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CIRCULATION.

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CONTENTS.

MINERAL PRODUCTION OF CANADA---1912

The annual report of Mr. John McLeish, Chief of the Division of Mineral Resources and Statistics, containing revised figures for the year 1912, has been published by the Mines Branch, Ottawa.

Mr. McLeish's report shows that the output has increased greatly over that of previous years. For 1912 the total value was $31,827,302, or 30.8 per cent. greater than that of 1911, amounting to $135,048,296. The value per capita has increased from $2.23 in 1886 to $18.27 in 1912.

Noteworthy features of the year, which was by far the most successful year in the history of the mineral industry in Canada, were the extensive development of ore reserves, particularly Sudbury nickel copper ores, Porcupine gold ores, and British Columbia copper and lead ores, extension of ore smelting and refining facilities, improvements in methods of treatment of the ores and good prices received for the metals.

The production of metalliferous products in 1912 was valued at $61,172,753, being 45.3 per cent. of the total mineral output. The value of non-metalliferous products was $45,080,674.

The Mines Branch has endeavoured to obtain from every mine operator in Canada an annual report with respect to the number of men employed and wages paid, the total tonnage of ores mined, the tonnage concentrated and the quantities of concentrates produced, the tonnage of ore or concentrates shipped, and the net value thereof, the quantities of metals as determined by settlement assays contained in the ores shipped, and the quantities of metals for which payment was made by the purchaser's smelter or recovered by the operator's smelter. This has been successfully done, and with the exception of two products, placer gold and petroleum, Mr. McLeish's report contains this very interesting information with respect to each of the products.

The total number of men employed in 1912 in metalliferous mines was 10,612. Wages paid amounted to $10,113,578. There was mined 4,194,517 tons of ore. Total net value of shipments from metalliferous mines was $46,018,233; in non-metalliferous mines, exclusive of stone quarries and clay pits, there were employed in 1912 an average of 33,954 men, earning in wages $23,877,781. The tonnage mined, chiefly coal, was 17,165,628, having a net value of $45,080,674.

The report contains also a statement of the production of the several smelting and refining companies operating in Canada, and is an admirable summary of the progress of the mineral industry for the year 1912.

GOWGANDA

Gowganda progresses in spite of many difficulties. In our special correspondence this week will be found several items of interest concerning this silver district. For numerous reasons Gowganda has not had a fair chance to make good. Chief among these is lack of transportation facilities, and it is unfortunate that the Gowganda road is still in such bad condition in spite of the urgent necessity of improvement.

LABOUR ORGANIZATION IN CANADA

Membership in the labour unions is growing. The annual report of the Department of Labour, recently issued, shows that there was an increase last year from 133,132 to 160,120. This is equivalent to about two per cent. of the population.

The Department estimates the number of wage-earners in Canada at 1,300,000. About one-eighth are members of unions.

Nearly the whole membership is in organizations, which have their headquarters in the United States, and most of which are in affiliation with the American Federation of Labour. The latter organization is the most important of its character in North America, and has a membership of about 2,000,000.

Organization has proven a great boon to wage-earners in Canada. At the annual Trades Congresses vital subjects are discussed. Deputations place the resolutions before the Dominion and Provincial Governments and urge action. The serious deliberations of the Trades Congresses command attention and respect and organized labour gains influence thereby.

The two miners' unions which are affiliated with the American Federation of Labour are the United Mine Workers of America, and the Western Federation of Miners. Both these organizations are now conducting strikes characterized by lawlessness, by violence and intimidation. The miners would do well to use other means to gain their ends. They could take a lesson from the workers in some of the other industries.

At the beginning of the year the United Mine Workers had a membership of 5,631 in Canada, and 381,334 elsewhere, and the Western Federation had a membership of 5,947 in Canada, and 55,000 elsewhere.

THE GRIEVANCE PROBLEM

It is often contended by miners, as by those engaged in other industries, that adequate provision is seldom made for the airing of grievances. The complaint is made that an employee who goes to the manager to register a complaint, thereby incurs the ill-will of his employers and makes his position worse instead of better. Some employees state that as a result of going to the manager they become immediately subject to the displeasure of the under bosses and suffer accordingly.

There can be little doubt that an opportunity for easy access to those in authority would establish better relations. Grievances aired become less intolerable. Many are imaginary, being based upon incomplete knowledge of the facts and unfair comparisons. Some are real and can be removed only when fully understood by both parties.

In the recent investigation of the strike of miners in the Michigan copper district, the Copper Country Commercial Club found that most of the contentions of the strikers were ill-advised. The officers of the Western Federation showed much anxiety over recognition of themselves as representatives of the miners; but failed to present the investigating committee with any statement of the grievances of the copper miners. The committee, after investigation, however, came to the conclusion that the miners have no suitable means of lodging complaints, and they have recommended that each manager set aside a day or half-day of each week for the express purpose of hearing grievances of employees, that he investigate every complaint, and adjust every legitimate grievance with all possible speed, and see that no man is discriminated against because of presenting complaints.

It seems necessary to reassure the employees that they will be given a proper hearing and that everything reasonable will be done to adjust real or dispel imaginary grievances.

The companies will do well to consider the recommendations favourably.

WESTERN FEDERATION METHODS

In an attempt to settle the strike of Michigan copper miners, the Copper Country Commercial Club appointed a committee to investigate the subject from all sides and make a report to Governor W. N. Ferris. The mining companies assisted this committee in every possible way and allowed free access to all the data bearing on the subject. From the investigation a voluminous report has been made.

The officers of the Western Federation were asked to present to the committee their side of the case. The vice-president of the Federation, who has been in Calumet in charge of the strike since its inception, was asked to present all the facts and grievances and demands upon which were based the calling of the strike. Later a second invitation was personally extended to Mr. Mahoney to furnish to the committee the above data and a statement of conditions in the copper country which the Western Federation of Miners was seeking to better. The committee reports that this information has not been furnished.

As the strikers have been now out of work for three months it is evident that they must soon find employment. The avowed purpose of the committee was to locate the trouble and endeavour to remove it. The action of the union officers has made this difficult. It has, however, made more clear the impression that the strike was not called so much for the benefit of copper country miners as for the organization which a number of them have been induced to join.

THE NANAIMO STRIKE

Published accounts of the report of Mr. Samuel Price, K.C., on the U. M. W. A. coal miners' strike on Van-

couver Island indicate that the trouble there is in some respects similar to that in the copper mines of Michigan.

The report points out that the real object of the strikers is to establish a branch of the U. M. W. A. and to compel recognition of it by the employers.

To obtain their end, the members of the U. M. W. A. have used the same violent methods as have the members of the Western Federation.

It seems little more than folly to expect desired results when such methods are used. To destroy property, libel the managers, and assault employees who wish to work, and then expect to be rewarded by concessions is ridiculous. The right of men to organize to improve conditions is well recognized; but the members of unions would do well to endeavour to gain their ends by lawful means.

NANAIMO RIOTERS PUNISHED

Press despatches state that forty men have been found guilty of rioting in connection with the strike of coal miners at Nanaimo and sentenced. Three men and two boys will serve two years in the penitentiary, twenty-three will be imprisoned for one year and are subject also to a fine of $100 each. Eleven were sent to jail for three months and fined $50 each. Several union officers were sentenced. It is reported that the United Mine Workers are now ready to call the strike off.

The authorities are to be commended for making it clear that, no matter what dispute there may be between labourer and employer, violence will not be tolerated.

OIL IN ALBERTA

Numerous reports are current concerning discoveries of oil near Calgary. Gas has been found in large quantity in Alberta; but there are as yet no producing oil wells. It is quite probable that oil exists, and it may be that really important discoveries have been made.

As yet, however, no large quantity of oil has been found and investors will do well to be wary.

At a recent meeting of the Calgary city officials and Board of Trade a warning was issued urging the public to exercise care in investments in oil leases or in the stocks of companies which have been or may be formed for oil exploitations.

This prompt action, taken to protect the public, will be much appreciated.

An Ottawa despatch states that Mr. D. B. Dowling has been sent by the Department of Mines to investigate the discoveries. Mr. Dowling is a mining geologist who is very familiar with the coal and gas fields and his report will be of much interest.

BRITANNIA MINES

As Mr. Wm. Fleet Robertson has pointed out in his annual report for 1912, comparatively little is heard of the operations of the Britannia mines at Howe Sound, B.C. The owners have established an elaborate plant and are producing a large tonnage of ore. According to the report of Mr. Robertson the production in 1912 was between 14,000,000 and 15,000,000 pounds of copper and between 70,000 and 80,000 ounces of silver. A flotation process is used in concentrating the ore, and it is said to be proving very successful.

COAL PRODUCTION ON VANCOUVER ISLAND, B. C.

The statement has been made repeatedly by leaders of the striking coal miners on Vancouver Island, British Columbia, that but little coal has been produced at the mines of the Canadian Collieries (Dunsmuir), Limited, since the union miners went on strike in September, 1912. The following figures show the production at that company's Cumberland and Extension mines, respectively, during eight months of the current year to September 1:

1913. Month.	Cumberland. Long Tons.	Extension. Long Tons.
January	27,429	1,022
February	29,516	2,471
March	36,313	3,862
April	38,225	4,433
May	40,087	5,012
June	42,661	6,020
July	48,407	7,337
August	47,815	3,254
Totals	310,453	33,411

In the corresponding period of 1912 the output was 397,312; for 1911 it was 353,665. The output at Cumberland mines for last month (September) was 52,187 tons; for the last day of that month is was 2,337 tons. The average per day for 26 working days was 2,007 tons. Work was suspended at Extension during the first half of August, but it was resumed recently and coal is now being mined there.

U. S. COAL PRODUCTION IN 1912.

The total production of coal in the United States in 1912 was 534,466,580 short tons; spot value, $695,606,071.

The total production of Pennsylvania anthracite in 1912 was 75,322,855 long tons (equivalent to 84,361,598 short tons); spot value, $177,622,626.

The total production of bituminous coal and lignite in 1912 was 450,104,982 short tons; spot value, $517,983,445.

In 1912 the production of coal in the United States not only surpassed all previous tonnage records, but the average value per ton exceeded that of any normal year in the 33 years for which statistics are available. In fact, with respect to the latter, there has been only one year in which coal prices generally were higher than in 1912. This was in 1903 when, because of the fuel famine produced by labour troubles in the anthracite region of Pennsylvania and in the organized bituminous States, prices were advanced above and figures reached in recent history. The higher values in 1903 were notably exhibited in the bituminous regions, anthracite companies as a rule holding to the circulars, which maintained the prices of the previous year plus the increased cost due to the advance in wages and the reduced working time granted in the strike settlement. The average value per ton for anthracite in 1912 was higher than in 1903, and was again due to further advances in wages.

CORRESPONDENCE

A FEDERAL MINING LAW.

Editor Canadian Mining Journal:

Sir,—A press despatch sent out from Ottawa in September included the following: "New mining regulations are provided in a bill to be introduced at the next session of Parliament by Hon. Louis Coderre, Secretary of State and Minister of Mines. It is expected that an entire new mining law will be placed on the statute book and that the system of mining regulations now governing the administration of mines will be abolished. . . . The difficulty encountered in framing a Dominion mining law is found in provincial rights. The mining laws at present in force in Nova Scotia, New Brunswick, Ontario, and British Columbia, were passed before Confederation, while Alberta only last year passed a new provincial mining law."

Passing over the misstatement that British Columbia's mining laws were passed before Confederation, I desire to remind those interested in the subject that much progress toward the enactment of a Federal mining law was made about three years ago, before the present Federal government displaced the Laurier administration, and that Hon. Wm. Templeman, then Dominion Minister of Mines, heartily co-operated with those who did the work relative to which some information is here given.

In passing, I will state that I have been prompted to write on this subject by what is, in my opinion, unjust and uncalled for editorial comment, made in a provincial newspaper, as follows: "A new mining law is to be enacted to afford better protection to the miner and the prospector. The late government was too busy caring for the big fellow, the man with the roll, to bother about the interests of the miner and the prospector."

The excerpts that follow have been made from the Journal of the Canadian Mining Institute for 1911 and 1912, respectively. They will serve to indicate what progress was made during the last years of office of the Laurier administration, and by whom. The only comment I have to make at this time is that I deprecate the making of statements that deny common justice to either political opponents or friends. While the present administration has my support, I do not hesitate to give credit to the Canada Department of Mines under the Laurier government for much useful work, and especially for much that resulted in very material benefit to mining in British Columbia, though, of course, we have to thank only our Provincial Legislature for the excellent mining laws of this province.

From the annual address of the President of the Canadian Mining Institute, at Quebec, March 1, 1911:

"Possibly in no direction have the activities of the Institute been engaged to better purpose than in publicly voicing the opinions of the mining communities with a view to influencing legislation. Thus in recent years representations have been repeatedly and successfully made to both the Federal and Provincial governments on questions affecting or likely to affect the industry; and special reference may be here appropriately made to a very important work of this nature undertaken during the past year by the Legislative Committee of the Institute. It has long been a matter of just complaint that the conditions in respect of the granting of title to mining lands subject to Federal control were aggravating and unsatisfactory, since they were fixed not by Statute, but by Order in Council, and, consequently, unstable and uncertain. Acting, then, under the direction of the Council, the Legislative Committee interviewed the Prime Minister and the Minister of Mines in April, 1910, and represented to those gentlemen the importance of placing a mining law on the statutes of the Dominion regulating the issue of title to mineral lands. The question was also debated by the committee before the Select Committee on Mines and Minerals of the House of Commons, and the government, having consented to introduce a bill, invited the Institute to suggest the principles on which it should be formulated. Certain recommendations were in consequence made by the Institute's committee and having been approved by the Council were duly submitted to the authorities; whereupon the Minister of Mines appointed Mr. J. M. Clark, K.C., of Toronto, to draft a bill on the lines suggested for early submission to parliament."

From the report of the Council for year 1910-1911:

"The most important work undertaken by the Institute during the year has been the endeavour to induce the Dominion government to act on the recommendations of the Select Standing Committee of the House of Commons on Mines and Mining. These recommendations were (1) that there be assigned to the Mines Department the administration of mines, including the issue of title thereto, and of all mining laws; and (2) that an act be passed consolidating all the laws relating to mines under Federal control. . . . " (Here follows a statement of the actions of the Institute Committee and of its recommendations after these had been endorsed by the Council of the Institute.)

From the President's address, Toronto, March 6, 1912:

"Among the more important undertakings in which the Institute has been engaged during the past year was drafting, at the request of the Federal government, of a code of mining laws for that portion of Canada in which the minerals are still under Federal control. A bill, embodying this code and based on the principles advocated by the Institute, is now ready for submission to parliament."

From the report of the Council for year 1911-12:

"Federal Mines Act.—As reported last year, the Institute was successful in inducing the late government to take preliminary action towards the adoption of a mining law for the Dominion, and in this regard the Council desires to place on record its appreciation of the services rendered by Mr. G. G. S. Lindsey, chairman of the committee, who presented the case to the Prime Minister on behalf of the Institute, and, in general, is responsible for advancing the business to its present stage. A draft of a bill, based on principles advocated by the Institute, was duly prepared. This draft was carefully revised by Mr. F. T. Congdon, M.P., and Mr. R. W. Brock, Director of the Geological Survey, and resubmitted to the Institute's committee for final approval. It was designed that the bill should be presented to parliament at last summer's session; but unfortunately other business deemed to be more pressing was given precedence. Meanwhile the attention of the present administration has been called to the requirements in this direction, and it is hoped that the bill will be made law during the present session of parliament."

It would seem that, two years having elapsed since the present government took office, much longer delay in this matter, which is of particular importance to those interested in mining lands under Federal control, will not be reasonable.

E. JACOBS.

Victoria, B.C., October 13, 1913.

A VISIT TO MINES OF ALBERTA AND BRITISH COLUMBIA

By Reginald E. Hore.

(Continued from October 1st issue.)

From Fernie the party travelled down the Elk river valley, passing through a district which contains many coal seams. At Morrissey creek nine seams have been worked at the Carbonado mines of the Crowsnest Pass Coal Company; but owing to the great quantity of gas encountered no mining is being done here at present. South of Morrissey creek there is a block of 45,000 acres of coal land held in reserve by the Dominion Government.

South of Morrissey the valley of the Elk river becomes narrower and at Elko the stream enters a narrow canyon carved into the flat-lying Cambrian rocks. The party left the train here and walked to the canyon where Mr. Schofield described the geological features of the district.

B party, Excursion C 2. International Geological Congress

At International Coal mine, Coleman, Alberta

"**The Rocky Mountain geosyncline,** which includes the greater part of the Selkirk, Purcell, and Rocky Mountain ranges, consists of pre-Cambrian, Paleozoic, and Mesozoic sediments. Their western border passes through Coeur d'Alene, Kootenay, and Shuswap lakes, along whose shores is exposed the old crystalline complex, from which part of the above sediments was derived.

"The Rocky mountains on the east are separated from the Purcell range on the west by the wide Kootenay-Columbia valley. This topographic feature, which is of first importance in the structure of the region, is called the Rocky Mountain trench. The rocks which form the greater part of the Purcell range are probably pre-Cambrian in age, and their structure is of an entirely different character to that of the Rockies. The Purcell sediments were first folded into a series of northerly plunging anticlines and synclines. Later these folds were truncated by normal faults which strike in a N.E.-S.W. direction and hence trend in a direction at right angles to those of the Rocky mountains. It is probable also that the fault system of the Rockies truncates that of the Purcells, for, in the Rocky Mountain trench, a block of Mississippian limestone is down-faulted in contact with the pre-Cambrian quartzites, and this block trends in a N.W.-S.E. direction. From the above facts it is probable that the Purcell range was built prior to the Rockies, and that the two ranges are structurally separated by the Rocky Mountain trench.

"On the hill to the north of Elko is exposed a section showing the transition from the Cambrian (?) quartzites at the base of the hill to the lower Paleozoic limestones at the summit. Elk river, which above this point had been flowing in a hanging valley, now swings to the southwest, and enters a narrow canyon carved into the flat-lying Cambrian, argillaceous quartzites, and joins Kootenay river at grade about 15 miles southwest of Elko."

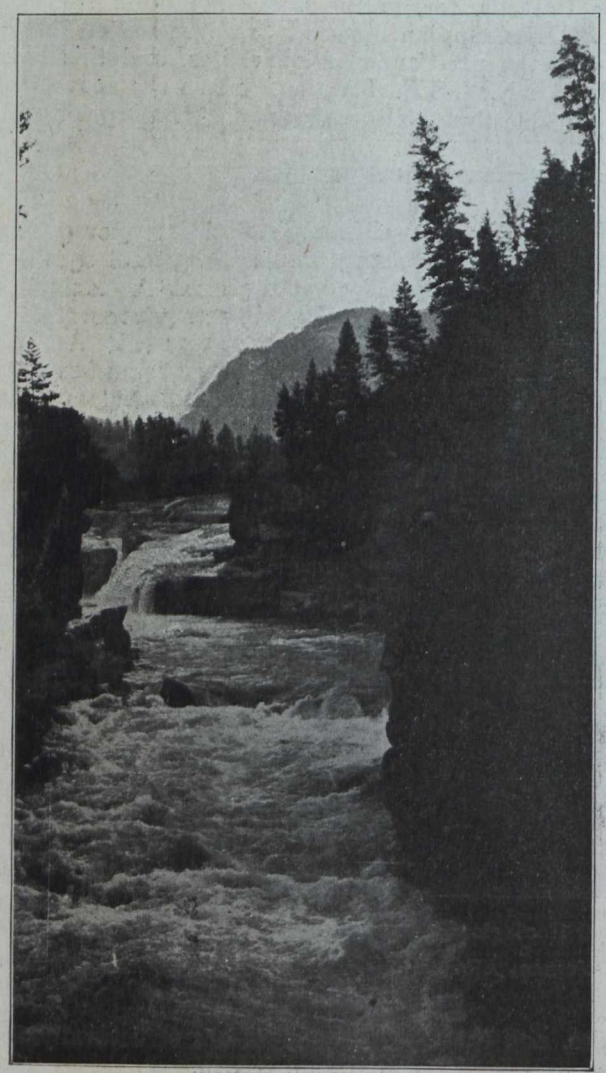
The accompanying photograph shows a view up the stream from the point visited.

