

THE CANADIAN MINING JOURNAL

VOL. XXXV.

TORONTO, January 15, 1914.

No. 2

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office - - - 2nd Floor, 44 and 46 Lombard St., Toronto
Branch Office - - - - - 34B Board of Trade Building
London Office - - - - - Walter R. Skinner, 11-12 Clement's Lane
London, E.C.

Editor

REGINALD E. HORE

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

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

CIRCULATION.

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

CONTENTS JANUARY 15.

	Page
Editorial—	
Western Federation Methods	37
Mining in Ontario in 1913	39
The Coal Trade of Nova Scotia in 1913. By F. W. Gray..	40
The Mineral Industry in Quebec in 1913: By Theo. C. Denis	44
British Columbia in 1913. By E. Jacobs	46
Coal Mining in British Columbia in 1913. By E. Jacobs....	48
Rock House Practice of the Quincy Mining Company. By	
T. C. De Sollar	51
Western Federation Strike in Michigan	55
The Hudson Bay Exploring Expedition, 1912. By J. B.	
Tyrrell	61
Personal and General	64
Special Correspondence	66
Markets	72

WESTERN FEDERATION METHODS

Miners in Canada and the United States who belong to the Western Federation of Miners or the United Mine Workers have good reason to be disgusted with the way in which these organizations are being conducted. In Michigan the Federation and in Vancouver Island the United Mine Workers have, during the past year, added to unsavory reputations by deeds of violence and false accusations.

The strike in the Michigan copper district was called on July 23, 1913, by the Western Federation of Miners. As a very large number of the employes of the mining companies are not members of the Federation, bands of strikers were sent unexpectedly into the shops, and the workmen forced to quit. For two or three days the organized strikers controlled the situation, and terrorized the community. Their excesses were suddenly checked, however, by the prompt arrival of 2,500 soldiers, ordered to the district by Governor Ferris.

After several weeks of idleness, it became possible to open the mines again. Immediately the strikers began to abuse the men going to their work. Excited by the false teachings of their leaders, and encouraged by the liberties which the local courts allowed them, the strikers continued their unlawful practices.

In spite of the agitators, the forces at work increased. Then three workmen employed by the Copper Range Consolidated Company were murdered in their beds. The enraged citizens thereupon took a hand in affairs, and the Citizens' Alliance became a prominent factor in the struggle. At the request of the citizens, the grand jury was called upon to conduct an investigation. As a result, several of the agitators, rather than testify, hurriedly left the district, and the molestation of workmen ceased.

Then occurred the terrible calamity of Christmas eve when seventy-four people, mostly children and women, were killed in a panic at Calumet. These people had assembled for an entertainment given by the Women's Auxiliary of the Western Federation. While presents were being distributed to the little ones, someone in the hall raised a cry of fire, and the rush that followed resulted in an almost incredible loss of life.

Here was disclosed to the public the character of the president of the Federation. Without waiting for the facts to be ascertained, he hurried to send off telegrams, in which he insinuated that a member of the Citizens' Alliance had rushed into the hall and raised the cry of fire, which resulted so horribly. The fiendish cunning of the man was calculated to arouse sympathy throughout the country. It is no great credit to the

American newspapers, that several of them helped to spread Mr. Moyer's false assertions.

Not content with this performance, which might be expected to arouse the strikers to further and more terrible deeds of violence, Mr. Moyer shocked the community by ordering the families of the victims of the disaster to accept no aid from the Relief Committee, which had been hurriedly organized by the citizens. Subscriptions amounting to \$25,000 were soon received by this committee, and the members endeavored to give immediate help to those in need. In spite of the fact that many of the families are in great distress, they are afraid to accept any aid from the committee.

There is little in the strike of miners in Michigan to suggest that its object is the betterment of conditions for the workmen. The demands which have been made, in so far as they relate to improved conditions, have already been met. The one demand which has not even been considered is that the Western Federation be recognized as representing the employes. There were last July many reasons why this demand should be refused. There are now several hundred more reasons, and the recent acts of Mr. Moyer are among them.

To Canadians the strikes on Vancouver Island and in Michigan have important lessons. It is recognized in the mining industry that the men should have the right to organize and by any lawful means endeavor to obtain higher wages and improved conditions. Most of our miners are foreigners, and many of them are not in the habit of studying conditions very carefully. It is natural for them to leave the leadership in labor disputes to the officers and agitators of the labor unions. The unfortunate fact is that the officers of the two unions allied with the American Federation of Labor have proven and are proving themselves unworthy.

