spot	5.00
1st half 2.35—2.50. Year 1916	2.25—2.35
Foundry, prompt	3.50—4.00
Contract	3.00—3.50.
JANUARY 24th, 1916.	
Straits Tin, b.o.f.	42.25
Copper—	
Prime Lake, nom.	25 00 to 25 50
Electrolytic, nom	25 00 to 25 50
Casting, nom.	24 00 to 24 25
Lead, Trust price	6 10
Lead, outside	6 10
Spelter, prompt western shipment	19 05 to 19 30
Antimony—	
English brands, nominal	
Chinese and Jap.	42.50 to 43.00
American	42.50 to 43.00
Aluminum—	
No. 1 Virgin 98-99%	53.00 to 55.00
Pure 98-99% remelt.	51.00 to 53.00
No. 12 alloy remelt	43.00 to 45.00
Nickel	45.00 to 50.00
Cadmium nominal	\$1.25 to \$1.50
Quicksilver, nominal	\$275.00
Platinum—	
Nominal	\$88.00 to 100.00
Cobalt (metallic)	\$1.25
Silver (official)	57 5-8

METAL PRODUCTS.

Owing to the withdrawal of all price lists by the leading manufacturers of brass and copper products, quotations appearing below are based on the outside market and are likely to change at any moment. All prices are nominal as follows:

Sheet copper	base 31.50
Copper wire	base 26.00 to 26.50
High sheet brass	base 34.00 to 36.00
Seamless brass tubing	38.00 to 40.00
Seamless copper tubing	38.00 to 40.00
Brazed tubing	38.00 to 40.00
Brass wire	34.00 to 36.00
Brass rods	34.00 to 36.00
Sheet zinc, f.o.b. smelter	23.00

TORONTO MARKETS.

JANUARY 26th, 1916

(Quotations from Canada Metal Co., Toronto)

Spelter	21 cents per lb.
Lead	7½ cents per lb.
Tin	47 cents per lb.
Antimony	48 cents per lb.
Copper casting	26 cents per lb.
Electrolytic	26 cents per lb.
Ingot brass	yellow, 13c.; red, 15c. per lb.

JANUARY 26th, 1916.

(Quotations from Elias Rogers Co., Toronto)

Coal, anthracite	\$8.00 per ton
Coal, bituminous	\$5.25 per ton

STOCK QUOTATIONS

(Courtesy of J. P. Bickell & Co., Standard Bank Building, Toronto).

As of close, January 24th, 1916

New York Curb.

	Bid	Asked
Atlanta	.21	.22
Canada Copper	1.93½	2.00
Am. Marconi	4.00	4.25
Belmont	4.25	4.37½
Goldfields Cons.	1.00	1.06¼
International Nickel	2.14	2.15
Jim Butler	.93	.95
Jumbo Extension	1.31¼	1.37½
Riker Hegeman	5.50	5.75
Standard Silver-Lead (B.C.)	1.75	1.81¼
Stewart Mining	56¼	62½
Tonopah Extension	4.43¾	4.50
Tonopah Merger	55	60
Tonopah Mining	6.75	7.00
United Profit Shar.	2.00	2.12½
West End. Cons.	79	81
Anglo-Amer. Oil	16.75	17.25

Submarine Corp.	38 25	39 00
Kennecott Copper	54 25	54 37½
Standard Oil of N.J.	5 07	5 10

Porcupine Stocks

Apex	7.5-8	7.¾
Dome Consolidated	.19	...
Dome Extension	.33	33½
Dome Lake	.26	28.
Dome Mines	27.50	28.00
Foley O'Brien	60	75.
Gold Reef	01¼	2
Hollinger	29 00	29.75
Homestakes	42	...
Jupiter	20	20¾
McIntyre	90½	91.
McIntyre Extension	29	31.
Moneta	12	12½
Porcupine Crown	83	87.
Porcupine Imperial	4 1-8	4¼
Porcupine Tisdale	1½	2½
Porcupine Vipond	73	74.
Preston East Dome	5¾	6.
Teck Hughes	16¼	18.
West Dome	15½	16¼
West Dome Consolidated	23	23½

Cobalt Stocks.

Bailey	4 7-8	5.
Beaver	40.	41½.
Buffalo	...	90.
Chambers Ferland	28½	28½.
Coniagas	4.55	4.75
Crown Reserve	52.	54¼
Foster	...	7½.
Gifford	7.	7¼.
Gould	7.	...
Great Northern	4½.	4.7-8
Hargraves	3½.	5.
Hudson Bay	30.	35.
Kerr Lake	4.45	...
LaRose	67.	70.
McKinley	40.	42.
Nipissing	7.25	7.50
Ophir	7½.	8½.
Peterson Lake	31¼.	32.
Right of Way	5.	6¼.
Seneca Superior	73.	78.
Shamrock Cons.	18.	18½.
Silver Leaf	2.5-8	2¼.
Temiskaming	68.	69.
Trethewey	16.	17½.
York Ontario	½	1
Wettlaufer	8.	8½.