The canyon is a truly beautiful one, and there was some difficulty in getting the passengers back to the train. This was possibly because of the fact that after having done so much walking before breakfast many had little desire to do any more. The acti-

vity of the guides, however, made it almost impossible for anyone to loiter, and the train pulled out, on time as usual, with all hands on board.

For some distance southwards down the valley of the Elk river the Canadian Pacific and Great Northern railroads run close together. At Elko the C. P. R. leaves the Elk, however, and runs north-westerly across the valley of Kootenay river, then southwards to Moyie Lakes and down the valley of the Moyie river. At Moyie is the St. Eugene silver-lead mine.

St. Eugene Mine.—The St. Eugene until recently has been a very large producer of silver-lead ore. On June 30, 1912, the date of the last annual report, it had produced 1,015,280 tons of ore and 190,121 tons of concentrates from which was recovered 5,319,150 ounces of



Elk River at Elko, B.C.

silver and 227,614,836 pounds of lead. The gross value of the production was $10,527,985. During the past two years the mine has been only a small producer. The Consolidated Mining and Smelting Company, of Canada, owns the property.

Kootenay Lake.—The C. P. R., or rather one branch, leaves the Moyie river at Curzon and crosses westward down Goat river to the Kootenay river and Kootenay Landing. Here the party left the train, which was taken by ferry up to Proctor, and boarded a steamer for the trip up the lake to Nelson.

This proved very delightful and a welcome change after several days' confinement in the sleepers.

Kootenay lake is a long narrow sheet of water hemmed in by mountain ranges. Here and there along the shore there are low places, gravel beaches at the mouths of entering streams; but almost continuously the shores rise steeply to lofty hills. To the west is a range of very rugged mountains. The snow-capped peaks backed by heavy clouds presented view after view which won the admiration of the party as the steamer carried us along on the quiet waters of the lake.

On the more gentle slopes which occur in places along the east shore there are a number of small clearings, fruit ranches, which in comparison with the great stretches of unbroken forest look wonderfully small from the middle of the lake.

Half way up the lake a stop was made to visit the Halcyon Springs Hotel and the hot springs which attract its guests.

From the hotel there is a splendid view of the snow-capped mountain peaks to the west. In fact the view was so pleasing that many of the party felt quite content to stay and look, while the others made the hot climb up to the springs. And then also there was a tame bear whose antics caused many distinguished scientists to forget their original object in climbing the hill.

West Arm.—The route continues north for some miles further and then at Proctor turns sharply to the west along a narrow arm of the lake to Nelson. This part of the trip was made in the early evening. The approach to the mining town is up a very narrow sheet of water enclosed by high hills. Along the south shore the C. P. railway has been built almost at the water's edge and some of the difficulties of construction that have been overcome in the mountains are here to be appreciated. Later on the trips to Rossland and Grand Forks it became more and more clear that the railway has been constructed and is operated under conditions which would have frightened many companies.

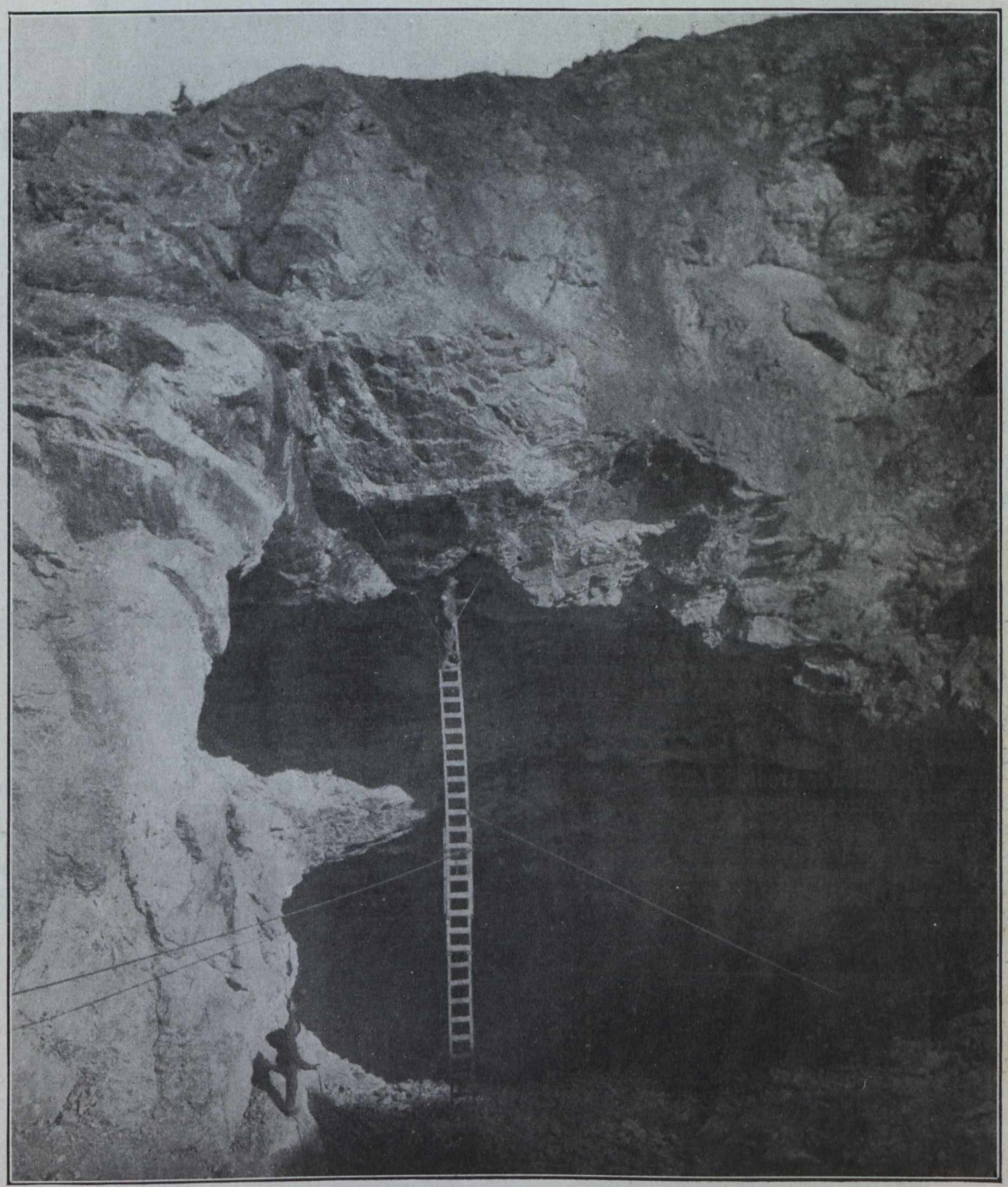
Nelson.—After a trip up the beautiful lake, walled in by mountains and presenting the appearance of a great river, the steamer reached Nelson early in the evening. A splendid reception was met with here. The Board of Trade and the mining men of the district did their utmost to entertain the visitors. A pleasant evening and much of the night was spent as the guests of the citizens. Mr. Coderre was prevailed upon to stay over the following day to talk with some of the men interested in the zinc problem. An account of this meeting has been already published in the Journal.

Of Nelson and vicinity, Mr. O. E. Leroy says: "The City of Nelson is situated on the delta of Cottonwood creek which flows into the west arm about 22 miles west of the main body of Kootenay lake. The city owes its existence primarily to the mining activity in the later 80's and for some years its growth depended wholly on the mining industry. At present, mining, lumbering, manufacturing and fruit ranching are the chief industries and the city is also the main distributing centre for the Kootenay and Boundary districts. The city is underlain by granitic rocks of the Nelson batholith near the northern edge of an area of the rocks of the Rossland group. The latter also appear in small isolated patches throughout the main area underlain by the batholith. The ore deposits are all later than the intrusion of the granodiorite batholith, and younger than the last evidences of igneous activity which form a system of lamprophyric dikes cutting and faulting the ore bodies. The country in the vicinity of Nelson is rather widely

mineralized, the principal deposits being gold-silver, silver-copper, silver-lead, and copper-gold-silver. The chief mines working at present are the Granite-Poorman (gold), Silver King (silver-copper), Molly Gibson (silver-lead), and the Eureka and Queen Victoria (copper-gold-silver). The total production of the mining division to the end of 1911 amounts to rather more than $10,700,000 in value.

and the City of Nelson power plant developing 2,350 h.p. The former company supplies power and light to various points in West Kootenay and the Boundary districts, particularly to the mining and metallurgical centres at Trail, Rossland, Grand Forks, Phoenix and Greenwood."

Granby.—From Nelson the geologists' special proceeded to Grand Forks where the smelter of the Granby Consolidated Smelting and Power Company is situated,



Granby Consolidated Co's Knobhill-Ironsides mine at Phoenix, B.C. Barring down loose in open stope

"Four miles west of Nelson the railway crosses to the north side of Kootenay river. The Kootenay from Granite to Castlegar, 22 miles, where it joins the Columbia, has a fall of 335 feet, and is characterized by swift-flowing reaches, falls and rapids. The most important falls are at Bonnington, where it is estimated that under a 40-foot head 267,000 h.p. can be developed at low water. At present there are two plants, the West Kootenay Power and Light Company with 20,000 h.p. developed,

then to Phoenix and the Granby mine. After viewing the open workings the party went underground through some of the large stopes. The ore is low grade, but has been very cheaply mined and treated, so that Granby has been for several years one of America's large copper mines. A few years ago the manager reported serious falling off in reserves and for a time the company's prospects looked anything but bright. Another property, however, has been acquired at Hidden Creek. This is

The glory-hole, Granby Co's Knobhill-Ironsides mine, Phoenix, B.C.

proving up very satisfactorily, and is counted on to produce a large tonnage of higher grade ore than that at the old mine. A description, by Mr. O. E. Leroy, of the latter property, was given in the October 1 issue of the Journal. The new or Hidden Creek property is several hundred miles north of Phoenix, and was not visited by the party. A smelter is being built at Granby bay for this new mine.

The Granby Mines.—The properties of the Granby Consolidated Mining, Smelting and Power Co., at Phoenix have for years been large producers of copper ore. The mines operated are the Gold Drop and Ironsides. On June 30, 1913, the former had produced 1,091,598 tons and the latter 8,144,684 tons, making a total of 9,236,282 tons.

The shipments during the last fiscal year totalled 1,261,088 tons. The smelter treated 1,279,869 tons ore yielding 22,688,614 pounds copper, an average of 17.68 pounds per ton. The ore yielded also 324,336 ounces of silver and 47,266 ounces of gold. The receipts were $4,782,691.20. Expenditures for operations and for some ore purchased totalled $3,568,091.90, leaving a profit of $1,214,599.30.

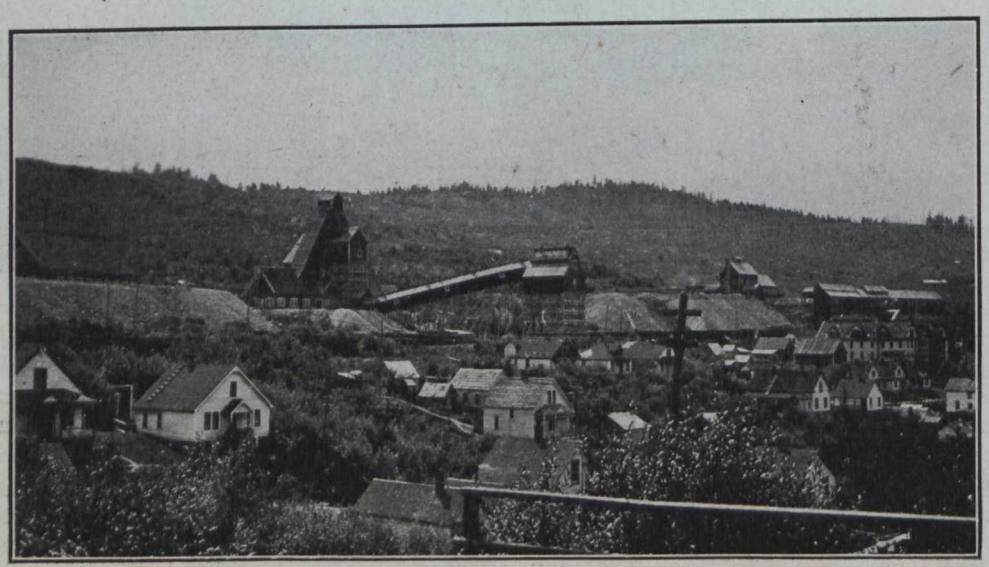
Mr. C. M. Campbell, assistant superintendent, estimated the ore in sight on July 1, 1913, at 5,613,402 tons, 210,402 being credited to the Gold Drop, and 5,403,000 tons to the Ironsides mine.

Granby Costs—The costs of mining and treatment of the Phoenix ores are unusually low. The large ore bodies are very economically mined and the average cost for the last year was 75.4 cents per ton, which is the lowest yet reached. The average smelting cost for the year was $1.214 per ton.

The total cost of copper per pound, after deducting value of the gold and silver was 10.6 cents. The average selling price was 16.039 cents.

Granby's Hidden Creek Property.—The Hidden Creek mines at Anyox are being rapidly developed and a 2,000-ton smelter to treat the ore is nearing completion at Granby Bay, Observatory Inlet. The officials expect that the plant will be ready to begin operations by the first of the year.

Mr. O. B. Smith, superintendent of the company's mines, reports that there had been developed on July 1, 7,759,550 tons ore, containing an average of 2.2 per cent. copper. Gold and silver contents are estimated at 20 cents per ton of ore.



Victoria shaft, Granby mine, Phoenix, B.C.

There are two ore bodies. At No. 1 the ore developed is estimated at 3,328,400 tons, carrying 151,580,500 pounds copper, or 2.26 per cent. For No. 2 the estimate is 4,431,150 tons, carrying 188,935,600 pounds copper or 2.13 per cent. The bulk of the ore lies above the 385 ft. level only 394,100 tons below this level being included.

(To be continued.)

BRITISH COLUMBIA COPPER CO.

Information relative to the operations of the British Columbia Copper Co. has been published lately in New York and in Western newspapers. The following is an excerpt from the Pioneer, Phoenix, B.C.:

The production of the British Columbia Copper Co., Ltd., for the month of August, 1913, amounted, it is estimated by the company's officials, to 700,000 lbs. of fine copper, 2,400 ozs. of gold, and about 12,500 ozs. of silver. Adding these to the final figures for the earlier months of the year, the company's output for 1913 to date has been as follows:

	Lbs. Copper.	Fine Ozs. Gold.	Oz. Silver.
August	*700,000	*2,400	*12,500
July	618,379	2,413	10,262
June	634,238	2,245	11,827
May	618,076	1,762	8,479
April	786,624	2,210	10,955
March	844,735	2,139	10,299
February	668,312	1,446	8,082
January	720,260	1,488	8,621
Eight months	5,590,624	16,103	81,023
Year.			
1913	7,800,000	*24,750	123,000
1912	11,146,811	25,863	142,025
1911	9,944,987	.....	.....
1910	7,143,456	.....	.....
1909	6,325,000	.....	.....

*Estimated.

During 1913, the plant has been operating at only two-thirds of its full capacity.

A conspicuously favourable feature of the figures is the unusually high gold-silver yield from the ores. It will be noted that while the copper production from the ores treated in 1913 is only about two-thirds of that of 1912, the gold and silver yield is very nearly equal to that of the whole twelve-month period a year ago. On the basis of $20 an ounce for gold, and 55 cents an ounce for silver, the monetary return from these sources in 1913 should amount to about $117,650. This sum will reduce the net cost of copper per pound by almost exactly 1.5 cents, representing one of the highest gold-silver yields on record for the British Columbia Copper Co.

The worst "drawback" of the company, and this a "drawback" which is more apparent than real, is its expenditures in taking up new properties under option. The officials realize that no mine lasts forever, and have wisely adopted the sound policy of looking for additional properties while these latter may be cheaply obtained, and while, too, the British Columbia Copper Co. is in a favourable position for bargaining for such properties. In 1912 there was spent $230,000 in taking up new options and exploring and developing them, and similar expenditures in 1913 for about the first six months of the year have amounted to nearly $120,000. It appears that the expenditures for the entire year in this direction will be about $240,000, which will add to the operating cost per pound of copper ore produced, approximately 3.08c. In the past years there have been charged against options and their development, and plant additions, etc., expenditures (based on per pound of copper produced) amounting to 3.08c. in 1912, 2.27c. in 1911, 2.96c. in 1910, and 1.80c. in 1909.

GOLD ON SIBOLLA CREEK, B.C.

Mention was made in the Canadian Mining Journal of October 1 of a new gold strike on Sibolla creek, southwest of Telkwa, a small town on the Grand Trunk Pacific Railway, from Prince Rupert eastward through British Columbia, and at the junction of the Telkwa and Bulkley rivers. The information which follows was sent from Telkwa to the Vancouver Daily Province:

After ten days, spent on the Sibolla creek placer field, 120 miles southwest of Telkwa, your correspondent reports the following: Three days' sampling of the gravel about Discovery claim, on the creek, resulted in fly-specks and colours in only one pan out of four. No coarse gold was shown. Below Discovery, for the first three claims, the result was the same, and after that to No. 19 below, the colours became more numerous and not more than one-quarter of the total pannings were barren.

A shaft was being sunk at the time by S. White, I. McCulley, Dave McKenzie, Billy George, and Louis Koltas, in an effort to reach bedrock, and after 12 ft. of a 6 by 6-ft. shaft had been sunk, windlass erected, and the shaft timbered, the water came in in too great a volume so work on all the creek claims ceased.

Attention was then given to the bench claim of Leo McLaughlin and partner, on the north limit of No. 3, below Discovery, but at the time your correspondent left, bedrock had not been reached. However, colours were consistently present all the way down the shaft, which was, at that time, 15 ft. deep, timbered and with windlass erected. Prior to leaving, most of the prospectors left all their spare supplies with this party and they now have provisions for two months. The only others on the ground properly equipped are George Barrett and Joseph Bussinger, who have provisions for four months, and a good outfit, including a rocker. They are staked on the bench and should reach bedrock in the big flat without being seriously impeded by water.