Under the circumstances it is not surprising to learn that the Michigan mine managers have refused to recognize the Federation, and that the men at work, who far outnumber the men on strike, have asked that Federation members be not employed in the mines.

The excuse given for calling the strike is that the men should receive a minimum wage, that the length of shift should be reduced to eight hours, and that the one-man drill should be abolished.

The objection to the one-man drill is nonsense. The eight-hour shift is required by law, and was put in force before it was required. The adoption of a minimum wage for all the mines, would, in the opinion of those who know the conditions, be unfair to several of the companies.

It is evident, therefore, that the object of the strike is recognition of the Federation. According to the union officers the number of members of the Federation in the copper district when the strike was called

was 9,000, and 7,600 voted in favor of a strike. If we assume that the figures are reliable and that they mean that two-thirds of the 13,500 men employed by the copper mining companies are members of the Federation, there seems to be some reason for the Federation officers asking for recognition as representatives of the miners. If the officers have a clean record behind them and are able to show clearly that they voice the wishes of two-thirds of the employes, the mine managers should be willing to treat with them. The Western Federation is the only metal miners' union which the American Federation of Labor recognizes, and it is natural that the men prefer to join this organization on account of its national character.

To conclude that the mine managers should recognize the Federation it is necessary to assume that the Federation has a reasonably clean record and that a large majority of the employes of the Michigan copper companies are, or were on July 23, members of the Federation. Unfortunately for the strikers, neither of these assumptions is true.

R. W. BROCK TO BE DEPUTY MINISTER

A despatch from Ottawa states that Mr. R. W. Brock, Director of the Geological Survey of Canada, has been appointed Deputy Minister of Mines to succeed Mr. A. P. Low, who resigned some time ago. Mr. Brock, who has been Director of the Geological Survey since 1908, was formerly Professor of Geology at Queen's University. He studied at Toronto, Queen's and Heidelberg Universities, and joined the Geological Survey in 1897. His field work was chiefly in British Columbia, and he made a very useful study of the geology of the Rossland district.

Mr. Brock is well qualified for the position of Deputy Minister, and his friends will be pleased to learn of his appointment.

CASEY-COBALT.

A satisfactory report was presented to the shareholders of the Canadian Casey-Cobalt Mining Company in London last week. The company has had a prosperous year. Not only was the output of the property a little more than doubled, but considerable extensions were made in the plant. One feature was the building of a transmission line from New Liskeard, which enabled electrically driven equipment to be installed.

The mill was thus increased from a capacity of 30 tons a day to 80 tons a day. The total ounces shipped in 1913 were 607,621, as compared with 274,066 in the preceding year. The balance of \$317,636.23 was carried forward to the credit of profit and loss, out of which subsequently a dividend was paid of \$109,499.33. The total assets of the company, other than mining properties, at the end of the year, were \$457,612.45. The officers and directors were re-elected as follows: W. R. P. Parker, President; J. H. Watson, Vice-President; R. E. G. Van Cutsem and G. M. Clark; C. H. C. Leggett, Secretary-Treasurer.

MINING IN ONTARIO IN 1913

Ontario made a large production of metals and non-metals in 1913. The metal mining companies had a very successful year and the shareholders of stock in the leading producers received large amounts in dividends.

As in former years the chief metals produced were gold, silver, nickel, copper and iron.

Gold.—The production of gold was very much larger than in previous years, being more than double the production of 1912. The increase is accounted for by the good results obtained in mining the gold quartz deposits in the Porcupine district. Porcupine produced about \$4,000,000, and some, but a comparatively small amount of gold, was produced in the Kirkland Lake, Swastika, Larder Lake, Long Lake, and Sturgeon Lake districts.

The Hollinger and Dome mines are still by far the largest producers. The Hollinger has numerous large veins of ore, much of which is high grade. The Dome has enormous, but very irregular deposits of gold quartz, and the ore is considerably lower in grade than the Hollinger. During the year the Porcupine Crown Mining Company has completed and put into operation a simple and very successful cyanide plant. The ore bodies are relatively small but rich, and the mine is expected to be a good producer.

The McIntyre has also been shipping gold during 1913. The published reports indicate that the mine is being operated at a small profit.