SILVER PRICES

January	New York cents	London Pence
10	56½	
11	56¼	26 15-16
12	57	27
13	56 7-8	27
14	57	27 1-16
15	56 7-8	27
17	56 3-8	26 3-4
18	56 5-8	26 7-8
19	56 5-8	26 7-8
20	56 3-4	26 15-16
21	56 7-8	27
22	57 1-4	27 3-16
24	57 5-8	27 5-16

CROW'S NEST.

Summarizing the year's results of the Crow's Nest Pass Coal Company, for The Financial Post, Elias Rogers, the president, says that the output of coal was about 877,000 tons and the output of coke about 266,000 tons. "Since Jan. 1, 1915," declares Mr. Rogers, "we have paid off all our indebtedness and have now a substantial balance in the bank. All bonds against the subsidiary companies have been paid and there are now no bonds outstanding against any of the companies, and no preferred stock. As far as we can judge, the prospects for the coming year are quite as good if not better than the past year."

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

<p>Ontario Cohen, S. W. Campbell & Deyell. Carter, W. E. H. Ferrier, W. F. Forbes, D. L. H. Gwillim, J. C. Hassan, A. A.</p>	<p>Haultain, H. E. T. Segsworth, Walter E. Smith, Alex H. Smith, Sydney. Maurice W. Summerhayes. Tyrrell, J. B.</p>	<p>Quebec Burchell, Geo. B. Cohen, S. W. DePencier, H. P. Hardman, J. E. Hersey, Milton L. Johnson, W. S. Smith, W. H.</p>	<p>British Columbia Brown & Butters. Fowler, S. S. FOREIGN-New York Canadian Mining & Exploration Co., Ltd. Colvocoresses, Geo. M. Dorr, Jno. V.N. Hassan, A. A.</p>
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ENGINEERS, METALLURGISTS AND GEOLOGISTS.

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<p>SPEARMAN CHAS., B.Sc., M.A. Mining Geologist and Engineer Structural geology problems relating to ore deposits, examinations, reports, petrographical examinations, radio-active tests, etc. Box 413, Haileybury, Ont.</p>	<p>FERRIER, W. F. Consulting Mining Engineer and Geologist 204 LUMSDEN BLDG., TORONTO, ONT.</p>	<p>HASSAN, A. A., Mining Geologist and Consulting Engineer. SUITE 203-204 RIGGS BLDG., WASHINGTON, D.C.</p>
<p>BURCHELL, GEO. B. Mining Engineer Lignite and Bituminous Coal Mining Examinations and Reports 505 MCGILL BLDG., MONTREAL Cable Address "Minchel" Phone Main 6737</p>	<p>FOWLER, S. S. Mining Engineer, NELSON, B. C.</p>	<p>JOHAN V. N. DORR Consulting and Metallurgical Engineer 17 Battery Place and New York City First National Bank Building Denver, Colorado</p>
<p>CANADIAN MINING AND EXPLORATION CO., LIMITED WILLIAM WALLACE MEIN, Consulting Engineer Mining Properties Purchased or Financed 43 Exchange Place, New York. Cable: Cameco, New York.</p>	<p>FORBES, D. L. H. Mining & Metallurgical Engineer Chuquicamata, Chile Chief Construction Engineer for Chile Copper Co.</p>	<p>SMITH, SYDNEY. Mining Engineer, HAILEYBURY, ONT.</p>
<p>CARTER & SMITH Consulting Mining Engineers Hermant Building, 19 Wilton Ave. TORONTO W. E. H. Carter B.A. Sc. Alex. H. Smith, M.I.M.M.</p>	<p>GUESS & HAULTAIN Mining & Metallurgical Engineers 123 Bay Street TORONTO CANADA</p>	<p>SUMMERHAYES, MAURICE W. Mining Engineer, Manager Porcupine-Crown Mines, Limited Timmins - Ont.</p>
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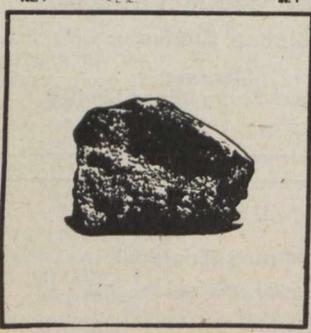
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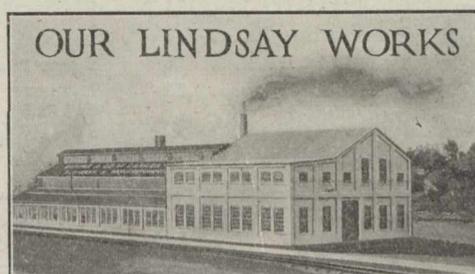
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