The bench north of Sibolla creek has all been staked, but as far as could be seen, no active development had been done, except an 8-ft. hole, sunk by your correspondent on the Newsboy claim, in which fly-specks and colours were present after the first 3 ft. The wash here is very deep, and at the bottom of the hole the conglomerate gravel, slightly cemented, is moist and full of air spaces, but pay dirt is not likely to be found until a strata more dense and less coarse has been reached.

On the bench due west of the camp some promising ground was seen marked with dry water courses and sedimentary in character. Here the gravel at 3 ft. deep is very fine and heavily cemented, but no pay was discovered, though colours were fairly plentiful, with a large proportion of white iron and some black sand. A dozen claims have been staked on this ground.

Contrary to the first report, no contact of a slate and porphyry was seen, but a shale or coarse slate runs parallel with the porphyry along the range and dips into it at an acute angle. The large rounded boulders so plentiful in the wash are mainly grey and blue gran-

ite, and rose quartz is plentiful in the gravel with an occasional small specimen of native gold in some of the larger pieces. The field shows no sign of having been an ocean beach, but rather resembles the bed of a lake, or what is more probable, glacial detritus, and the characteristic surface boulders stretch for a distance of more than 12 miles, intersected with swamps, mainly with a gravelly bottom. The three beaver dams which have to be crossed in reaching Sibolla creek show considerable signs of wear, and horses with packs will not be able to reach the field should rain fall this month. The water at present above the dams is low and the frost has been very severe the past week.

Andy Goodwill and partner, one of the original locators, were met with on our way out, and had with them four packhorses and expect to put in the winter on No. 1, below Discovery, where the first coarse gold was taken out, and C. P. Price, also one of the original locators, is now outfitting here for the same purpose. Price states that coming out by a new trail from the Sibolla country he discovered on the same range about 12 miles north a similar creek to the Sibolla, fairly plentiful with colours, bearing out our own observations.

More than 300 claims have been staked, but with one exception no party of prospectors have been outfitted properly to reach bedrock in what is, to all surface appearances, a most promising field. If the men at present on the ground fail the value in the field in all probability will not be ascertained until next year.

The actual time occupied in going in from Telkwa was six and one-half days and time in coming out, travelling light, five days.

OIL AND GAS OF THE NORTHWEST PROVINCES*

By Wyatt Malcolm

The plains of Western Canada are underlain by a great body of sediments, nearly horizontal in attitude, and resting on a Pre-Cambrian base. The eastern contact between the Pre-Cambrian rocks and the later formations runs in a generally northwest direction from Lake Manitoba past Athabaska, Great Slave, and Great Bear lakes. In the eastern part of the plains a great unconformity exists between the Paleozoic systems, consisting of limestones, dolomites and shales, and the Cretaceous system, consisting of shales and sandstones, so that we find the Dakota sandstones of the Cretaceous system resting directly upon limestones of the Devonian system. The paleozoic strata are exposed by faulting in the Rocky mountains and much of the later sediments has been eroded, only traces of the lower members being left. In the west, deposition during Carboniferous, Triassic, and Jurassic times has to a great extent bridged over the unconformity seen in the east. The geological column includes formations from in nearly all the great systems from the Cambrian to the Recent. In western Alberta and in some parts of south Saskatchewan the Cretaceous sediments are overlain by Tertiary deposits. Overlying all is a mantle of unconsolidated Pleistocene and Recent deposits.

Little has been done yet to test the gas and oil possibilities of the district. A few wells have been sunk, and in a number of these gas in commercial quantities has been struck. Prospecting for oil has been less successful.

Prospecting for oil has been carried on in two different areas in the Pincher Creek district, southwestern Alberta, one on the south branch of the south fork of Oldman river, and the other on Oil creek, which flows into Waterton lake. This has apparently resulted in no great measure of success. In northern Alberta the Dakota sandstone, where exposed along the Athabaska and its tributaries, is impregnated with a bituminous substance believed to be a petroleum product, and it is thought that liquid petroleum exists in this porous rock at some distance from the outcrop. To test the validity of this belief, wells were drilled during the nineties by the Dominion Government at Victoria on the Saskatchewan, at Athabaska Landing, and at the mouth of Pelican river. In the first two wells the Dakota sandstone was not reached, while in the last it was reached at a depth of 750 feet, penetrated about 87 feet, and found to carry maltha or heavy, tarry petroleum.

Prospecting for gas has been much more encouraging. The boring at the mouth of Pelican river, although disappointing so far as oil is concerned, proved the presence of a great reservoir of gas in the Dakota sandstones, and heavy flows were struck at 820 and 837 feet. In southern Alberta, also, gas is found in paying quantities. A good field exists at Medicine Hat, and flows have been obtained at several different points west of that city. At Bow island a flow of several million feet is obtained.

Thus, while the presence of oil in commercial quantities remains to be proved, boring operations have demonstrated beyond a doubt the existence of large reservoirs of natural gas, and it seems probable that further exploratory work throughout the wide area underlain by the Cretaceous rocks should lead to the discovery of other reservoirs.

It is believed that the Devonian limestone is the source of the gas and petroleum products of northern Alberta, while the porous Dakota sandstone forms the reservoir into which they have risen and in which they have been retained by the overlying shales. The Dakota sandstone is the productive formation at the mouth of Pelican river, and it is also believed to be the gas-bearing formation at Bow island in southern Alberta. As the Devonian limestone and Dakota sandstone are of wide distribution and probably underlie the western part of Manitoba and a great part of Saskatchewan and Alberta, the prospects for the discovery of other gas fields seem favourable. On account of the great thickness of sediments overlying these formations, the driller, however, must be prepared to go to a considerable depth.

*Extract from memoir No. 29-E., published by the Geological Survey of Canada, 1913.

TREATMENT OF ZINC ORES.

The Daily News, Nelson, B.C., last month published the following: "Declaring that the problem of the treatment of complex zinc ores had been solved and that he was willing to demonstrate the process, F. B. Allan, of Toronto, has written to the Nelson Board of Trade. The process of which he writes will save all the metals in the ore, he declares in a letter read at a meeting of the Board, at a cost of about $2 a ton. He suggests that from $15,000 to $20,000 should be raised to erect a plant on a commercial basis. The secretary was instructed to take the matter up with the British Columbia Mining Association."

COAL MINING IN BRITISH COLUMBIA*

By Wm. Fleet Robertson, Provincial Mineralogist.

The year 1912 proved to be, as far as statistics of production will show, one of the most successful in the history of coal mining in British Columbia. During this year the total gross production of coal made in the Province was 3,025,709 tons (2,240 lbs.) of coal, which is only some 113,526 tons short of that of 1910, which is still the "record year" in coal mining. Had it not been for the labour troubles, occurring in the later months of 1912, at the mines of the Canadian Collieries on Vancouver Island, whereby that company's output was reduced to a point 150,000 tons lower than the preceding year, there is little doubt but that 1912 would have been the record year to date, instead of occupying, as it does, only second place; yet, with the exception noted, it is greatly in advance of any other year.

The total sales of coal made in 1912 amounted to 2,230,-565 tons (2,240 lbs.), of which 1,263,427 tons was sold in Canada, practically all in British Columbia; 858,981 tons was exported to the United States, including Alaska; while 108,157 tons was exported to other countries. The coke sales of the Province for the year amounted to 267,564 tons (2,240lb.), of which 217,307 tons was sold in British Columbia and 50,257 tons exported to the United States.

The following table shows, for the past six years, the output and the per capita production of the various districts:

Local Production of British Columbia.

Year.	District	Gross tons of coal mined	Total No. of employees at colliery	Tons of coal mined per employee	No. of men employed underground	Tons of coal mined per underground employee
1907	East Kootenay District.....	876,731	2,290	383	1,527	574
	Coast District	1,342,877	2,769	356	2,862	469
	Whole Province	2,219,608	2,959	366	4,389	506
1908	East Kootenay District.....	883,205	2,524	350	1,746	506
	Coast District	1,226,182	3,549	345	2,686	456
	Whole Province	2,109,387	6,073	347	4,432	476
1909	East Kootenay District.....	923,865	2,427	380	1,737	532
	Coast District	1,476,735	3,991	370	2,976	496
	Whole Province	2,400,600	6,418	374	4,713	509
1910	East Kootenay District.....	1,365,119	3,111	439	2,374	575
	Coast District	1,774,116	4,647	382	3,529	502
	Whole Province	3,139,235	7,758	404	5,903	532
1911	East Kootenay District.....	442,057	2,197	201	1,585	272
	Coast District	1,855,661	4,676	397	3,627	511
	Whole Province	2,297,718	6,873	334	5,212	440
1912	East Kootenay District.....	1,261,212	2,410	523	1,780	708
	Coast District	1,764,497	4,720	374	3,495	504
	Whole Province	3,025,709	7,130	424	5,275	574

Per Capita Production—While no figures can be given as to the actual cost of mining in the different fields, the per capita production of these fields is of interest, as having a bearing upon the working costs and as indicating the mining facilities existing and the improvement made in these conditions from year to year. It will be seen from the above table that the production per capita has steadily and materially increased during the past three years. This increased effectiveness of the labour employed is largely due to better methods, better equipment, and greater volume of output. The figures given for 1911 are the actual statistics for that year, but they are in a way misleading for comparison with other years as regards the per capita production of the whole Province and of the East Kootenay field, since during that year the collieries of this latter field closed for eight months owing to labour troubles, while in the Coast District they represent a full year's work. In the Coast District the effectiveness of the employee, both total and underground, has not altered very materially in the last three years, and is considerably lower than in the East Kootenay District. In the East Kootenay field the effectiveness of the total employees has increased from 439 tons in 1910 to 523 tons in 1912, while the per capita output of the underground employee has similarly increased from 575 tons to 708 tons, a very remarkable and encouraging improvement.

The Coalfields of the Province which are at present producing may be divided into two main divisions—those of the East Kootenay District and those of the Coast District. These fields from their geographic positions—the one at the extreme eastern boundary of the Province, and the other at the extreme western edge—are in no way competitors in the market, their markets being quite separate and ruled by completely different conditions.

The Market of the East Kootenay Field is provided primarily by the railways of the south-eastern part of the Province and of the northern parts of the adjoining States of Montana and Washington, approximately two-thirds of the coal sold as such being exported to those States, while the other third went to supply the demands of the south-eastern part of the Province—its domestic needs, its railways, steamboats, mines, and smelters.

Coke, a product of the coal mines, is sold in the same markets, with the difference that the local consumption—chiefly by the smelters of Trail and the Boundary

*Extract from Annual Report of the Minister of Mines, 1912.

District—takes over 80 per cent. of the product, while 20 per cent. is exported to the States mentioned.

As regards the marketing conditions in this field, the East Kootenay collieries are, however, brought into direct competition with the collieries of Alberta just over the Provincial boundary-line, all these collieries being in the same coalfield, with practically the same grade of coal and working under similar conditions.

This competition has kept the price obtainable for coal at from $2.25 to $2.50 a ton, with little probability of any material increase in price, owing to the facility with which new collieries can be opened up and the very large reserve areas of coal limits in that district; a description of these reserves was given in the Report of this Bureau for the year 1909.

The Coast District may be subdivided into two fields —the Nicola-Princeton field and the Vancouver Island field—in which the markets differ considerably. In the former field the consumption is chiefly by the local railways, while a small amount finds its way to Vancouver, even under the handicap of what seems to be an excessively high freight charge.

The Vancouver Island Coal Market is provided by the domestic and manufacturing requirements of the coast cities, and of the ocean-going steamers calling at these ports. The demand for coal from the larger coasting steamers and from the railways has in the past couple of years diminished, as the Canadian Pacific Railway main line engines are nearly all burning California crude oil, and a large coasting steamer burning coal is now an exception. Notwithstanding the heavy consumption of crude oil, the coal sales have remained about constant, approximately 70 per cent. of the coal sold being for use in British Columbia, 20 per cent. exported to the United States, and 10 per cent. to other countries, chiefly Mexico. In the Coast District the demand for export coal has been so great and constant, particularly on the seaboard, and the prices obtainable so satisfactory to the shippers, that it has permitted of the domstic price being kept at a figure so high as to admit of the importation from California of fuel oil as a competitive fuel, where conditions permit of its use. It would appear, therefore, that the present price of coal on the seaboard, of from $4 to $4.50 a ton f.o.b., is not liable to decrease for some time.

Producing Mines—As in former years, the greater proportion of this product was made by three larger companies—the Crow's Nest Pass Coal Company, with two collieries in East Kootenay, and by the Western Fuel Company, of Nanaimo, and the Canadian Collieries, Limited, formerly the Wellington Colliery Company, these last two operating on Vancouver Island.

In addition to these larger shippers, very appreciable shipments have been made by the Hosmer Mines, Limited, and the Corbin Coal and Coke Company, in East Kootenay; by the Nicola Valley Coal and Coke Company, the Diamond Vale Collieries, and the Inland Coal and Coke Company, all of the Nicola Valley; by the Princeton Coal and Land Company, of Princeton; and by the Pacific Coast Coal Mines, Limited, and Vancouver & Nanaimo Coal Mining Company, both operating on Vancouver Island, near Nanaimo.

Consumption.—During the year 1912 about 56.65 per cent. of the coal, sold as such, by the collieries of the Province was consumed in British Columbia; about 38.51 per cent. was exported to the United States, including Alaska; and 4.84 per cent. was exported to other countries, chiefly to Mexico. Of the coke sold, about 81.23 per cent. was consumed in British Columbia, and the remaining 18.77 per cent. was exported to the United States.

PLANT ORDERED FOR BRAZEAU COLLIERIES.

The Roberts and Schaefer Company, engineers and contractors, Chicago, U.S.A., through their president, Mr. Warren R. Roberts, secured a contract on October 7th for a complete coal mining plant for the Brazeau Collieries, Ltd., of Toronto, Canada, on the lump sum basis, aggregating approximately $185,000.00.

This modern mining plant will open up the recently acquired coal acreage of the Brazeau Collieries, Ltd., at Nordegg, Alberta, Canada.

This company is owned jointly by Mackenzie, Mann & Co., Ltd., who control the Canadian Northern Railway; Mr. Martin Nordegg, vice-president; and a firm of Belgian bankers who are represented by Mr. Ernest Gheur, consulting engineer of the Brazeau Collieries, Ltd., and Mr. H. Prudhomme, their Canadian representative, treasurer of the coal company.

The Canadian Northern Railway Company has practically completed a line 160 miles long to Nordegg, at the site of the mines.

The plant will be one of the most extensive in the Canadian field, and will consist of a modern mine tipple with box car loader; dump house from two slope coal mines with conveyor delivering coal to tipple; complete boiler plant, including boiler coal conveyor; combined generator house and repair shop, including electric transformers; combined carpenter and blacksmith shop; warehouse; two mine fans; mine office building; boarding house; miners' wash house; two railroad track scales; commissary building; complete steam and water piping for the entire equipment, and all electric wiring.

The Roberts and Schaefer Company has guaranteed to complete this entire installation in the fall of 1914, which will require the early ordering of material preparatory to starting the construction work in the spring.

NIPISSING LOW-GRADE MILL

Mr. James J. Denny, writing in the Mining and Scientific Press, September 27, 1913, gives the following description of this mill:

The Nipissing low-grade mill is at Cobalt, Canada. The high-grade ores of this property have been treated for the last three years in the high-grade mill by an amalgamation and cyanidation process yielding the silver content directly as bullion.

The object of the new low-grade mill was to treat the low-grade wall rock by cyanidation and likewise recover the silver in the form of fine bullion. The mill was designed and constructed by James Johnston, of the Butters Engineering Co., and owes much of its success and smoothness of operation to his experience and foresight. Operations on a small scale were commenced on November 16, 1912, and after a short period of minor adjustment started at full capacity. Up to the present it has continued to run with gratifying success.

The rock is mainly the Cobalt series of conglomerate and is very hard and tough. The following is an analysis of the average run of mine ore:

	Per cent.		Per cent.
Ag	0.106	Pb	0.064
Cu	0.270	CaO	9.020
As	1.880	MgO	4.330
Fe	1.920	Al_2O_3	10.030
S	0.640	CO_2	11.060
Bi	0.010	Insolubles	59.840
Ni. and Co.	0.73	Hg	Trace

The washing plant, where the ore is crushed in breakers and given a preliminary jigging treatment, is not a part of the mill proper, as the concentrate from this section is credited to the mine. The ore from the mine averages about 60 ozs. per ton, and the tailing from the washing plant as sent to the mill proper averages about 28 ozs. per ton.

In the mill proper, the ore is crushed by stamps in a 0.25 per cent. solution of caustic soda, lime being added to the extent of 5 lbs. per ton of ore. The lime is used merely for settling, to facilitate subsequent decantation of clear solution back to the battery storage tank, the alkalinity for cyanidation treatment being furnished by the caustic solution. The fine grinding is effected by a closed system of tube-mills and classifiers, two of the tube-mills being used to regrind the battery discharge, and the other two for the ultimate fine grinding. Of the final product, only 5 per cent. remains on a 200-mesh screen, 16 to 20 per cent. is a fine 200-mesh sand, and the remainder an impalpable slime. After settling and decanting the solution, the thickened slime passes on to the reducing treatment.

The pulp is given a preliminary desulphurizing treatment by being passed through a tube-mill which is charged with aluminum ingots. The final treatment is given by lining the filter stock tank with aluminum plates and agitating for about ten hours by mechanical means. From the stock tank the pulp is drawn off by the filters as required. After filtering, the cake carries 26 per cent. alkali solution as moisture, and is thence discharged without washing to the cyanide tanks.

The cyanide treatment consists of agitating the pulp for 48 hours in a 0.25 per cent. cyanide solution, dilution 2.5:1. The pulp is then settled, the excess solution decanted, and after being again agitated the pulp is pumped to the stock tank for filtering.

As already mentioned, the pregnant solution is precipitated with aluminum dust. The details of the mill practice, together with a statement of costs, are included in the article by E. M. Hamilton. The precipitate is then sent to the refinery of the high-grade mill, where it is melted in a reverberatory and refined, the bullion averaging 999 fine.

When the process was first put into operation, the mechanically agitated stock tanks were depended on for the desulphurizing treatment. Here the aluminum plates were soon found to form a coating which was thought to be a calcium aluminate, and the reducing action was seriously retarded. To overcome this difficulty, the tube-mill charged with aluminum ingots was added. This kept the aluminum clean and bright, but the aluminum consumption was increased as a result of the wear on the ingots. Lately, however, the trouble has been found to be due to impure aluminum containing iron and silica; sheets of pure aluminum are found to remain clean and to have no tendency to form a coating.

Crushing a neutral ore in an alkaline solution is unusual, though not unknown in cyanidation, and the 26 per cent. of the alkali solution passing over with the cake to the cyanidation tanks will be criticized as being contrary to general practice. However, instead of being detrimental as is ordinarily maintained, in this particular case, namely, with Cobalt ores where the native silver is associated with antimony, the addition of alkali to the cyaniding solution has proved to be a decided benefit. Daily tests, running the working mill solution against fresh cyanide solution, show in every case an increased solvent power of from 0.2 to 0.5 ozs. of silver per ton of ore in favour of the mill solution. In this connection, the behaviour of the mineral dyscrasite is interesting. As mentioned at the beginning of this article, the reducing treatment has no effect on this mineral, probably due to the fact that it is a complex of variable composition of the metals, silver and antimony, and does not contain sulphur. However, the results from treating this mineral by plain cyaniding, compared with the results of similar treatment, after the preliminary reducing treatment, show a decided advantage in favour of the latter, owing to the beneficial action of the caustic soda solution during cyanide treatment. A further advantage of the caustic in the cyanide solution is the fact that it is necessary to precipitation with aluminum dust and saves the addition of caustic at that point.