Silver.—The silver output of Ontario, chiefly from Cobalt and neighboring districts, was in 1913 about the same as in 1912. In 1912 there was produced 30,719,883 oz.

In 1913, as in the previous years, leading producers were Nipissing, Coniagas, La Rose, Cobalt Townsite, Crown Reserve, Kerr Lake, McKinley-Darragh-Savage, Buffalo, and Cobalt Lake. Increases were made, however, by Seneca-Superior, the recent arrival among the large dividend payers, and the Casey Cobalt. The Timiskaming had a poor year and has comparatively little good ore in sight.

The Kerr Lake section of the camp promises to be an interesting one during the coming year. The lake has been successfully drained and rich ore found on the bottom. The satisfactory results obtained have added considerably to the value of the Kerr Lake and Crown Reserve properties.

The old Drummond mine has been satisfactorily opened up by the new owners, Caribou Cobalt Mining Company, and good ore found under the old workings.

At Cobalt the Northern Customs concentrator was sold and a new plant has been quickly built near the La Rose. The Northern Customs Company will treat the La Rose ore at the new concentrator. The old plant is now owned by the English syndicate controlling the Townsite, Casey Cobalt, Cobalt Lake, and City of Cobalt Mining Companies, and treats the ore produced by these companies.

Nickel and Copper.—The mining companies operating in the Sudbury district found a good market for their products during 1913, and increased their output. The Mond Nickel Company completed a splendid new smelting plant, which is now in operation.

The output for the Sudbury district in 1913 was about 36,000 tons of matte. The nickel content of the matte

was about 24,000 and worth, in the matte, about \$5,000,000. The copper, 12,000 tons, was worth about \$1,700,000. As usual, the Canadian Copper Co. was the largest producer. The International Nickel Co. paid in 1913 \$3,230,000 on common, and \$540,000 on preferred stock.

DIVIDENDS PAID BY ONTARIO MINING COMPANIES IN 1913.

Beaver	\$60,000
Buffalo	890,000
Caribou Cobalt	25,000
Cobalt Lake	315,000
Casey Cobalt	180,000
Cobalt Townsite	363,188
Coniagas	1,640,000
Crown Reserve	849,031
Hollinger	1,170,000
Kerr Lake	600,000
La Rose	936,641
McKinley-Darragh-Savage	1,033,937
Nipissing	1,800,000
Seneca-Superior	309,940
Timiskaming & Hudson Bay	163,000
Timiskaming	150,000
Trethewey	150,000
Wettlaufer	141,758

The International Nickel Co., controlling the Canadian Copper Company, and treating chiefly Sudbury nickel-copper ores, paid during 1913 \$3,230,000 on common and \$540,000 on preferred shares.

COBALT TOWNSITE.

At the annual meeting of the Cobalt Townsite Mining Company, Limited (Canadian company), in London, the auditor's report showed that during the eleven months ending with September, the net earnings of the company were \$629,622.80, as against \$512,081.91 for the preceding twelve months.

After payment of dividends amounting to \$375,000, a balance of \$458,988.46 was carried forward in profit and loss account.

The issued capital of the English company is slightly under £200,000, and between 70 and 80 per cent. of this capital has now been repaid in the form of dividends.

The profit and loss account is about 45 per cent. of the issued capital. The company is now treating 200 tons of low grade ore per day at the mill recently purchased from the Northern Customs Concentrators, Limited.

The total assets of the company, other than mining property, at the close of the year amounted to \$729,525.40. The total amount received from ore sales for the eleven months, plus the amount of ore in transit and at smelters, was \$1,350,594.20, while the average number of men employed during the year was 245.

The engineer's report showed the ore reserves to be in excess of those at the end of 1912, notwithstanding a production for the eleven months of 1,987,921 ounces of silver.

The officers and directors were re-elected as follows: W. R. P. Parker, President; J. P. Watson, Vice-President; R. E. G. Van Cutsem, G. M. Clark and Rupert Simpson.

THE COAL TRADE OF NOVA SCOTIA IN 1913

A RESUME

By F. W. Gray

Production.—For the first time the annual coal production of Nova Scotia has exceeded 7,000,000 tons. Approximate estimates, compiled at the beginning of December, show the coal output of the Province in 1913 to be in the vicinity of 7¼ million tons, an increase of 270,000 tons over 1912.

A tabulation of the production of the various coal companies compared for three years is as follows:

Production of Nova Scotia Coal Mines.