The outstanding essential principles of the practice followed at the Nipissing low-grade mill are, therefore: (1) The extremely fine grinding; (2) the preliminary reducing treatment before cyanidation; (3) the use of aluminum-dust precipitation. In July the mill treated 234 tons per day of 27-oz. ore, and below the stamps made an extraction of 93.16 per cent. actually recovered in bullion.

As the mill has been running less than a year, the compiling of representative figures showing costs is a matter of difficulty. In connection with the desulphurizing treatment, treating 7,268 tons per month, the following data are available:

Collecting, Desulphurizing, and Transferring of Pulp.

	Per ton.
Labour	$0.050
Supplies (aluminum, 0.81 lbs.; caustic soda, 1.46 lbs.; lime, 5 lbs.)	0.347
Power	0.027
Workshop	0.008
Total	$0.432

Alkali Solution, Filtering and Transferring.

	Per ton.
Labour	$0.069
Supplies	0.006
Power	0.028
Workshop	0.002
Total	$0.105

The desulphurizing treatment effects a saving of from one to four ounces per ton, depending on the amount of refractory minerals present, at a total cost of 54c. per ton.

NIPISSING.

The following is a brief financial statement of the affairs of the Nipissing Mining Co., Ltd. (the Operating Company) as of October 1st, 1913:

Cash in bank	$1,169,511.93
Ore and bullion in transit	55,464.64
Ore on hand and in process and bullion ready for shipment	158,491.00
	$1,383,467.57

DRUNK ON SHIFT.

Before Magistrate Brodie, James Bourtin, shift boss at the Murray mine was fined $15 and costs, and George Farrell, hoistman at the Murray mine, was fined $20 and costs for being drunk on shift the night of September 16th. Information was laid by Mr. T. F. Sutherland, inspector of mines for Ontario.

THE MOFFAT-IRVING ELECTRIC STEEL FURNACE

Two years ago Messrs. James W. Moffat and Thomas C. Irving, Jr., erected in Toronto an electric smelting plant for the manufacture of steel castings. The smelter has now been in successful operation for some time and the company is supplying high grade castings to a number of customers in the city.

As the iron is largely derived from material which cannot be recovered in the ordinary blast furnace, the process has a special interest. Its successful application is a notable achievement. The raw material is flue dust and other furnace fines, containing about 42 per cent. iron. This is concentrated by treatment on a magnetic separator and then smelted in an electric furnace with limestone and coke. After being in the furnace for a period varying from 3 to 5 hours, the metal is drawn off into a ladle, and then poured into the moulds.

The Charge—With 1,000 pounds ore there is charged about 400 pounds limestone and 100 to 200 pounds coke. The coke and limestone are both first crushed to pass ⅛-inch screen. Coke breeze is used.

The crude ore contains about 42% iron. By magnetic separation a product containing 66 to 68% iron is obtained. This is then fed into the furnace. The sulphur content of the ore varies from .08 to .25% and the phosphorus from .15 to .3%.

Method of Charging.—Above the furnace are three bins for ore, coke and limestone respectively. From the ore bin the ore runs down by gravity to a hopper on the side of the furnace shaft. From this small hopper the ore is fed automatically into the furnace by a screw. An electric attachment records the number of turns of the screw. It has been found that by keeping the hopper full a very steady feed is obtained. The gravity feed from the large hopper gives the required regularity by keeping the small hopper full. The limestone is fed also near the top of the shaft in the same manner as the ore. The coke is introduced at the bottom of the shaft.

Reduction of the Ore.—There is an evolution of carbon monoxide at the bottom of the shaft. The ore coming down the shaft meets a strong current of reducing gas and reduction of the oxides takes place in the shaft.

Near the end of the run a determination is made of the amount of carbon in the steel. The coke feed is then regulated to give more or less carbon as desired.

The heat is produced by a current of 2,000 to 2,500 amperes passing through each of three graphite electrodes which are worked at a potential of 80 volts. The electrodes are set 120° apart and converge downwards. In the bath they are about 24 inches apart. The electrodes are controlled by hand. The current is delivered to the plant at 12,200 volts. This is stepped down to 80 volts by a Packard 300 k.w. transformer.

The Steel.—The remarkable control over the entire operation of steel making in the electric furnace makes it possible to produce steel of the highest grade. The usual analysis is: Carbon, 0.25 to 0.35; silicon, 0.27 to 0.32; manganese, 0.65 to 0.70; sulphur, 0.030 and lower; phosphorus, 0.040 and lower.. Under physical test this steel has shown an ultimate tensile strength of 80,000 to 100,000 lbs. per square inch, and an elastic limit of 45,000 to 60,000 lbs.

INTERNATIONAL NICKEL CO.

N. Y.—Business of International Nickel Co. continues at a level sufficient to maintain earnings during current fiscal year at about the same high rate as obtained in 12 months ended March 31 last, when gross aggregated $6,800,000. A recession in business had been expected some months back, but the six months ending with September, being the first half of current fiscal year, have not been in accord with that forecast.

July was a quiet month, as is not unusually the case, but business in August was much better and bookings this month have been such as to indicate active operations for some time to come.

The feature of the company's business most pleasing to those interested is the enlarging demand for nickel for commercial purposes as against demand for use in munitions of war. Probably the latter use now absorbs only half of metal produced by International Nickel.

Should gross earnings of Nickel Co. during the current fiscal year equal those of last year surplus available for dividends should exceed that of the last year as result of retirement of the entire outstanding funded debt. Bond charges in the year ended March 31, 1912, amounted to $445,650; on that date bonds outstanding totalled $8,162,154. The sums formerly paid out in interest charges now go to swell surplus for dividends.

In the last fiscal year International Nickel's expenditures for new construction were very heavy, bringing total spent for new construction in 11 years to over $9,600,000. In the current year to date expenses of new construction have been much lighter, but if the outlook for business is as bright at the close of this year, the succeeding fiscal year will probably see a resumption of new construction on a heavy scale. Expenditures for this purpose since incorporation compare as follows:

Year to March 31. New construction:

1913	$1,323,276
1912	951,294
1911	1,160,486
1910	238,840
1909	269,190
1908	1,548,482
1907	1,390,071
1909	369,190
1905	716,378
1904	645,895
1903	225,435
Total	$9,600,208

The usual semi-annual inspection by directors of the company's properties will be made early in October.—Boston News Bureau.

GYPSUM.

The Great Northern Mining & Railway Company, Eastern Harbour, C.B., has passed into the control of Montreal capitalists, headed by J. A. Davis & Co. The new owners have incorporated a company under the name of the Cheticamp Gypsum & Plaster Co., to operate the properties which include mill, railway, quarries, wharves, etc. The quarries are estimated to contain an enormous tonnage of gypsum.

The U. S. Bureau of Mines has issued a bulletin on First-Aid Instruction for Miners. The publication contains sections on: a simple description of the anatomy of the human body, common injuries and their treatment, bandages, dressings, and transportation of the injured. It is an excellent handbook for the first-aid man and can be read with profit by anyone.

COPPER MINING IN MICHIGAN

By Reginald E. Hore.

(Continued from last issue.)

Dividends.—During 1912 the dividend-paying mining companies paid to shareholders $9,901,875, and added considerable amounts to surplus account. Ahmeek, Baltic, Calumet & Hecla, Champion, Mohawk, Osceola, Quincy, Trimountain and Wolverine all paid larger dividends than in 1911. Dividends paid for the past five years and to date have been as follows:

Dividends Paid by Michigan Copper Companies.

	1908.	1909.	1910.	1911.	1912.	All Years.
Ahmeek	.....	.....	.....	100,000	900,000	1,000,000
Atlantic	.....	.....	.....	.....	.....	990,000
Baltic	90,000	1,000,000	1,000,000	500,000	700,000	7,750,000
Calumet & Hecla	2,000,000	2,700,000	2,900,000	2,400,000	4,200,000	120,050,000
Central	.....	.....	.....	.....	.....	2,130,000
Champion	500,000	500,000	900,000	500,000	1,100,000	7,500,000
Cliff	.....	.....	.....	.....	.....	2,518,620
Copper Falls	.....	.....	.....	.....	.....	100,000
Franklin		.....	.....	.....	.....	1,240,000
Kearsarge	.....	.....	.....	.....	.....	160,000
Minesota	.....	.....	.....	.....	.....	1,820,000
Mohawk	250,000	300,000	200,000	150,000	350,000	2,650,000
Osceola	192,300	769,200	961,500	721,125	1,201,875	10,881,650
Quincy	495,000	440,000	412,500	440,000	550,000	20,430,000
Tamarack	.....	.....	.....	.....	.....	9,420,000
Trimountain	500,000	.....	150,000	.....	300,000	1,250,000
Wolverine	600,000	600,000	600,000	540,000	600,000	7,440,000

In 1912, Copper Range Consolidated, from profits made by ownership of shares of Baltic, Trimountain and Champion mining companies, distributed $787,382. St. Mary's Canal Mineral Land Co., from profits made from half ownership of Champion Copper Co. and from sales of land, distributed $480,000 to shareholders.

Increased Wages.—Soon after the higher prices became established, the Michigan copper companies increased the wages of the miners. The increase, amounting to about 10 per cent. at most mines, was made voluntarily, and reflects a willingness on the part of the owners to share profits with employees. During the four lean years, wages were necessarily low, and yet plenty of men were available. In spite of the higher wage offered, there has been considerable difficulty in maintaining efficiency during 1912. Good men being not always obtainable, the companies have been compelled, in many cases, to keep on their rolls an unusually large percentage of poor and inexperienced workmen. Inability to secure suitable men has made it impossible to run some of the mines at their usual rate, and, as a result, there has been a natural increase in cost per ton due to lower production, as well as an increase due to the higher wage. Costs per pound of copper were from one-fourth to one-half cent higher than in 1911. This is largely to be charged to labour, though greater expenditure for construction has materially increased costs at some mines.

One-Man Drilling Machines.—The increased wage has in some cases not been reflected in higher costs, owing to many of the best miners having increased in efficiency. Using better machines and operating and caring for them more intelligently, the miners can earn larger wages while decreasing the cost per ton. The one-man drills, which have only recently been largely in use, have proved remarkably successful. The use of these drills has enabled the companies to pay higher wages than would otherwise be possible, as the saving in labour is larger than the increased cost of supplies and repairs. Good miners are, consequently, earning much higher wages than the companies could afford to pay under the old conditions.

Efficiency Engineers.—At several mines, graduates of the Michigan College of Mines and other colleges are employed as "efficiency" engineers. These men have themselves worked as miners and devote their attention to improving underground practice. They instruct the miners in use and care of the machines, study and compare costs of different methods of mining and handling the ore and guard against waste of air and supplies.

Mining Methods.—The methods of developing and mining the lodes were described in the January 1 issue of the Journal, in which was published some extracts from the writer's report on the copper industry made for the Michigan Geological Survey.

The One-man Drill.—One of the most noteworthy changes in mining practice in recent years has been the adoption of lightweight (150 pound) one-man drilling machines to replace the heavy (290-pound) two-man machines which were long in use.

Concerning these drills, the superintendent of one of the mines stated to an investigating committee recently:

"The necessity for further close economy in the operation of our mine forced us to go into the market for a more efficient drilling machine, and, if possible, a machine that could be operated with one man as compared with two, which was standard practice. After about eighteen months of experimenting we adopted our present machine. Our intention was to divide the benefits accruing to us from the use of the one-man machine with the men. This benefit to take the form of higher wages to machine operators (called miners).

That we have carried out this plan is shown by the following table which shows the increase in wages to the men operating one-man drills over wages made when operating two-men drills:

in case a man does not make what we call a fair rate he is paid off at a rate of not less than sixty-five dollars per month, but this ruling effects a very small portion of our employees. In fact, for the month of June this

Comparative Statistics on One-man Drill and Two-man Drill Calumet & Hecla and Subsidiary Mines for Year Ending December 31, 1912.

	Shifts.	Labor Cost.	Supplies.	Total.	Average wage per shift.
Two-man drill	350,012	$1,024,801.84	$291,526.14	$1,316,327.98	$2.83
One man drill	54,758	193,935.81	94,058.24	287,904.05	3.34

One-man (Leyner) drill, 59th level, Conglomerate lode. Photo by O. Gardner

Calumet and Hecla mine, Calumet, Mich.

"The miners' wages largely depend upon the efficiency of the man as our work is all on the bonus system and is so arranged that increased efficiency is of mutual benefit to the employer and the employee. We have a fixed contract which is not cut as the efficiency of the employee increases. It is also one of our rules that

year it was not necessary to use this minimum wage for a single employee. The one-man drill has resulted in a decided increase in efficiency, which, with further experience, will increase and will result in not only lower costs, but in higher wages to the men. What is more, the drill is popular with the good miners and any senti-

ment against it is made from without. Any attempt to return to the two-man drill would be a backward step in industrial progress and would work untold hardship to this district in its competition with other copper-producing districts. It is as little to be thought of as the elimination of any other labour-saving device. If copper mining in Michigan is to be a progressive and permanent institution, we must shape our methods now to be able to work deposits of a still lower grade than have been worked up to the present time, and the one-man drill and the further possible increase in the efficiency along this line is the most important step now before us."

Wages.—The recent investigation undertaken by the Copper Country Commercial Club shows that in 1912 the companies paid in wages a total of $12,606,409.34, or a little over $1,000,000 per month. For the six months prior to the strike the average wage was $3.20 per shift for miners, and $2.63 for trammers. For the month of May, 1913, the companies under Calumet and Hecla management paid miners $3.47 and trammers $2.87.

Number of Employees.—On July 22, the day before the strike was declared, there were 14,300 men in the employ of the mining companies. The chief employers were Calumet and Hecla 4,107, Copper Range Consolidated 2,716, Quincy 1,483, and Osceola 1,143.

On October 8, 1913, there were 5,445 men at work.

One-man (Leyner) drill, 59th level, Conglomerate lode. Calumet and Hecla Mine, Calumet, Mich. Photo by O. Gardner.

GERMAN CONSUMPTION OF FOREIGN COPPER.

Messrs. L. Vogelstein & Co. report for the months January to July, 1913:

	Tons.
Imports or copper	134,293
Exports of copper	6,010
Consumption of copper	128,283

as compared with consumption for the same period in 1912 of 120,071 tons.

Of the above quantity 115,349 tons was imported from the United States.

CANADA'S NICKEL INDUSTRY*

By Alex. Gray.

(Continued from last issue.)

Precious Metals in the Nickel Copper Ores.

It is of interest to have the technical advisers of the Canadian Nickel Corporation formally record the fact that they count on recovering precious metals worth $1 per ton of ore. The cost of this recovery always has minimized its net value to other companies. If the Hybinette process will save $1 out of the estimated content per ton of $1.20, then the precious by-products will become an important factor. It has never been contended by the International Company that these precious metals were other than a negligible quantity, in view of what it costs to separate them.

With reference to these precious metals Dr. Coleman states that native gold was early found in the gossan of the Vermilion mine of the International Company. The mine was taken up as a gold mine. Gold was also obtained, soon after, from the Victoria mine of the Mond Company. More gold was found at the Crean Hill mine. Sperrylite, the arsenide of platinum, was originally obtained from the Vermilion mine, and later from the Victoria. The name, Sperrylite, was conferred upon it in honour of Mr. F. L. Sperry, chemist of the Canadian Copper Company, who had sent it to experts for examination. The mean of the two analyses of samples submitted by Mr. Sperry, was:

Arsenic	40.98
Antimony	0.50
Platinum	52.57
Rhodium	0.72
Palladium	trace.
Iron	0.07
Cassiterite	4.62

"The sperrylite of the ores is mainly contained in copper pyrites," says Dr. Coleman. . . . . "This mineral has not been found at the other mines, though the platinum obtained from matte made from their ores suggests that it is really present. It is known that palladium occurs in the Sudbury ores in larger amounts than platinum, but no palladium compound has yet been discovered. The silver, also, is not accounted for unless contained in the copper pyrites."

However, it is manifest that the nickeliferous ores do not all carry anything like the percentage of precious metals determined by Professor George R. Mickle about 16 years ago. He found that gold and the arsenide of platinum were not confined to the Vermilion mine gossan. He located these metals in the unweathered sulphides, both in the pyrite and pyrrhotite. His results must have been exceptional, because "the average of six samples of solid ore gave over 3 dwts. of platinum and a trace of gold, while pyrrhotite with little chalcopyrite gave considerably less than the average, and one sample of ore with much chalcopyrite gave 7 dwts. 12 grs. of platinum and a trace of gold." The highest assay from the Mickle samples, was 1 oz. 3 dwt. of platinum and 3 dwts. of gold, from decomposed ore resting on the solid ore. Of themselves those results would create furore were they at all indicative of the average. They find their quietus in the historical events attending the exploitation of the Vermilion mine as a gold mine, as related by Dr. Coleman:

"The Vermilion was first taken up as a gold mine in 1887, and a shaft was sunk by Messrs. Tough and Stobie on a small quartz vein the following year, on the low ground 930 feet north of the present mine and just beyond the Crean Hill Railway, the name coming from the Vermilion river, which flows 2 or 3 miles to the southeast. A shaft was sunk 40 feet on the quartz vein and some very rich ore (wire gold) was found on the surface and also to some extent in the wall rock. Mr. B. Charlton, president of the Vermilion Gold Mining Co., states that several thousand dollars worth of gold was obtained by means of a three-stamp prospecting mill while sinking the shaft.

"The rich ore presently ran out and then gold was found in the gossan on the hill at the present mine, which was put through the little mill. The men in charge were puzzled to find the carpet used to collect the coarse gold whitened by shining grains of a tin white mineral, afterwards named sperrylite. Since the owners were in search of gold, and not platinum, the mine was sold in 1890 to the Canadian Copper Co.

"It was presently found that the gossan contained palladium, as well as platinum and gold, and the Canadian Copper Company made attempts to dispose of the mineral to various firms dealing in the rare metals, such as Balbach & Co., and Johnson, Matthey & Co. In 1896 the two firms mentioned reported that the ore contained from 6 to 9 ozs. of platinum and from 8 to 14 ozs. of palladium. In 1897 a consignment of 14 casks (5 tons) of platinum sand was made to Johnson, Matthey & Co., who found its treatment a matter of extreme difficulty, as the ore could not be levigated nor treated successfully by any acid process, and in smelting the palladium contents are sacrificed. The platinum contents could be recovered only by smelting with a large proportion of silver ore, involving considerable cost in its subsequent separation. In 1899 they paid for the ore at the rate of £8 per ton, and after deducting various charges, the net return from the consignment was at the rate of $22 per ton. An offer was made to buy the ore at the rate of £9 5s. per ton if quantities of 100 tons or more were shipped; but no more seems to have been sent to them, probably because the price was so low for ore running on the average 7 ozs. of platinum and 11 ozs. of palladium per ton. Platinum was worth about $16.00 per ounce at the time.

"Negotiations were carried on in 1899 and 1900 with a French company on the basis of 35 per cent. of the value of the two metals, palladium to be taken as equal to platinum in value, but apparently without result.

"In 1902 a small amount of platinum sand was sent to the Orford International Works at Bayonne, and in September, according to Mr. A. Wadhams, experiments were carried on under the direction of Mr. Hybinette for the separation of the precious metals. They seem not to have been very successful and finally the material was turned in with the ordinary nickel-copper matte, so that only a small percentage of the platinum metals was recovered.

*From Journal of Commerce.

"In October, 1903, 155.65 tons of 'platinum dirt' was shipped to the Orford works, according to official records at Copper Cliff, and Mr. Browne states that 90 barrels of gossan were removed in 1903, containing 6.88 per cent. copper, and 2.91 per cent. of nickel, with 6.5 ozs. of palladium, 4.1 ozs. of platinum, 4.3 ozs. of silver, and 0.28 oz. of gold per ton.

"Since sperrylite and gold are very easily separated from the gossan by panning, there is no doubt that most of the platinum and gold could have been saved by sluices or cradles, and it is surprising to find Johnson, Matthey & Co., stating that the ore could not be 'levigated.' The source of the palladium is not known, since analyses of sperrylite show only traces of that metal.

"In 1902 the Canadian Copper Company began taking out unweathered ore, sinking the main shaft to about 50 feet and drifting in various directions to follow the ore underground, and there is a record of 198.28 tons having been shipped in February, 1905. This was very rich in nickel and copper, averaging 20 to 25 per cent. of the combined metals. Assays made apparently in 1903, show that the ore contained 4 ozs. of silver, 4 ozs. of palladium, 1.5 ozs. of platinum, and 1/3 oz. of gold per ton.

"An assay of clean chalcopyrite, made by Mr. Waern in the laboratory of the Canadian Copper Co., in September, 1909, showed a trace of gold, 0.79 oz. platinum, 3.62 ozs. of palladium, and 3.78 ozs. of silver—a total of 8.13 ozs. per ton of the precious metals."

In the absence of complete data relating to the past recovery of precious metals from these ores, when dealt with in bulk, possibly there is considerable misconception. The Vermilion and Victoria mines cannot be regarded as indicative of the whole district. Undoubtedly some of the precious contents are saved. Taking certain complete analyses of bessemer matte as a basis, and including other high matte analyses, which showed only traces of palladium and 0.13 oz., 0.50 oz., 0.44 oz., 0.25 oz., and .40 oz. of platinum, Dr. Colesman says: "It came as a surprise to learn that for several years more palladium than platinum was recovered from the Canadian Copper Company's matte during the process of refining at Constable Hook, New Jersey. In 1902 no less than 2,375 ozs. of platinum and 4,411 ozs. of palladium were recovered, doubtless belonging to ore mined in previous years. If it all came from the ore mined in 1902 there were 0.0102 ozs. of platinum and 0.0189 ozs. of palladium, or 0.0291 of the combined metals, per ton of ore. In 1903 the amounts were 0.0077 of platinum and 0.0144 of palladium, and in 1904, 0.0052 ozs. of platinum and 0.0093 ozs. of palladium; showing a rapid falling off, due probably to the fact that Creighton ore had largely replaced others." No platinum, since 1904, has been reported, according to Dr. Coleman; yet another authority claims, without giving his grounds for so doing, that "there were recovered by the Orford Copper Company Works, at Constable Hook—the refining concern of the International Company—in dealing with the nickel-copper mattes shipped from Copper Cliff during the six years ended with 1912, 2,864 ozs. of platinum and 4,986 ozs. of palladium, 15,675 ozs. of gold, and 459,250 ozs. of silver." Lest the data be confusing, however, it is stipulated "that it cannot be specifically stated that this entire production was from the nickel-copper ores since certain residues from other mines are treated along with the matte in the process of refining. Doubtless, however, a large proportion is traceable to the nickel and copper-carrying pyrrhotite. The value of the production was almost $817,030."

At first blush that amount is a handsome extra. Reference to the tonnage smelted in those six years—and recollection of the other "residues" referred to—will dispel the impression that each ton of International ore had had more precious contents than has been commonly supposed. Were all the ore similar to that from the Victoria and Vermilion mine, the per ton precious metal contents would be quite important. But the Vermilion was somewhat incidental to the larger operations at the Creighton and Crean Hill Mines. It is different with the Mond Company, which mined the Victoria mine, almost exclusively, until lately. This leads Dr. Coleman to remark: "Since the Victoria mine in the early days contained so much sperrylite and gold that they could be panned from its gossan, it is probable that the Clydach refinery in which its bessemer matte is treated, must separate important amounts of gold and platinum and also of palladium, though there is no published account of the production of the metals."

The Alexo Mine.

In 1908 Alex. Kelso discovered a body of ore in Dundonald township, near Matheson, on the line of the Timiskaming & Northern Ontario Railway. Dr. Coleman, while recognizing the limitations of the locality, pronounces the Alexo Nickel mine to be "the most promising recent find of nickel ore in Canada, aside from the Sudbury deposits." No attempt has been made by the present owners, Mr. E. F. Pullen being the president to erect anything in the nature of a smelting plant. Perhaps the tonnage proved thus far does not warrant it. All told, the shipments from the property to July 31st, totalled 2,785 tons. This went to the Mond smelter, the yield in metals as notified by the smelter returns, being:

	Contents.
Nickel	241,563 lbs.
Copper	32,565 lbs.
	Aver. Analysis.
Nickel	4.34%
Copper	.58%

The ore is mined from an open cut, using one No. 43 Rand steam drill, a small hoist, buckets and derrick. It is loaded direct into wagons and teamed to the mine siding, three-quarters of a mile away on the Porcupine branch of the railway. The open cut is about 60 feet long, 10 feet wide and over 40 feet deep. Further along the ore body has been opened at surface for a distance of 200 feet, the cut being 9 feet wide and 9 feet deep. The total length as exposed, is given as 300 feet, beyond which it is said to be covered by drift. Pyrrhotite, however, is found some 1,200 feet away from the present workings, seemingly on the strike of the ore body being mined.

With a somewhat improvised plant—large enough for current purposes, unprepared for more than it is called upon to perform, it is complimentary to the owners that they modestly capitalize their company at $40,000 in dollar shares, issued $30,000, and have reserved $10,000 in the treasury. No stock has been sold. It is all held by the original partners who staked the property—which is a new departure. On the other hand there have been overtures looking to the purchase of the property, contingent on the demonstration of more ore than is indicated in the shallow workings and at outcrop.

A profit is realized from the shipment of the raw ore to the Mond Company, but the large producing companies of the Sudbury District declined to purchase the Alexo mine. A short time ago the Messrs. Guggenheim were

prepared to explore the property and take it over if the tonnage became greater. Several years ago Mr. David Fasken interested the Canadian Copper Company in the matter. Some diamond drilling was done, but results were not deemed sufficient to warrant a deal. The Mond Company also is said to have drilled the property. It may be extensions to the ore bodies will be uncovered. Dr. Coleman, in describing the Alexo situation, says:

> "The ore crops out for about 200 feet, with about 6 feet of solid ore at the widest place, followed by several feet of mixed ore and rock, and finally by serpentine with only a few specks of ore. Below the surface the solid ore thins out and at 100 feet depth there is only mixed ore and rock against the foot-wall."

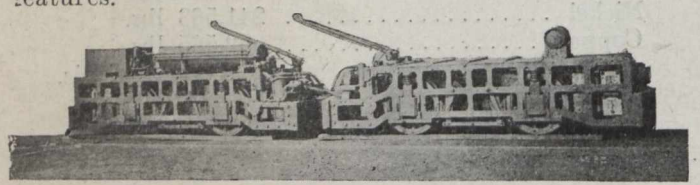
The latter feature doubtless was ascertained by means of the drilling; because the open cut boring is not 100 feet deep.

ELECTRIC MINE LOCOMOTIVES.

The Carnegie Coal Company has recently installed at the Charleroi Coal Works two of the largest mine locomotives ever built. These locomotives weigh 30 tons apiece and are of the Baldwin-Westinghouse "Barsteel" type. It is estimated that each locomotive can haul 100 cars each loaded with 3 tons of coal over the local grades.

The Carnegie Company recently acquired possession of the Charleroi mine, which is of considerable size and is well developed. A large production is desired from it, but the haul is about two miles long with the grade largely against the load. Hence the average haulage locomotive of from 15 to 25 tons would not be sufficiently large to keep production up to the estimated tonnage.

The locomotives possess a number of interesting features.

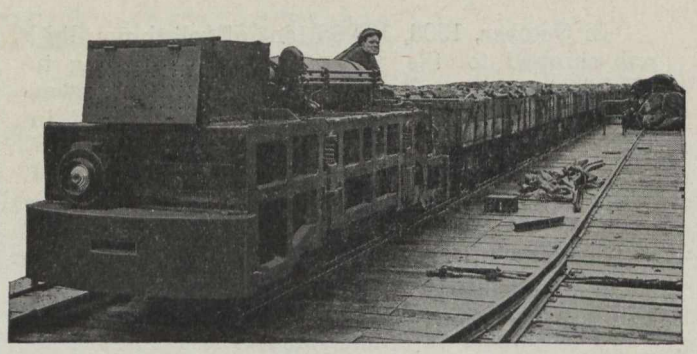


A 30-ton mine locomotive

Each locomotive consists of two separate units which can be separated and used as 15-ton locomotives if desired. This use of two units in tandem is advantageous in such large machines because the weight is distributed over 8 wheels instead of 4, and hence the locomotive has great tractive power and is also easier on the track than if the weight were more concentrated.

The "barsteel" construction represents the most modern type of design. As is clearly seen in the illustrations, the frames are not built up of plates, but are formed of a grid of steel bars of heavy cross-section. The side frame of each unit is cast separately forming an extremely strong and rigid construction. The openings in the frame give ready access for inspecting, oiling, replacing brake shoes, adjusting brake rigging, etc., and also provide thorough ventilation to the electrical apparatus so that its all-day efficiency is higher than would be the case if the frame were totally enclosing. This type of frame has been in use for many years for large freight locomotives, but has been only recently adapted for mine locomotives.

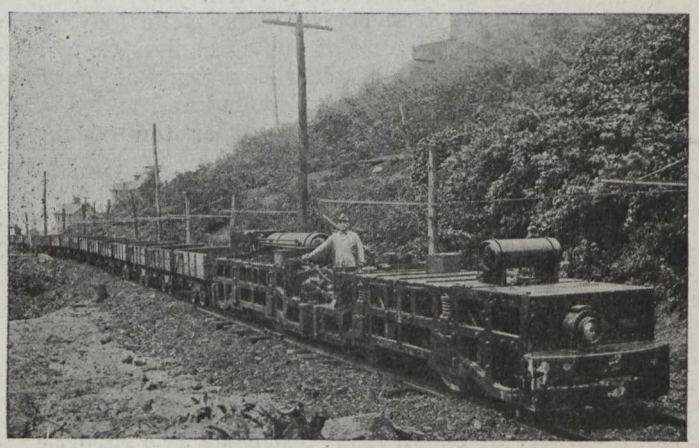
Air brakes are used owing to the greater ease of handling so large an engine, but each unit is equipped with hand brakes which can be operated together from



A 15-ton unit on the tipple

the operating stand of the leading unit. An auxiliary reservoir is provided on the trailing unit, the main reservoir and compressor being located on the leading unit. The hand brakes are operative on both units when disconnected for independent operation.

The controller for the tandem is of the individual magnetic blowout type, and handles all four motors at once. When the tandem is split, the four-motor controller handles the two motors of its unit without change in connection while the other unit has its own two-motor controller.



The tandem with train of coal cars

In addition to the two large haulage units the Carnegie Co. has installed at Charleroi ten traction-reel gathering locomotives or "crabs," also of the Baldwin-Westinghouse barsteel type.

CANADIAN COAL AND COKE CO.

The Canadian Coal and Coke Co., of Montreal, Quebec, has arranged to take over the properties of the Western Coal and Coke Co., the Pacific Pass Coal Fields, the St. Albert Collieries, and the Lethbridge Collieries, all developing coal mines in Alberta. The authorized capital of the Canadian Coal and Coke Co. is $15,000,000, divided into $4,000,000 preferred and $11,000,000 common. Of these amounts about $3,750,000 of preferred and between $9,000,000 and $10,000,000 of common has been issued, the remainder being retained in the company's treasury. The company has authorized an issue of $3,000,000 of bonds, $2,000,000 to be issued shortly; the proceeds will be applied in discharging certain current liabilities incurred by the several other companies above-mentioned in doing their development work, and the balance will be appropriated for completing development and equipment of the properties and for working capital. Negotiations in connection with placing the bonds are in progress.

BOOK REVIEWS

MINERAL DEPOSITS—by Waldemar Lindgren, Prof. of Economic Geology, Massachusetts Institute of Technology; Geologist, United States Geological Survey—McGraw Hill Book Company, N.Y.—Price $5.00 net.—For sale by Book Department, Canadian Mining Journal.

This work is one of the best on the subject that has yet appeared. Dr. Lindgren's experience as geologist for the United States Geological Survey, and as a teacher in one of the leading technical colleges, has given him unusual qualifications for a masterly presentation of the subject. He has long been recognized as a leading authority on ore deposits. His published works win admiration everywhere.

The scheme of the book is to outline the broader principles of the science of ore deposits. The several mining districts are dealt with only in so far as they afford good examples of the type of deposit being described. The classification adopted is a purely genetic one, and in this the book differs markedly from the well-known texts on mineral deposits which are now in use.

In most of the standard texts an attempt is made to discuss mineral deposits without strict adherence, if any, to a genetic scheme of classification. In most texts, metals and non-metals are discussed separately. Several authors classify the deposits according to the chief metal contained.

Dr. Lindgren avoids the customary treatment and classifies the deposits according to origin rather than according to the contents.

A complete treatment of the subject which would include discussions of distribution, occurrence, structure, origin, production, and valuation of deposits, as well as statements of the uses of the materials mined, process of mining and reduction, and criteria for judging the value of the products, is not attempted. The treatment is from a scientific rather than from a utilitarian viewpoint, the object being to give the student a clearer insight into the geologic relationship of the various deposits.

The first chapter is devoted to definitions of terms used, and to a general discussion of the distribution of the elements, composition of the earth's crust, traces of metals in rocks, price of metals, etc.

Chapter I. deals with the deposition of minerals, solution and precipitation, etc.

The next four chapters deal with underground water. The flow, composition, chemical work, and the origin of the water and its dissolved substances are discussed. These chapters give one of the best presentations yet written of this important subject.

Chapters VII. and VIII. are devoted to spring deposits, and the relations of mineral deposits to mineral springs.

Chapter IX. deals with folding and faulting, definition of the terms, classification of faults, etc.

Chapter X. is entitled, "Openings in Rocks." Attention is called to the various ways in which fractures and other openings are made.

The next two chapters deal with the form, structure, and texture of the mineral deposits and ore shoots.

In Chapter XIII., Dr. Lindgren presents his scheme of classification of mineral deposits, and each of the succeeding chapters deals with one of these classes:

Deposits formed by mechanical processes of transportation and concentration (placer deposits, etc.).

Deposits produced by chemical processes of concentration in bodies of surface water by reactions between solutions (limestones, limonite, bog-manganese ore, phosphate beds, etc.).

Deposits formed by evaporation of bodies of surface waters (saline residues, gypsum, nitrates, etc.).

Mineral deposits resulting from processes of rock decay and weathering (residual iron ores, manganese deposits, hydrated silicates of nickel, etc.).

Deposits formed by concentration of substances contained in the surrounding rocks by means of circulating waters (sulphur, asbestos, Lake Superior iron ores, Mansfeld copper-bearing shales, etc.).

Deposits resulting from regional metamorphism.

Deposits of native copper with zeolites in basic lavas (Lake Superior copper deposits, etc.).

Lead and zinc deposits in sedimentary rocks; origin independent of igneous activity (lead and zinc ores of the Mississippi valley).

Metalliferous deposits formed near the surface by ascending thermal waters, and in genetic connection with igneous rocks (quicksilver deposits, gold at Tonopah, Comstock, Cripple Creek, Goldfield, etc.).

Metalliferous deposits formed at intermediate depths by ascending thermal waters, and in genetic connection with intrusive rocks (gold quartz veins, California and Victoria type, Nova Scotia gold, Cobalt silver, etc.).

Veins and replacement deposits formed at high temperature and pressure, and in genetic connection with intrusive rocks (tin-bearing veins, some Ontario quartz veins, gold telluride veins of Western Australia, etc.).

Deposits formed by processes of igneous metamorphism (contact metamorphic deposits, Clifton, Bisbee, Cananea, Bingham, Boundary district, B.C., etc.).

Mineral deposits of the pegmatite dikes (feldspar and quartz, mica, apatite, etc.).

Mineral deposits formed by concentration in molten magmas (diamonds, chromite, magnetites, Sudbury nickel-copper, etc.).

Metamorphosed deposits (Swedish iron ores, etc.).

In Chapter XXIX., Dr. Lindgren discusses the oxidation of metallic ores, the general conditions, the principles, changes at surface, and secondary enrichment.

Chapter XXX. is a short statement of methods of calculation of rock analyses.

While the work from the mode of arrangement of its material leaves something to be desired from the standpoint of the student who desires to obtain information concerning all the types of deposits in which any one metal occurs, the text is undoubtedly by far the best available for those who wish to study the subject of mineral deposits scientifically.

A number of Canadian deposits are briefly mentioned, and it is interesting to note Dr. Lindgren's ideas of their origin, gathered from the literature rather than from personal observation. Naturally it is with the United States deposits that the author is most familiar. He has evidently, however, perused the literature very carefully and has been able to classify a number of the better known Canadian deposits also.

The asbestos deposits of Quebec are classed, following J. A. Dresser, as concentrations from the surrounding rock—a recrystallization of the serpentine proceeding inward from the cracks.

The native silver deposits of the Cobalt district come under the heading — Deposits formed at intermediate depths by ascending thermal waters and in genetic connection with intrusive rocks. In this he agrees in the main with the published writings of W. G. Miller, A. E. Barlow, J. B. Tyrrell, W. A. Parks, R. E. Hore, and others. Attention is called to the probability that there has been ample opportunity for the deposition of secondary silver by descending solutions as the veins have been long within a short distance of the surface. The peculiar fact that the mineral smaltite, which alters very readily in oxidizing waters, is found a few feet from surface practically unchanged is not mentioned by Dr. Lindgren.

The Porcupine gold deposits are considered by the author as formed at high temperature and pressure and in genetic connection with intrusive rocks. While the Porcupine deposits are very briefly mentioned, the text contains very interesting discussion of similar deposits in Calfornia and Victoria, which are supposed by Dr. Lindgren to have been formed at lower temperature.

The Sudbury nickel-copper deposits are considered to have been formed by concentration in molten magmas.

The Granby and adjoining ore bodies at Phoenix, B.C., are described as deposits due to igneous metasomatism not distinctly related to contacts.