	Tons of 2,240 lb. Calendar Year.		
	1911.	1912.	1913.
Dominion Coal Company—			
Glace Bay Mines	3,895,000	4,513,269	4,750,000
Springhill Mines	266,000	419,096	378,000
Nova Scotia Steel & Coal Co.	780,000	841,528	826,000
Acadia Coal Company	370,000	435,654	536,000
Inverness Coal & Railway Co.	281,000	279,318	292,000
Intercolonial Coal Co.	263,000	235,859	188,000
Maritime Coal & Railway Co.	160,000	140,000	150,000
Colonial Coal Company	30,000	36,897	67,000
Minudie Coal Co.	105,000	60,000	60,000
Cape Breton Coal, Iron & Ry. Co. ....	.....	.....	10,000
Miscellaneous .....	.....	.....	.....
	<u>6,250,000</u>	<u>6,961,619</u>	<u>7,257,000</u>
Cape Breton Island.....	5,000,000	5,671,012	5,945,000
Nova Scotia Mainland	1,250,000	1,290,607	1,312,500

Cape Breton Island produced in 1913, 5,945,000 tons, or 82 per cent. of the entire Provincial output, the percentage being identical with that of 1912.

The combined outputs of the collieries controlled by the two large Cape Breton companies, i.e., the Dominion Coal Company and the Nova Scotia Steel & Coal Co., total 5,954,000 tons, or 82 per cent. of the Provincial output, compared with 84 per cent. in 1912.

The production of the Dominion Coal Company's collieries in Cape Breton and on the Mainland was 5,128,000 tons, or 70 per cent. of the entire Nova Scotian output, against 72 per cent. in 1912. The preponderance of the two large companies is not, therefore, quite so marked as in the previous year.

In 1912, as compared with 1911, the whole of the increase came from the Dominion Coal Company's collieries, but in 1913 the Acadia Coal Company share notably in the additional production.

In the resume for 1912, the writer predicted that 1913 would not see any remarkable rise in the outputs of the Province, and that the Dominion Coal Company and the Acadia Coal Company would provide the greater portion of the expected additional tonnage. This expectation was fulfilled by the actual figures. It was further forecasted that the developments projected at the mines of the Nova Scotia Steel Company and the Inverness Coal & Railway Company would not add greatly to production until 1914. It now appears as if this expectation would be fulfilled in part only, and it is not probable that the production of the Province in 1914 will exceed 7,500,000 tons, but it should reach that figure if trade conditions are favorable. It also seems very probable that the additional tonnage will be largely contributed by the smaller companies and

that the percentage of the two larger companies will decline still further. If history repeats itself, and the financial stringency of 1913 is followed by a recession in trade such as followed in 1908 after the decline in securities in 1907, it may be that the outputs of 1913 will not be exceeded.

Accidents.—There were no accidents during the year involving serious loss of life, but there was unfortun-

ately a decided increase in the number of single fatalities, particularly those caused by falls of roof and sides. It is hoped that the occurrence is merely sporadic and is not an indication of a permanent increase. It cannot be said that the increase is due to any increase in the percentage of foreign laborers employed, as the number of foreign miners fatally injured does not exceed the number of native miners who were the victims of accident.

The Commission appointed by the Nova Scotia Government to investigate the flooding of mines from the sea in Inverness County reported to Parliament in the spring, and their findings were issued as a Sessional Paper. The burden of the report was contained in a recommendation that in future "every reasonable means should be employed to ascertain the depth, nature and condition of the overlying strata before pillars are extracted in any submarine area."

The plant of the Port Hood Colliery has been dismantled, and it is extremely improbable that any attempt will ever be made to unwater the flooded workings.

Underground Fires.—The production of coal in 1913 was much reduced by the occurrence of no less than three serious underground fires. The first fire occurred in No. 3 mine at Springhill on Christmas Eve, 1912, and necessitated the sealing off of a portion of the producing workings. Although the sealed-off area has not been as yet reopened, there is every indication that the fire is extinguished.

The Intercolonial Coal Company encountered a spontaneous outbreak of fire in the Drummond Colliery at the end of February, which, as at Springhill, rendered it necessary to seal off the affected section, and resulted in the loss of producing faces.