The Rossland gold-copper deposits are considered to have been formed at high temperature.

For the Lake Superior native copper deposits and a few other very similar occurrences a special place is given in the scheme of classification. The deposition is thought to have been connected with the cooling processes of the Keweenawan lavas.

The zeolitization is considered as an after effect of volcanism and the native copper is supposed to have the same origin as the zeolites with which it occurs in the lavas. In this chapter there are a couple of errors which may here be pointed out. The section, on page 400, should be titled Calumet, instead of Houghton. The Calumet conglomerate is on page 401 incorrectly called a 'volcanic' conglomerate. R. E. H.

CYANIDE PRACTICE, 1910-1913—edited by M. W. von Bernewitz—Mining and Scientific Press—Price $3.00—For sale by Book Department, Canadian Mining Journal.

This is the third of a series of books published by the Mining and Scientific Press on Cyanide Practice. It includes numerous articles on all phases of current cyanide practice based upon experience in all parts of the world. Most of the articles have been published in the columns of the Press, and a few of them in other periodicals.

An attempt is made to present these articles according to the subjects dealt with rather than according to dates of their original publication.

There are several papers on each of the following subjects:

Chemistry of Cyanidation, Crushing, Concentration and Treatment of Concentrates, Roasting, Agitation, Decantation, Filtration, Precipitation and Clean-up, Disposal of Residue, Measurement and Estimation of Tonnages.

There are also a number of descriptions of present practice in several districts, and detailed descriptions of several mills. The names of many prominent metallurgists are included in the list of authors, and the publishers deserve much credit for gathering together so much up to date discussion and description of cyanide practice.

RECENT STRIKE OF OIL AND GAS IN WESTERN ALBERTA

By R. W. Brock.

The Geological Survey has received a sample of the oil recently struck in No. 1 well of the Calgary Petroleum Products Company, situated at Black Diamond, sixteen miles west of Okotoks, Alta. This oil was struck at a depth of about 1,560 feet. It is what is technically known as a "white oil," being transparent and of an amber colour. It is phenomenally light for a natural mineral oil, having a specific gravity of about 62 Baume. Evidently it consists largely of gasoline. In fact, it has been successfully used in its raw state in place of gasoline in an automobile.

"White oils" are rarely found in quantity. They would appear to be the result of filtration through clay strata, under pressure, of the lighter portions of ordinary petroleum. That this has occurred in the present instance is made probable by the fact that at a higher horizon in this well a flow of gas 2,000,000 feet a day was struck. This gas is also peculiar in the large amount of gasoline it contains. It probably represents a farther stage in the process of filtration.

The amount of oil present has not yet been determined, so that the commercial value of the strike is still unproved. If the amount of gas encountered in the higher level is any criterion, this may prove to be the exceptional case, and a considerable quantity of oil, for a "white oil," be obtained.

Whether oil is present in large quantities or not, the strike is of importance, as the "white oils" are usually found only in the vicinity of large bodies of the ordinary petroleum. Thus it is an excellent indicator.

Mr. D. B. Dowling, of the Geological Survey, who visited the well shortly before the strike was made, reports that the well is located on an anticline, in shales of the Pierra formation, and that the oil was encountered in underlying Belly river beds. On either side of the anticline overlying Edmonton beds are exposed. Going eastward therefore the covering will rapidly thicken. Westward toward Moose Mountain, according to the work of D. D. Cairnes, of the Survey, the formations are folded into a number of anticlines bringing lower formations to the surface, and in Moose Mountain faults are encountered. Between this faulted ground and the well are several anticlines where prospecting for oil might be undertaken. These anticlines probably run in the direction of the main structural lines, that is, roughly parallel to the mountain ranges. Mr. D. B. Dowling, of the Geological Survey, is now in the field, having been commissioned by the Director to examine the well and make a study of the geology of the district.

PERSONAL AND GENERAL

Mr. J. G. McMillan has been appointed inspector of mines for the Cobalt district. Mr. McMillan is a graduate of the mining department of Toronto University. Some years ago he was in charge of the Foster and later the Hargraves mines at Cobalt. Mr. McMillan has made numerous explorations in northern Ontario for the Provincial Government and recently returned from Hudson Bay where he was making harbour surveys for the Dominion Government. Mr. McMillan succeeds Mr. T. F. Sutherland, who was appointed successor of Mr. E. T. Corkill.

Mr. Clement Foster is in England. It is understood that his visit is in connection with the flotation of the Tough-Oakes Mining Company.

A number of mining engineers have been recently examining properties in Bartlett township, south of Porcupine.

Mr. H. S. Robinson, engineer of the Trethewey Mining Company, is now at the West Beaver mine, in the Port Arthur district, which is under option to the Trethewey.

Mr. H. Grattan Tyrrell, bridge engineer, of Chicago, gave an illustrated lecture on October 15th, before the Engineering Society of Northwestern University, on the subject of "Bridge Engineering." Mr. Tyrrell, who is a graduate of Toronto University, was formerly chief engineer for one of the Ohio bridge companies, and afterwards special engineer of bridges for the Harriman railroads in the Western and Pacific States. He is author of several books on bridge and structural engineering.

At the Buffalo mine, Mr. J. M. Swent has been appointed engineer, and Mr. C. Beech assistant engineer.

Mr. J. H. Plummer is in London.

Mr. W. H. Aldridge, of New York, formerly managing director of the Consolidated Mining and Smelting Company of Canada, Ltd., now managing director of the Inspiration Consolidated Copper Company, has been elected a member of the Executive of the American Mine Safety Association, which held its annual session at Pittsburg, Pennsylvania, at the end of September.

Mr. A. W. Allen, of Victoria, B.C., has been in Winnipeg, Manitoba, conferring with the directors of the Lucky Jim Zinc Mines, Ltd., as to resumption of operations at the company's Lucky Jim mine, in Slocan district, B.C. Since the death of the managing director, the late Mr. Thos. G. Procter, Mr. Allen has been in charge of the company's affairs in British Columbia.

Mr. A. J. Beaudette has gone to New York to report to his principals the result of the 1913 season's prospecting work on a coal property situated in Dockrill's basin, southeast of Hazelton, Omineca mining division, B.C.

Mr. Wm. Blakemore, of Victoria, B.C., has been in the Flathead country, Southeast Kootenay, examining coal and oil lands.

Mr. R. W. Brock, director of the Geological Survey, after his return from Yukon Territory, was leader of a party of International Geological Congress excursionists who visited Rossland on their way back East. Before returning to Ottawa, Mr. Brock spent a week or so in British Columbia on Survey business.

Mr. Chas. Camsell recently gave an address in Vancouver, B.C., illustrated by lantern slides, under the auspices of the Vancouver Chamber of Mines, on the mineral resources of the western part of the Northwest Territories of Canada. He also gave information relative to parts of Similkameen district, B.C.

Mr. Paul S. Couldrey, formerly manager for the Le Roi No. 2, Ltd., at Rossland, B.C., but now superintendent of the Cerro de Pasco Co.'s copper mines in Peru, has been spending a holiday in the south of France.

Mr. R. G. Drinnan, for years superintendent of coal mines in the Crowsnest district, B.C., now in charge of coal properties in Alberta, is making Edmonton his headquarters instead of Vancouver, B.C.

Mr. Chas. Fergie and Mr. J. M. Gordon, of Montreal, were recently at coal mines in Alberta, of which the former is the managing engineer.

Mr. R. P. Featherstonhaugh, well-known in connection with placer-gold mining operations in Atlin district, B.C., lately returned to the Omineca Gold Mines Co.'s placer mining work on Quartz creek, in Omineca mining division.

Mr. Thos. Graham, chief inspector of mines for British Columbia, when on an official visit to the Crowsnest district last month, took advantage of the opportunity to see some of the coal mines about Lethbridge, Alta.

Mr. W. D. Greenough, manager of the Atlas Mining Co.'s mines in Whitehorse copper camp, Southern Yukon, left that camp last month for a trip to see his principals in the United States.

Mr. F. T. Hamshaw, of New York, formerly managing a placer-gold mine on McKee creek, Atlin, B.C., after having obtained an option on several of the working claims in Shushanna gold field, Alaska, left that field last month for "the outside," to make arrangements for operating them next mining season.

Mr. H. L. Hollis, of Chicago, Illinois, recently examined the Surprise silver-lead mine, in Slocan district, B.C.

Mr. Henry Kehoe, of Spokane, Washington, who spent several months of last year in Ontario, has been appointed engineer in charge of mining operations of the recently organized London-Arizona Consolidated Copper Co., in Pinal county, Arizona.

Mr. Jas. McEvoy last month examined a coal mining property situated about 12 miles from Princeton, Similkameen, B.C.

Mr. John McMartin has been in British Columbia, both in the country most conveniently reached from Prince Rupert, the Grand Trunk Pacific Co.'s western terminus, and at Sheep creek Nelson mining division.

Mr. O. B. Perry, manager of the Yukon Gold Co., arrived at Skagway from Dawson early in October on his way south.

Mr. Royal Pullen has been appointed assistant superintendent of the operations of the Canadian-Klondike Mining Co.

Mr. Wm. Fleet Robertson, provincial mineralogist for British Columbia, is making investigations in connection with placer-gold mining about Barkerville, Cariboo district.

Mr. F. M. Sylvester, for several years assistant to Mr. Jay P. Graves, general manager for the Granby Consolidated M. S. and P. Co., has been appointed general manager on Mr. Graves' retirement owing to ill-health. Mr. Graves remains on the directorate of the company as vice-president.

Mr. Francis A. Thomson, head of the mining engineering department of the State College of Washington, Pullman, Washington, has been appointed acting dean of the faculty of the college. Professor Thomson is

well known in the more productive metal mining camps of southern British Columbia, with operations in some of which he has been associated.

The Canadian Westinghouse Co., Hamilton, has issued a bulletin describing carbon circuit breakers.

The McKiernan-Terry Drill Co. has issued a bulletin describing 'Wizard' rock drills.

The H. W. Johns-Manville Co. has secured the contract to furnish 67,500 square ft. of J-M built-up asbestos roofing to cover the new railway exchange at St. Louis.

This firm's product is built up on the roof from successive layers of asbestos (rock) felts, cemented together and coated with Trinidad lake asphalt.

The Siemens Company, of Canada, has received an order from the Dome Mines Company, Ltd., of South Porcupine, Ont., for 1 450-h.p., 250 r.p.m. 550 volt, 50 cycle slip-ring type induction motor, and short circuiting and brush lifting device, pedestal bearings, together with a Siemens type liquid starter. The motor is for driving a compressor made by Belliss & Morcom.

One of the contracts in connection with the construction of the new Michigan Central Terminal at Detroit is for 200,000 square feet of J.-M. Built-Up Asbestos Roofing, involving five carloads of material, to be used for railroad sheds alone. If placed end to end these sheds would extent over a mile. The contract for this roofing was given to the Detroit branch of the H. W. Johns-Manville Co., the well-known manufacturers of asbestos products, who are also furnishing the waterproofing, J.-M. Vitribestos Smoke Stacks Lining, two thousand feet of J.-M. Sectional Conduit, and 16,000 linear feet of J.-M. Asbestocel Pipe Covering for plumbing, heating and power lines throughout the building.

SPECIAL CORRESPONDENCE

YUKON TERRITORY

A Norwegian named J. Nielson, who, after conviction on a charge of having attempted to blow up one of the gold dredges of the Guggenheim Co., out of spite for having been discharged from employment, was sentenced to 20 years' imprisonment, is now in the penitentiary at Kingston, Ontario. He was taken down from Dawson by two of the Northwest Mounted Police; the journey occupied 15 days, close steamer and train connections having first been arranged for. He is thought to be a little off his head.

After having spent 14 years in Yukon Territory, Mr. G. W. McLean recently retired from the important position of Comptroller and left Dawson for Ottawa. When in Vancouver, B.C., en route, Mr. McLean stated, as reported in a local newspaper, that efforts were being made to extend the Yukon mining season this autumn. New machinery and gold dredges were being taken north. The output of gold, which was nearly $5,550,000 in 1912, will exceed $5,000,000 this year. It is expected that gold will be found in the Canadian Yukon, across the International boundary line from the Chisana field in Alaska.

Wilson Creek.—Capt. O. J. Newcomb, master of the packet St. Michael, which arrived at Dawson from the mouth of the Yukon river on October 8, brought news of a gold strike having been made on a stream running into Palta slough, one of the most travelled channels on the Yukon, about 200 miles from St. Michael and 50 miles below the Russian mission. The scene of the strike is a stream 18 miles long, called Wilson creek. The tundra is 7 to 8 ft. deep, similar to that of the Nome country. Captain Newcomb stated that men were taking out $30 a day to the rocker, and he had seen several with small pokes of gold. The strike was made four or five weeks ago, and when his steamer passed up the slough about September 20, 50 men had already staked claims. The same men had also staked on smaller streams, called Disappointment and Independence, in the vicinity. The Northern Commercial Co. has stocked one of its barges with supplies and placed it on Wilson creek as a floating store.

Lone Star.—Mr. T. A. Firth, secretary of the Lone Star Quartz Mining Co., is reported in newspapers to be shipping to San Francisco one ton of high-grade gold ore from the company's property, situated near the head of Victoria gulch, a tributary of Bonanza creek. The ore has been insured for $2,000; in it are specimens estimated to run at a rate of more than $10,000 to the ton. It is expected the returns from the shipment will be between $4,000 and $5,000. The company owns eight claims and shareholders in the company are chiefly Dawson men. Dr. D. D. Cairnes included in the information he prepared for the International Geological Congress excursionists, who visited the Yukon in September, the following brief notes: "On the Lone Star group several hundred feet of work has been done in open-cuts, trenches, shafts, and tunnels. A Joshua Hendy 4-stamp mill has been erected on the property, and a gravity tramway 3,500 ft. long has been constructed to convey the ore from the mine-workings to the mill on the creek 900 ft. below. In addition, a power line four miles long has been built to transmit current to the mill from the power line of the Northern Power and Light Co. on Bonanza creek. The total gold production from this property has so far been small; not nearly enough to pay for the development work. All the quartz properties in the district, however promising their character, have still to be considered as being in the uncertain prospect stage." (Note.—It must be remembered that Dr. Cairnes wrote some time ago, probably before the work of the 1913 season was done.)

Shushanna.—Mr. O. B. Dickeson, president of the White Pass and Yukon Route, which has a railway from Skagway to Whitehorse, 110 miles, and thence steamers for the season of navigation and stages for winter—461 miles to Dawson, on his return from the Yukon said: Our mining engineer this year examined the White River district, which we believe has a bright future. The gold strike in the Chisana country, just beyond the White River copper region, is bound to assist considerably in providing transportation business for a railway if we extend our system into the White River district. With reference to the Chisana district to date our company has refrained from saying anything regarding the value of the gold finds there, but the best evidence of what we think is, however, the fact that we have spent more than $150,000 in buying horses, supplies, etc., with the object of providing for the needs of that camp, and this will not come anywhere

near supplying the requirements of those going into that country. We know for a certainty that in one place, 250 by 16 ft., $27,000 in gold was taken out in six weeks, and that is not the only place at which gold has been discovered, different discoveries being some distance apart. Practically all of the prospectors who went in by our route came out for supplies and are returning to the field, which is the best evidence of what they think of it. There are three distinct routes: First, the Whitehorse-Kluane trail, which is the shortest in point of distance from Seattle or Vancouver; second, the White River route, from the mouth of the White river to Donjek; third, the Coffee Creek trail. The two first-mentioned are stated by men who have gone in and out to be the best. Up the White river to Donjek will be the most economical and best summer route for many reasons. We sent a light-draft steamer two trips up White river and landed passengers and goods at Donjek, the nearest point of organized transportation to the diggings, about 80 miles. We have sufficient faith in the country to immediately extend our operations to take in passengers and supplies whenever the conditions warrant our doing so.

A suit in equity, filed in the Yukon Territorial Court by Henry Dubois and Hugh Brady, hotelkeepers, Dawson, against William James, discoverer of the new gold field named Shushanna, in Chisana River district, Alaska, M. Wales, who accompanied James, and William Johnson, for an injunction restraining the defendants from selling the Shushanna claims and disposing of the gold obtained therefrom, they having grubstaked James and Wales. The suit has been settled out of court. The claimants state that they are to receive a substantial interest in some of the claims staked by the defendants, who have bonded the Shushanna property to F. T. Hamshaw, of New York, it is said, for $500,000.

Close of Navigation.—Navigation on Yukon river was nearing its close for the season toward the middle of October. Ice had already formed in many places along the river prior to October 10, and some of the larger steamers were being prepared for their winter quarters. Mails will be taken to river points in launches until the freeze-up. Down the river the water in tributaries was so low that boats had difficulty in navigating them, consequently some of the camps nearly missed getting in their winter's supplies, but rain fell and relieved the situation.

ALBERTA.

A discovery of placer gold on the Macleod river, west of Edmonton, has been reported by John Gentle, an old prospector, who showed some nuggets, one of which was stated to weigh a little more than two ounces. Several men, well-known in Edmonton, have been taken by Gentle to the scene of his discovery to stake claims. Meanwhile no confirmation of the report has been received.

Coal mining news items, from the District Ledger, Fernie, follow: The mines at Pocahontas, about 200 miles west of Edmonton, worked only part time lately; miners are quitting the camp owing to the dull times prevailing. Many students are attending Mr. Tom Stephenson's classes in mining, which are being held weekly at Bellevue, in the Blairmore-Frank district. Men responsible for guiding the destinies of the Western Coal and Coke Co. recently visited the company's Beaver mines, west of Pincher creek. They were led by Messrs. Chas. Fergie and J. M. Gordon, of Montreal. It is stated that operations on a large scale will be commenced next spring; meanwhile, No. 2 mine is to be worked as at present, producing 200 tons of coal a day, but in order to keep it working expenses are to be cut to a minimum for the time being. At Coalhurst, the mine is being worked steadily, with plenty of railway cars always on hand and plenty of labour power for production. The mine-rescue men are hard at work training—one team in the morning and one at night. Three times a week they tackle the smoke chamber, testing their own endurance and the abilities of their oxygen helmets. A big blaze at Galt No. 3 mine, Lethbridge, caused much excitement one evening lately, many thinking the tipple was on fire. Fortunately, it was found to be less serious—a stack of mine timber was burning, and the fire was at the end farthest away from the bankhead. Both No. 1 and No. 2 fire teams were quickly there, and they worked hard all night keeping water continuously playing on the burning and surrounding timbers. By daybreak all danger of the fire spreading was over, but all the following day men were working at the smouldering timber. It is estimated that ten carloads, about 30,000 props, were destroyed and that the loss is about $5,000.

Work has been commenced on the Keystone Cement Co.'s property just west of Frank. Men are busily employed clearing the ground and preparing for building.

In an address recently given before the local Chamber of Mines, at Vancouver, B.C., Mr. Chas. Camsell, of the Geological Survey of Canada, predicted a great future for the country from Athabasca, in Alberta, right through the Mackenzie river district to the Arctic ocean. Oil and tar exude from the ground in many places, and having in mind the present value of oil the country has great commercial possibilities.

In connection with the foregoing, attention is drawn to Memoir 29-E, "Oil and Gas Prospects of the Northwest Provinces of Canada," recently published by the Geological Survey of Canada.

There has been much excitement at Calgary, following the reported striking of oil in what is known as the Dingman well, in Okotoks district, south of and about 30 miles from, Calgary. Local newspapers state that Mr. A. W. Dingman, manager for the Calgary Petroleum Products Co., has admitted that the strike is of more importance than was at first given out, and that oil of good quality is present in commercial quantity. There are many applicants to the Dominion land office, Calgary, for leaseholds in the vicinity of the Dingman holdings. Several other wells are being drilled in the district.

NOVA SCOTIA

THE NOVA SCOTIA MINING SOCIETY.

The headquarters of the Nova Scotia Mining Society has been removed from Halifax to Sydney. Rooms have been rented in the centre of the business section of the town, and the library of the society will be suitably housed. The local secretary is Mr. E. C. Hanrahan. The editing of the transactions will be still in the hands of Mr. Harry Piers, the Provincial Librarian, and the society will continue to be represented in Halifax by Mr. Saunders. The removal of the society to Cape Breton is significant of the remarkable change in the industrial life of Nova Scotia that recent years have brought about. Coal is overwhelmingly the mineral staple of the province to-day. Gold mining has declined to small proportions, iron ore mining has entirely ceased; in fact, metal mining at the present time in Nova Scotia is negligible, and the mineral industry is confined almost altogether to non-metallic minerals, namely, coal, gypsum, and limestone, building stone

and brick-clays. The great bulk of these minerals is being mined in Cape Breton Island. The percentage of coal mined in Cape Breton is steadily increasing, and it is, moreover, the only part of the province where larger coal outputs may be expected in the future than have been obtained in the past. It is, therefore, beyond question that the capital town of Cape Breton should be the headquarters of the long established Nova Scotia Mining Society, with its honourable traditions, which Sydney may be relied upon to preserve and possibly to add to, as its citizens, and the mining fraternity in particular, appreciate the compliment implied in the change.

Need of Technical School.—The next thing that Cape Breton needs is a technical school, properly housed and with adequate equipment, and there can be little doubt that this provision will soon be forthcoming. It would be difficult to find anywhere else a concentrated industry so large and important as the coal mines and steel works of Cape Breton with so little opportunity offered to the workers to improve their intellectual grasp and their technical knowledge. In making this statement there is no intention to disparage the present schools. On the contrary, indeed, for every praise is due to those who are now endeavouring to carry on the evening technical classes under difficult conditions and with miserably inadequate appliances. The amount of money sent out of Nova Scotia as payment for correspondence courses in technical subjects is very large, and there can be but little doubt that the money sent from Cape Breton during the past twenty years for correspondence tuition would have gone a long way towards providing proper facilities at home. It must, of course, be admitted that the industrial development of Cape Breton has been very rapid and it has been difficult to provide all the requirements of an urban industrial population as quickly as the need has become apparent. The great expansion of the steel-coal industry dates back but a little over ten years, and things have not always looked rosy during that time. The bustling town of New Waterford, the most recent addition to the incorporated towns of the Province, was but quiet farms and forest less than five years ago, although to-day the municipality contains four large collieries and has a population of approximately five thousand persons. From now on it is not likely that the increase in tonnages and population will be so spectacular, but it may be safely assumed that there will be no looking back and that the industries of Cape Breton have attained a permanence that justifies the ambitious and thoughtful portion of the community in looking forward to the provision of educational facilities similar to those already in existence in similar communities in other parts of the world. We can assure the members of the Royal Commission on Technical Education that there is no part of the Dominion where the governmental aid suggested by the Commission could be more usefully applied than in Cape Breton.

BRITISH COLUMBIA

The approach of winter has been made evident by light falls of snow in some of the mining districts where the elevation is comparatively high. No interruption of operations has yet been reported, though, except that in placer-mining camps the season is near its close.

Lode mining is maintaining its customary rate of production, as a rule. The larger producers—Granby Consolidated, British Columbia Copper, Consolidated Mining and Smelting, Britannia, Hedley, and several companies mining silver-lead or lead ores—Standard, Sullivan, owners of the Bluebell, and others—are together keeping the ore-tonnage figures well up to the level of other years.

Some progress has been made toward increasing the production of coal from Vancouver Island mines, the Western Fuel Co. having made a beginning from its No. 1 mine at Nanaimo, while the Pacific Coast Coal Co. at its Fiddick colliery, and the Canadian Collieries at its Extension mines, are also working in the direction of resuming production to some extent. The Jingle Pot, near Nanaimo, and in very much larger degree the Canadian Collieries at the Cumberland mines, are working to practically full capacity.

SLOCAN.

Sandon.—More ore has been found in the Slocan Star mine. About October 8 the crosscut which is No. 8 level from the main rise from the deep-level drift to the old workings, broke into ore, and where it entered the veins there was between two and three feet of clean shipping silver-lead ore. About two years ago the Slocan Star Mines, Ltd., was organized to acquire and operate the Slocan Star and Rabbit Paw groups of mineral claims which had been the subject of extra-lateral rights litigation between the Star Mining and Milling Co. and the Byron N. White Co. during a period of about ten years. The matters in dispute were finally determined by a judgment of the Supreme Court of Canada in 1909. Afterward a merger was arranged and the present operating company incorporated. Following the recommendations of Mr. A. G. Larson, of Vancouver, the new company drove a crosscut adit more than 2,000 to the Slocan Star vein, which was drifted on for some distance without any considerable quantity of shipping ore being met with. Eventually a raise was made to the old workings, No. 5 level, the lowest opened out to the surface by the old company, was 300 ft. vertically above the new low-level drift, and twice that distance on the average dip of the vein down to No. 5. The vein and ore-shoots, however, had been followed to a vertical depth of 132 ft. below No. 5. After making the necessary through connection, the work of driving a series of crosscuts from the raise to the ore-shoot, the direction of which had been ascertained, was undertaken. That first above mentioned is one of these, the ore-shoot having been reached previously at a level between the old workings and what is now No. 8. While no information has yet been received on this point, it is probable that No. 8 is about halfway between the old workings and the deep level below—say 300 ft. on the incline—deeper than No. 5. Whatever its precise depth, the fact remains that ore of shipping grade has been found at greater depth than the old workings, which is a decidedly important and encouraging development.

BOUNDARY.

Grand Forks.—Granby Consolidated Co.'s report for September shows a total of 103,830 tons of ore treated at the company's smelting works here; of that quantity, 102,310 tons, was from the company's mines at Phoenix, and 1,520 tons custom ore. Blister copper shipments totalled 1,855,490 lbs., while the refined copper produced was 1,824,659 lbs.

Greenwood.—The Jewel-Denero Mines, Ltd., is employing 35 men; more will be put on as soon as accommodation for housing them shall be completed. The company's 15-stamp mill is being regularly operated, difficulties that occasioned frequent stoppages previously having been overcome by the present general

manager, Mr. Chas. A. Banks. Finer grinding in a tube mill has admitted of a change from the earlier custom of shipping concentrate being abandoned and the gold being recovered in the mill.

SIMILKAMEEN.

Hedley.—The Gazette included among its recent mining news of Camp Hedley some items of which the following is a summary:

Mr. C. H. Poirier, mining engineer, has been sent in to examine the Golden Zone mine. After looking over the ground he decided to have the workings pumped out so that he could make an examination underground. The mine is being unwatered for the purpose.

The Minister of Lands has given his decision in the Similkameen River water rights case in which the Hedley Gold Mining Co. had appealed for recognition of its claims. The company is given the lower record on the river under certain conditions and the holders of the prior right are to have for their intake and headworks a site higher up the river. Certain costs in connection with the survey of sites by the latter are to be borne by the company, which will then be free to proceed with its water power project should it accept the conditions imposed. More power is required by the company to allow of a proposed considerable enlargement of its stamp-milling operations being carried out.

The Hedley Gold Mining Co., in line with its past policy of paying its employees a higher rate of wages on a graduating scale when the price of copper goes up (as is done by some of the copper-producing companies operating in the province) notwithstanding that it does not benefit a cent from a higher price for copper, since it produces only gold, has notified its men that their pay has been increased 25 cents a day as from August 31. A number of men in the company's employ, apart from this general advance, for special capability in their work, are paid at a higher rate than the regular scale for similar work in other camps.

YALE.

Hope.—Work has been suspended in the tunnel of the Aufeas mine pending the construction of an aerial tramway and ore bins. The mouth of the tunnel is on a steep hillside with no place there for storing ore. The face of the drift is in solid ore, so arrangements are being made to facilitate its transportation.

At the Araucumo, enough work having been done to show the existence of a good body of ore, a roadway is being cleared a distance of 3,000 ft. to the Cariboo wagon road.

Negotiations in connection with the project to install a stamp-mill on Hidden creek, delayed by the death of the late Mr. H. R. Bellamy, who previously had them in hand, have been resumed.

Kamloops.—More machinery is to be installed at the Iron Mask mine from which shipment of ore to the smelting works at Trail has been made lately. W. Clay has arrived from the Eastern United States to put in the additional plant which is expected to reach the mine shortly.

Prospects in the vicinity of Lake LeBois show promising looking deposits of ore containing lead carbonates. The ore has been exposed for more than 100 ft.

The erection of a small stamp mill has been completed up the North Thompson river, and preparations are being made to commence crushing a lot of ore from various claims in the vicinity.

Mr. W. M. Brewer has been looking over the Cotton Belt group of claims in Seymour Arm camp, to prepare a report on them for the Provincial Bureau of Mines.

SKEENA.

New Hazelton.—Harris Bros. have completed the work of driving on the 100-ft. level of their American Boy silver-lead mine on Nine-Mile mountain. They are now preparing to sink their No. 3 shaft 100 ft. deeper.

Camp has been removed to below timber line on the Highland Boy group on Rocher Deboule mountain and preparations are being made for the winter's work, which is to include driving an adit about 1,000 ft. to crosscut four veins, one at a depth of 1,500 ft. below its outcrop.

Mr. R. P. Trimble, who recently purchased the Great Ohio group of eight claims on Rocher Deboule mountain, has let a contract for the erection of bunk and boarding houses, blacksmith shop, office, etc.; construction of a trail, and running a drift 300 ft. on No. 1 vein. The contractor has commenced the work.

At the Silver Standard, on Glen mountain, from which ten cars of silver-lead ore that averaged $106.42 a ton was shipped to Trail, the drive to the north of the 250-ft. level has entered what is believed to be the same shoot of ore as occurs on the 100-ft. level. Some extra good ore has been found in a drift on the upper vein. Nearly all the men are now employed in taking out ore, to have it in readiness for shipment as soon as the snow shall be deep enough to allow of its being taken to the railway.

OMINECA.

Hazelton.—Manson is the centre of the Omineca River placer gold field. Official statistics for the current year are not yet available, but for 1912 they showed that 38 new placer leases had been taken up and many transfers of old leases made, the tendency being for consolidation of leases in financially strong hands, owing to the existing necessity for putting in heavy plant and machinery to work to advantage.

The Omineca Gold Mines has completed its 1913 season's work and the superintendent, Mr. R. D. Featherstonhaugh, has left Quartz creek for Vancouver. Mr. F. E. Groffman, also with this company, when on his way to Hazelton lately met on the trail 120 pack animals, most of which were carrying supplies for companies operating at Manson or on Omineca river. Prospecting work during the season just closed has generally resulted satisfactorily.

GENERAL NOTES.

A ditch line has been surveyed for the Summit Creek Hydraulic Mining Co., Ltd., in Cariboo mining division. The company intends shortly to commence construction of the ditch, so as to be in shape for gravel-washing operations in the first part of next season.

A miner who in July, 1912, was so injured that as a result he has since suffered from partial paralysis of the lower limbs, has succeeded in obtaining a Supreme Court judgment for $5,000 against the Little Billy Mining Co., which has been operating the Little Billy mine near Van Anda, Texada island.

The British Columbia Copper Co. is continuing the development of the Eureka, situated within a dozen miles of Nelson. Recently there was developed ore of higher grade than any previously mined; beside its copper content silver shows freely in it. The company is also working the Queen Victoria copper mine, situated about eight miles below Nelson and on the opposite side of Kootenay river.

COBALT, GOWGANDA, ELK LAKE AND SOUTH LORRAIN

Millerett—Surface development on the Millerett, which is now the property of the Miller Lake-O'Brien at Gowganda, is most encouraging. Trenching under the direction of an old prospector this summer has revealed the presence of a series of veins and cross veins on the Millerett, close to the contact between the Keewatin formation and the diabase, although entirely in the diabase. Silver is found in the smaltite veins, and as leaf in the wall rock over an area of several feet. The ore on the surface is patchy, sometimes two to three inches wide, sometimes a mere crack with cobalt bloom; but in comparison with the surface showing made by the system of veins being worked on the Millerett now, they are rich. Several promising leads have also been found on the Miller Lake-O'Brien. It is a matter of interest if not of economic importance to note that very high gold assays have been made from the ore taken from these new finds. Ore which showed little or no free gold ran as high as 37 ounces to the ton. To develop these new ore bodies a shaft will be sunk and vigorous development commenced at once. In view of local conditions the management attach great importance to the new discoveries.

Miller Lake-O'Brien.—Underground on the Miller Lake-O'Brien a 90-foot ore shoot has been developed on one of the cross veins at the 300-foot level. This is all high grade ore. Last month (September) the Miller Lake-O'Brien made a record production with a total of 70,000 ounces. August was almost as good with 65,000 ounces, and it can be said that the property owned by Mr. M. J. O'Brien has never been in better shape. There have been six cars shipped this year averaging about 40,000 ounces a car. Nothing but high grade ore and concentrates is shipped. The Millerett mill has been treating about 30 tons a day since it was taken over, the rock being transported from the shaft at the Miller Lake-O'Brien to the mill in an auto truck. Owing to the high cost of fuel the mill has been shut down until the hydro-electric plant which the company is building is ready. When it is operated again the ore will be taken over on a tramway which is now being built.

New Power Plant.—To continue to operate the Miller Lake-O'Brien had to find some solution of the power question. Wood has now to be transported a distance of three miles, and it cost the company a minimum of four dollars a cord. Encouraged to look for a long life by reason of the new discoveries and the improvement underground the company is now expending a considerable sum of money in installing a power plant between Gowganda and Burt lakes. The first unit of the plant will give the company 300 horse power. Two sets of water wheels will be installed and one generator and a pole line two and a half miles long built to the mine. It is estimated that the power will constitute a saving over wood fuel of from $15,000 to $20,000 a year.

The Mann on the west ridge at Gowganda, is meeting with considerable success in its development of the Boyd-Gordon which was purchased some time ago. The ninety foot shoot of high grade ore being developed on the 120-foot level is largely in Boyd-Gordon territory. The Mann has a carload of very rich ore on hand but it is not likely that it will be shipped until January when the winter roads will make transportation easier and more inexpensive. On two veins an aggregate of about 130 feet of good ore has been developed at the 120-foot level. During the year the Mann has been examined by several English syndicates and it was under option for some time. It has not yet changed hands.

General conditions in Gowganda have not much improved. The lack of money for speculative purposes has hindered development in the Montreal River district probably more than anywhere else. While camps with fair prospects can be reached by rail in Northern Ontario, syndicates fight shy of investing in a section where transportation expenses are necessarily higher.

The Gowganda road is much better than it has been previously, but it is still a day's journey from Elk lake in the summer months, and the freighting of supplies is an expensive matter. The government has done a little work on the road this summer in improving bad places and the Miller Lake-O'Brien is doing much to make the stretch of road between the mine and Gowganda quite good. But there is a great deal of work to be done on the road yet before it can be said that it is not the worst in Northern Ontario between two such important points as Elk Lake and Gowganda.

Beaver.—It is probable that the Beaver Consolidated will resume dividends before the end of the year. The directorate has decided that the shaft shall be put down with all expedition to the 1,000-ft. level. A level has already been established at the 800-ft. level, but the vein has not yet been cut. Another level will soon be opened up at the 900-ft. On the 460-ft. level some new ore has been found in the wall of the main drift and a new vein has been found at the 700-ft. level.

Nipissing.—During the month of September the Nipissing Mining Company mined ore of an estimated net value of $191,753, and shipped bullion from company and customs ore of an estimated net value of $442,588. The ore produced was all from the mine's own workings, but a good deal of bullion was produced from customs ore. The high grade mill treated 156 tons, and shipped 728,204 ounces. The low grade mill treated 6,879 tons.

The most significant development during the month was the announcement as to the policy to be pursued at shaft 64. Cross-cutting at the 650-foot level the main vein was found to be six inches wide, but assaying low in silver. It has been decided to continue the exploratory work in the Keewatin formation, and the main shaft will be sunk to the 900-foot level, and the vein sought at that depth. This is the most important development work the Nipissing has undertaken, and it will go far to solve the question of whether the Keewatin under the Cobalt conglomerate is of any value as an ore-bearing formation.

McKinley-Darragh-Savage—The production of the McKinley-Darragh-Savage mines for the month of September was 242,266 ounces, an increase of 30,000 ounces over the production of the preceding month and the highest for the year. The rich ore shoot developed on the 150-ft. level of No. 40 vein is responsible for the higher production, as this ore body gave alone 100,000 of the month's total. The McKinley-Darragh contributed 192,706 and the Savage 49,560 ounces. Of the total from the McKinley no less than 73,000 ounces was of high grade ore sorted and bagged underground.

Casey-Cobalt—The new line from the Northern Ontario Light and Power to the Casey-Cobalt has been completed and the mill is now dropping thirty stamps. This gives a capacity of 90 tons daily. The mill had

previously but ten stamps, so that the production from the mine will take a considerable jump.

Trethewey.—The estimated production of the Trethewey Silver Cobalt mine for the month of September was 56,400 ounces of silver, as compared with 55,000 ounces for the preceding month. During the last two months the Trethewey has been in better shape than for some time previously. In September the mill treated 2,900 tons of ore with the heads running 24 ounces to the ton. The extraction was 82 per cent. as compared with 80 per cent.

Wettlaufer.—Owing to the fact that there has been a cave-in of rock at the lower levels of the Wettlaufer mine, the property will be abandoned earlier than was at first anticipated. The South Lorrain property is practically closed down now.

Water Power.—Owing to the low water level attained on the Montreal River consequent on the dryness of the summer and fall and the great increase in the demand for power there has been a shortage of power for the mills. Before the rains came in the past two or three days all the eighteen mills of the camp have had to close down in rotation for 24 hours, and there will consequently be a reduction in output of considerable dimensions. It is hoped that the rains will put an end to the shortage. The two plants of the Northern Canada Power Company have a capacity of 12,000 horsepower, but they are overloaded. When the power plant at Fountain Falls is completed it will give an additional 4,000 horsepower, but no service is expected from this quarter this year.

Difficulty in Selling Ore.—There is still a very considerable difficulty experienced in selling ore, but competition has been invited from outside and firms not previously interested will probably be customers of the Cobalt mines. It is also hoped to enter the European market.

Express rates on silver bullion from Cobalt to England which were raised from $4.50 per hundred pounds to $7.00, have been reduced to $6.00. The Nipissing is shipping to New York, but the remainder of the companies still seek the London market.