The Acadia Coal Company, in June, had a fire in the Albion Mine, which was fought for over two weeks, and at times presented a very serious aspect. In fighting this fire Draeger oxygen apparatus was used to great advantage, under conditions of extreme difficulty. It is the deliberate opinion of those who succeeded in extinguishing the fire—and among these were the most seasoned fire-fighters in Nova Scotia—that without the aid of the oxygen apparatus the fire could not have been subdued. In connection also with the Springhill fire Draeger apparatus have rendered effective service. In several instances during the year it has been proved that chemical fire extinguishers can be very useful in dealing with incipient mine fires.

The Acadia Coal Company, although greatly hindered by the Albion Mine fire, increased its production by 100,000 tons. The new hoisting engine at the Allan Shafts was completed and put into operation during the year, and is now hoisting four-deck cages. The Albion Mine is being entirely operated by electricity. A reduction in the colliery coal consumption from 75,812 tons in 1912 to 56,512 tons in 1913 has been effected by the economies which the electrical installation has rendered possible. To reduce colliery consumption 25 per cent. and increase the output by almost the same percentage is a noteworthy advance.

The output of the Intercolonial Coal Company was seriously interfered with by the fire previously referred to. Operations have been resumed in the second seam, and the management are hopeful of increased output in 1914.

An interesting feature in connection with the mines in the Pictou field is the apparent non-existence of the so-called McCullough Fault. The workings of the Acadia slopes and those of the Drummond mine are vertically underneath those of the Albion mine, which lies on the other side of the hypothetical fault line, and it is more than ever evident that the structure of the Pictou coalfield is not thoroughly understood.

The Springhill mines suffered a reduction in the year's output of some 40,000 tons when compared with 1912, due to the restriction caused by the fire previously mentioned. An air compressor and additional boiler capacity have been provided here during the year. Diamond-drill prospecting was carried on throughout the year, but as yet no commencement has been made on the projected new slopes.

The Maritime Coal Railway & Power Company show an increase in output over 1912 of approximately 10,000 tons. This company has been vigorously developing and the management expect to increase the daily output up to 1,000 tons by the middle of 1914. The mine is being equipped with electrical coal-cutters and electrically-operated haulages.

The production of the Minudie Coal Company during 1913 was about the same as in 1912. This company is opening up two new seams, and it is expected to double the output during 1914.

The Inverness Railway & Coal Company are now the only company mining coal in Inverness County, Cape Breton. This company's output for 1913 was the largest it has yet produced, and shows an increase on the previous year of about 13,000 tons. In 1914 the management hope to exceed 300,000 tons. A very large and powerful hoisting engine, the largest in the Province, was installed and put into operation, and is said to be giving perfect satisfaction.

Dominion Coal Co.—The estimate of the probable production of the Glace Bay mines of the Dominion

Coal Company in 1913, given in the 1912 resume, was that it would be between 4,700,000 and 4,800,000 tons. The actual production will be approximately 4,750,000 tons, an increase over 1912 of almost 250,000 tons. A comparison of the outputs by collieries over the past three years is as follows:

No.	1911.	1913.	(Est.) 1913.
1.....	577,405	584,834	536,000
2.....	755,879	817,447	812,000
3.....	171,431	131,459	119,000
4.....	392,727	423,798	394,000
5.....	324,511	266,966	220,000
6.....	254,975	274,942	262,000
7.....	194,529	202,189	224,000
8.....	178,824	155,228	80,000
9.....	408,869	430,670	394,000
10.....	183,992	216,467	199,000
11.....	.....	.....	45,000
12.....	281,407	329,586	354,000
14.....	184,544	321,946	417,000
15.....	40,292	148,186	222,000
16.....	17,963	130,862	260,000
21.....	17,391	57,891	152,000
22.....	.....	20,798	60,000
Total.....	3,984,749	4,513,269	4,750,000

No. 7 colliery was the only one of the older mines that exceeded previous figures, and the entire increase comes from the Waterford and Birch Grove collieries, that is, from Mines Nos. 12 to 22 inclusive. All through the summer the Glace Bay mines were hampered by a shortage of workmen, and, although the increase in production is a handsome one, seeing that it followed an increase of 530,000 tons over 1911, it does not really represent the capacity of the mines, given a plentiful labor supply. Daily outputs of over 18,000 tons were numerous during the summer. The largest single day's output yet recorded was 18,956 tons, towards the end of November.

During the year the Emery seam near No. 3 colliery was reopened, and a new colliery, No. 11, has been equipped, and is now producing up to 300 tons per day.