Hollinger.—Mr. P. A. Robbins, the general manager of the Hollinger gold mines, announces that the gross profits for the four weeks ending Oct. 8th amounted to $145,866, the mill ran 94 per cent. of the possible running time, treating a total of 12,264 tons, of which 311 tons were treated for the Acme Gold Mines, Limited. The average value of the ore treated was $17.80, the approximate extraction 96.40 per cent., and the milling cost $1,376. Mr. Robbins points out that the working cost at $5.18 per ton, is the lowest point yet reached. Development work upon the main vein upon the lowest level is demonstrating that values are about the same as upon the upper levels. Practically one-half the ore milled came from development. In cross-cutting upon the 100-foot level an ore body was found with the same characteristics and high value as No. 1 vein. On the 300-foot level an extension of No. 8 vein has been picked up.

PORCUPINE, SWASTIKA AND KIRKLAND LAKE

The Dome Mines, Limited, has adopted a policy of publishing monthly production records. For September the record reads tonnage milled 10,790, value of gold produced $70,135, mill running time percentage of total monthly hours, 95 per cent. These figures compare with those given out earlier as follows:

	Tons Milled.	Value.
April.	9,863	$129,333
May.	10,852	148,499
June.	11,300	98,215
July.	11,150	75,958
August.	12,720	67,660
September.	10,790	70,135
	64,675	$529,802

Three Nations.—One hundred and fifty shareholders of the Three Nations Mining Company visited the property at Porcupine this month in a special train. The new ten stamp mill which has been in operation for the past four weeks was visited and while there the first run was made. The entire party was taken underground and shown the veins at the 100 and 200-foot levels.

THE CALGARY OIL STRIKE.

After a meeting of the Board of Trade and city officials recently, when the matter of the exploitation of the recent oil discoveries was discussed, the following warning was issued to the press and the public:

"To whom it may concern: Attention having been directed from many parts of the world to the reported discovery of crude petroleum in the vicinity of Calgary, it seems expedient that some announcement should be made on the subject with the purpose of preventing false or harmful statement or statements being circulated with respect to the result of the oil-boring operations in this territory.

"After several months of boring, crude petroleum of a limited quantity was struck on October 7, at a depth of 1,562 feet, in the boring upon the property of the Calgary Petroleum Products Company, Limited, located in Section 6, Township 20, Range 2, west of the fifth meridian.

"It is impossible to state whether the oil found merely came from a seepage or indicates the existence of a larger deposit at a greater or lesser distance of depth. Meanwhile boring continues, with some promise of ultimate success, but until oil has been struck in volume, the public is warned against placing too great confidence in circulated reports, and particularly urged to exercise care in investments in oil leases, or in the stocks of companies or syndicates which have been or may be formed for oil exploitations."

The warning was signed by Mayor Sinnott for the city and J. A. Campbell for the Board of Trade.

PROBLEMS OF OUR STEEL INDUSTRY.

Mr. J. H. Plummer, president of the Dominion Steel Corporation, is due to arrive in London, England, this week-end. When he visited Montreal last week en route to New York, it was not generally known that he had begun his mission which will have direct bearing on the new financing arrangements on which it is believed that the Dominion Steel Corporation must now embark.

It is understood that the corporation will make a satisfactory showing for its quarterly statement to September, the definite figures of which will scarcely be available to the shareholders and the "Street" for a couple of weeks. Mr. Plummer, however, from his close association with the plant's operations during the past four or five months is in intimate touch with conditions and will be able to present his showing where required in the London market.

The "Street" has been more or less favourably impressed by estimates of what the corporation was likely to show in its quarterly report. While the president rarely makes any "estimates" for the public, there is at least the statement of one of the Steel directors, Sir Henry Pellatt, of Toronto, who recently expressed the opinion that the 1913 earnings would be $1,000,000 higher than last year. "The company was never in such shape as it is today," was his statement.

Realization, however, that the corporation has still a number of problems to face, among them being this matter of new financing to liquidate heavy bank loans, gives rise to confusion of sentiment on the "Street." The corporation's bank loans are estimated at from $3,000,000 to $4,000,000.

In the early part of September it will be recalled that innumerable bear rumours were circulated. The favourite bear report to go out is the possibility of the common dividend being discontinued with each quarter. The directors, however, soon put at rest all fears of the October dividend and they had scarcely more than done so when it was hinted that the January dividend would be passed. That, of course, still remains for the future to determine. But those who know the president know that one of his chiefest concerns is to maintain the dividend policy once established. He will do his utmost within reason, though it is quite possible that unforeseen circumstances may upset his calculations.

Mr. Huntly Drummond who returned this week from an extended stay in London points out that while the demand for English money is greater than the supply at the present moment, those in immediate need can secure capital if they are in a position to pay the price.

Just as expressed by Mr. Drummond, there does not seem to be any doubt in the minds of men in close touch with the financial situation that Mr. Plummer will undoubtedly have to pay well for what borrowing he is able to effect. It is obviously premature to venture an opinion as to the nature the new financing arrangement will take. A new issue of preference stock seems likely.

Mr. Plummer has spent almost his entire summer at the Sydney plant, in constant attendance, watching the working out of the plant under the new extensions which have only been in operation since June 1. He is confident that it will in the ultimate do what is promised of it.

Last year, with net earnings of $4,714,057, the corporation only earned at the rate of 4.30 per cent. on the common stock outstanding, a mere fraction of a margin over the quarterly dividend, as critics were quick to point out. If the corporation can earn this year an additional $1,000,000, as Sir Henry Pellatt has predicted, the financial position would be very substantially altered.

However, the corporation is face to face with the recent reductions in the price of steel products in foreign markets. It is admitted that this may mean a little hardship for a time—and it would seem that the present moment was particularly unfortunate—but Mr. William McMaster, vice-president of the corporation, in an interview, expressed the opinion this week that the situation need not be looked upon with undue concern.

Mr. McMaster does not think that these reductions will have a permanent effect on the steel industry of Canada. It was brought about by a dullness which had come over the market, as an effect of the world wide monetary stringency of the past few months.

"I have known half a dozen such periods," he said, "when steel prices were down to the low level. But every time they have come back equally strong."—Financial Times.

THE NANAIMO STRIKE.

Judge Howey passed sentence recently on more than two score Nanaimo rioters. The maximum sentence was two years. Many union officers will spend the next year in jail.

Three men and two boys were sentenced to serve two years in the penitentiary, twenty-three were given imprisonment for one year and fined $100 each, and eleven were sent to jail for three months and will have to pay a fine of $50 each. All sentences date from the time of arrest. This means that those sentenced to serve three months will be liberated in about thirty days' time.

Those sentenced to serve two years are: J. J. Taylor, Vice-President of the British Columbia Federation of Labour and Vice-President of the Ladysmith local of the Union Mine Workers of America; Samuel Guthrie, President of the Ladysmith Union; Paul Heaconink, a leader, and two boys, John Morgan, son of a prominent mine foreman, who was also given a jail term, and William Simpson, jr., son of a mine contractor.

Taylor and Guthrie pleaded guilty to having taken part in the disturbances, and gave as their excuse that they headed processions of the union miners which led to disturbing the peace.

One Year Sentences.

A sentence of one year in jail and $100 fine was imposed upon John Allsopp, J. H. Armstrong, Carl Axelson, E. F. Saugman, William Baul, George Baul, George Baumgartner, Sam Brightman, James Colley, Robert Castar, Peter Kluska, H. H. Langdon, Duncan Mackenzie (Secretary of the Ladysmith Union), Joseph Mairs, jr., James Marshall, Charles Mortimer, Steve Merue, Steve Puyanich, George Porter, William Stackhouse (formerly a lieutenant in the United States army, and a prominent business man of Ladysmith); Martin Stogar, James Wallace, Robert Walkinshaw, and Charles Yogle.

Baul served last year on the Ladysmith City Council, and has for years been closely identified with public movements. He declared in his defence that he had not been out of the house at the time he was accused of taking part in the disturbances.

In connection with those sentenced for participating in the riot, George Pettibrew, International Board member and Organizer of the United Mine Workers, and Walter Nelson, a miner, on a charge of intimidating John Weeks, a mine boss, were found guilty and sentenced to two months in jail.

To Call Strike Off.

In connection with the coal miners' strike on Vancouver island, it was reported recently that the international headquarters of the Miners' Union have ordered Frank K. Farringdon, an American lawyer unionist, who came to British Columbia and handled the official end of the strike, to stop the strike and have the men return to work. It is said Farringdon tried to stop it, but has failed.—The Globe.

The Granby Consolidated Mining, Smelting & Power Co., Ltd., is putting in a new water supply system for its copper smelting works near Grand Forks, Boundary district. A reservoir has been constructed at a higher level than that of the works and connection made by pipe-line with a small lake in the mountains, distant a mile and a half from the smeltery. The supply of water will be practically unlimited and the pressure will be ample for all purposes.

STATISTICS AND RETURNS

DOMINION COAL OUTPUTS.

The Dominion Coal Company's production is maintaining a steady advance over last year's figures, although the capacity of the mines is greater than the outputs actually produced, which are being limited by an insufficient labour supply. In September the production was 407,532 tons, comparing with 380,084 tons in September, 1912. The output for the first nine months of the year totalled 3,527,707 tons against 3,321,362 tons in the same period of 1912, showing an advance of over 200,000 tons to the end of the third quarter. The production for October to the fifteenth of the month was 217,000 tons, and for the month the outputs will probably total 435,000 tons, or 10,000 tons greater than the record of 425,000 tons achieved in July last.

From present indications it is probable that the production for 1913 will reach 4,750,000 tons. The steady increase in the tonnage obtained from the Glace Bay collieries may be seen from the following tabulation.

Year.	Production in tons.	No. mines on full production
1908.	3,555,068	10
1909.	2,734,774 (strike)	11
1910.	3,526,754	12
1911.	3,984,749	13
1912.	4,513,269	15
1913.	4,750,000 (Est.)	18

The workings of No. 17 colliery are practically unwatered, but it is not probable that any large amount of coal will be mined in 1913. By next spring, however, the colliery should rank as an important producer. The railway branch to this mine is approaching completion, and fifty miners' houses are about ready for occupation.

No. 11 colliery, which was unwatered only this year, is now producing between 7,000 and 8,000 tons monthly, and will continue to rapidly increase in output.

No. 22 colliery has now an electrically driven air-compressor and is equipped with mining machines. The output, which is at present running around 6,000 tons per month, will rapidly increase, and by next spring this colliery should be producing between 12,000 and 15,000 tons monthly.

NINE MONTHS' DIVIDENDS.*

In no other nine months' period in the history of American mining and metallurgy have mines and works shown as large dividend disbursements as those in the period just ended. And this too, despite the general belief that the present year has not been a profitable one as relating to mining. When 146 companies, looking to the operations of mines for their profits, can pay in nine months, $78,772,652, it would seem that there has been little reason for the pessimism prevailing. Compared with the same period in 1912 there is shown an increase in the amount of dividends paid of $12,972,109, and with 1911 an increase of $17,993,232. In the 1913 period 146 companies participated, while in 1912 there was 138, and in 1911, 123. In total dividends paid the 146 companies paying dividends in 1913 have to their credit disbursements amounting to no less than $896,232,195.

The copper properties, 34 in number, have had a particularly satisfactory nine months' period, despite the strike in the Lake Superior region, for dividends were paid totalling $38,270,115. This shows an increase over the same period in 1912 of $9,449,687. Since incorporation these companies have divided among shareholders $420,434,064.

The properties classed as gold-silver-lead-zinc producers, too, have had a fairly prosperous nine months' period, for 106 of these yielded profits sufficient to pay to shareholders $28,406,999. To date these companies have paid dividends totalling $333,097,467.

Six metallurgical companies disbursed during the period $12,095,538 and 10 securities-holding corporations $18,707,042.

The accompanying table gives the amount of dividends paid by Canadian companies during September, the date of payment and the amount per share.

September Dividends.	Sept.	Amount per share.	Total
Crown Reserve, Ont.	15	.02	39,999
Granby, B. C.	2	1.50	224,977
Hedley, B. C.	30	.50	60,000
Hollinger, Ont.	2	.15	90,000
Hollinger, Ont.	30	.15	90,000
International Nickel, com. . .	2	2.50	195,000
Kerr Lake, Ont.	16	.25	150,000
Timiskaming & Hudson Bay	22	3.00	23,283
Yukon Gold	30	.07½	262,500

COBALT SHIPMENTS.

The ore shipments for the week ending Oct. 18, were:

	High	Low.	Total
Nipissing.	0	2	131,610
McKinley.	1	0	65,900
Cobalt Townsite	1	0	76,700
Cobalt Lake	1	0	64,090
Totals.	3	2	338,300

The bullion shipments for the week ending Oct. 18 were:

Mine.	Bars.	Ounces.	Value.
Nipissing.	72	85,055.05	$50,843.13
Buffalo.	60	60,802.00	37,000.00
Crown Reserve	59	64,004.00	38,401.00
Dom. Reduction	19	21,489.00	13,108.00
Wettlaufer.	14	11,154.00	6,832.00
Trethewey.	3	1,670.00	1,018.00
City of Cobalt	3	1,053.00	649.00
	230	245,227.05	$147,851.13

The bullion shipments for the year to date, are:

	Ounces.	Value.
Nipissing.	4,834,991.38	$2,770,722,58
Penn-Can.	14,141.60	8,456.90
Buffalo.	1,301,409.00	809,301.57
Crown Reserve	428,060.00	261,278.25
Dom. Red	373,672.40	216,385.15
Townsite.	36,818.40	30,364.04
Miscel.	3,920.00	1,623.90
Timiskaming.	25,561.70	14,023.04
O'Brien.	146,542.77	78,423.66
Wettlaufer.	15,869.00	9,757.00
Miller Lake	3,710.20	2,053.01
Colonial.	635.00	374.00
Trethewey.	15,199.83	9,300.04
Casey Cobalt	2,394.00	1,520.00
Kerr Lake	67,817.79	40,873.48
Bailey.	1,839.00	1,103.40
Cobalt Lake	1,717.80	996.36
City of Cobalt	2,808.45	1,702.00
Preston E. D.	3,452.60	2,002.50
Cobalt Comet	2,432.65	1,426.13
Lumsden.	1,814.40	1,079.00
Beaver.	1,837.00	1,138.94
	7,291,826.88	$4,316,650.75

*—Mining and Engineering World, Chicago.

MARKETS

STOCK QUOTATIONS.

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

October 22, 1913.

New York Curb.

	Bid.	Ask.
American Marconi	4.25	4.50
Alaska Gold	23.75	24.00
British Copper	2.37	2.50
Braden Copper	7.25	7.37½
California Oil	188.00	191.00
Chino Copper	41.00	41.50
Giroux Copper	1.12	1.37
Green Can.	5.50	6.50
Granby.	73.25	73.50
Miami Copper	23.12½	23.25
Nevada Copper	15.75	16.00
Ohio Oil	129.00	131.00
Ray Cons. Copper	19.12½	19.25
Standard Oil of N. Y.	145.00	147.00
Standard Oil of N. J.	378.00	380.00
Tonopah Mining	1.62	1.75
Tonopah Belmont	7.18	7.31
Tonopah Merger	.59	.60
Inspiration Copper	15.25	15.37½
Goldfield Cons.	1.37½	1.50
Yukon Gold	3.12	3.30

Porcupine Stocks.

	Bid.	Ask.
Apex.	.00½	.00¾
Dome Extension	.06	.07
Dome Lake	.16¾	.17
Dome Mines	9.75	10.25
Eldorado.	....	.01
Foley-O'Brien.	.18	.19
Hollinger.	16.25	17.50
Jupiter.	.09¾	.10
McIntyre.	1.90	2.00
Moneta.	.02	.04
North Dome	....	.40
Northern Exploration	.50	1.00
Pearl Lake	.12¾	.13
Plenaurum.	.40	.80
Porcupine Gold	.14	.14½
Imperial.	.01¾	.02
Porcupine Reserve	....	.06
Preston East Dome	.01½	.02
Rea.	.15	.20
Standard.	....	.01
Swastika.	.03	.03¼
United.	....	.01
West Dome	.08	.10

Cobalt Stocks.

	Bid.	Ask.
Bailey.	.07¾	.07⅞
Beaver.	.30	.31
Buffalo.	2.10	2.23
Canadian.	.16	.22
Chambers Ferland	.13	.14
City of Cobalt	.25	.35
Cobalt Lake	.48	.60
Coniagas.	6.90	7.10
Crown Reserve	1.65	1.70
Foster.	.04	.05
Gifford.	.01½	.02
Gould.	.04¼	.04½
Great Northern	.11	.11½
Hargraves.	.02	.02½
Hudson Bay	68.00	72.00
Kerr Lake	3.90	4.00
La Rose	2.00	2.05
McKinley.	1.38	1.40
Nipissing.	8.30	8.50
Peterson Lake	.27	.27½
Right of Way	.04	.05
Rochester.	.02½	.03½
Leaf.	.02	.02½
Cochrane.	.30	.50
Silver Queen	.03	.06
Timiskaming.	.15½	.16
Trethewey.	.30	.32
Wettlaufer.	.06	.09
Seneca Superior	2.60	3.00
Porcupine Crown	1.30	1.31
Teck Hughes	.26	.28

TORONTO MARKETS.

Oct. 24—(Quotations from Canada Metal Co., Toronto).
Spelter, 5 cents per pound.
Lead, 5.75 cents per pound.
Tin, 43 cents per pound.
Antimony, 8½ cents per pound.
Copper, casting, 17½ cents per pound.
Electrolytic, 17½ cents per pound.
Ingot brass, 11 to 15 cents per pound.

Oct. 24—Pig Iron—(Quotations from Drummond, McCall & Co., Toronto).
Summerlee No. 1, $26.00 (f.o.b. Toronto).
Summerlee No. 2, $25.00 (f.o.b. Toronto).

Oct. 24—(Quotations from Elias Rogers Co., Ltd., Toronto).
Coal, anthracite, $8.00 per ton.
Coal, bituminous, lump, $5.25 per ton.

GENERAL MARKETS.

Oct. 22—Connellsville coke (f.o.b. ovens).
Furnace coke, prompt, $2.00 to $2.15 per ton.
Foundry coke, prompt, $2.75 to $3.00 per ton.

Oct. 22.—Tin, straits, 40.60 cents.
Copper, Prime Lake, 16.87½ to 17.00 cents.
Electrolytic copper, 16.65 to 16.80 cents.
Copper wire, 17.50 to 17.75 cents.
Lead, 4.35 to 4.40 cents.
Spelter, 5.40 cents.
Sheet zinc, (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 7.50 to 7.60 cents.
Aluminum, 19.75 to 20.25 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $44.50 to $45.00 per ounce.
Platinum, hard, $50.00 to $51.00 per ounce.
Bismuth, $1.95 to $2.15 per pound.
Quicksilver, $38.00 per 75-lb. flask.

SILVER PRICES.

	New York cents.	London pence.
Oct. 11.	61¼	28¼
" 13.	..	28¼
" 14.	61⅜	28 5/16
" 15.	61¼	28¼
" 16.	61¼	28¼
" 17.	61⅛	28¼
" 18.	61⅛	28¼
" 20.	61¼	28 5/16
" 21.	61⅛	28¼
" 22.	61	28 5/16
" 23.	60¼	27 13/16