The permanent bankheads at No. 16 and No. 22 collieries were completed, and at the present time, with the exception of the large electric hoist to be installed at No. 15 and No. 16 collieries the operating collieries in the Glace Bay district, seventeen in number, are all fully equipped and developed. Collieries which may be expected to increase in outputs are Nos. 11, 15, 16 and 22.

No. 17 colliery is unwatered, and is now ready to produce coal. It is not likely, however, that any large quantity of coal will be hoisted until the spring of 1914.

The power station which serves the Waterford collieries has received a second generating unit, and an additional Bettington boiler, making four in all of this type, is about completed. Two batteries of Babcock and Wilcox boilers are in process of installation at this station, and are expected to be under steam about March of next year. The power station is designed to hold a third generating unit, the installation of which will probably not be long delayed.

The new Baum coal-washer at Sydney was in successful operation during the year.

The new shipping pier on Sydney Harbor was completed for use at the opening of navigation, and has enabled very satisfactory despatch to be given to shipping. There were days in the shipping season when the combined output of the mines and the coal-storage

banks approached 25,000 tons in a day of nine hours, but everything went with remarkable smoothness, and there were few avoidable traffic delays. The new pier helped very largely to make this satisfactory state of affairs possible.

Whether the mines of the Dominion Coal Company can work to full capacity during 1914 will depend on trade conditions, but present indications would justify the assumption that 1914 outputs would exceed those obtained in 1913. If the mines work to full capacity the production might reach 4,900,000 tons during 1914.

Nova Scotia Steel & Coal Co.—The Nova Scotia Steel & Coal Company's output shows a slight reduction from that of 1912. The Jubilee shaft has been reopened and unwatered and is now producing 300 tons per day. A new shaft is being sunk on the same seam. Sinking is progressing favorably and is down about 160 ft. at the time of writing. The new shaft is intended for hoisting coal, and when completed the shaft now in use for this purpose will be used as an air-shaft.

This company has under construction a Baum coal-washer to have a capacity of 750 tons per ten hours. It is anticipated that the washer will be completed early in 1914.

The Colonial Coal Company have made great advances in their production, having increased their output from 36,897 tons to 67,000 tons. More than half of the year's output has been briquetted. This company have installed a briquetting plant at each of their collieries, and it is stated the briquettes are meeting with a ready sale, particularly for railway use.

The Cape Breton Coal, Iron & Railway Company are now producing a small output from the Broughton colliery. Arrangements have been made with the Dominion Coal Company to transport the Broughton coal over the Sydney & Louisburg Railway for shipment over the Louisburg Pier. It is probable that this company's output will reach 100,000 tons in 1914. A railway branch some four miles in length is under construction from the Broughton colliery to the site of a proposed pier on Mira Bay.

Royalties.—The importance of the coal industry in the welfare of Nova Scotia has never been so clearly apparent as in looking forward to the prospects for 1914. The direct yield in coal royalty payments to the Provincial revenue in 1913 will approximate \$900,000, as not only is the production the largest in the history of Nova Scotia, but the tonnage royalty is now 12½ cents throughout the Province. Up to January 1, 1913, the royalty was 10 cents per ton, the Dominion Coal Company alone excepted.

Costs Increasing.—A number of coal companies have, within the past five years, disappeared from the operating lists, through physical disaster or financial difficulties, but the companies now operating are all well-established and in a position to extend their production if trade conditions will allow. Nevertheless, the conditions attending coal mining in Nova Scotia, particularly in Inverness County and on the mainland, are becoming yearly more difficult, and coal mining is further being affected by the increased cost of wages and materials that characterizes the present time. The operator's margin of profit is in many cases very slight, and in some cases there is an actual loss to the operator. The companies whose product is being sold in the St. Lawrence markets are meeting severe competition from United States coal, and at the mines they have to face increased operating expenses in every particular.

The duty on coal passing inwards to the United States, has been removed, but so far as Eastern Canada is concerned, the retention or removal of this duty is immaterial and of no effect, except in so far as it may be used as an argument in favor of allowing United States coal to reciprocally enter Canada without Customs duty. To those who meet this argument it may be pointed out that the existing market for Nova Scotian coal is held by virtue of the duty, and of that alone. If the duty is ever abrogated the Nova Scotian coal trade will irrecoverably collapse, and could not be revived even if the impossible were to happen, and Canada were to become a State in the Union. So far as Nova Scotia is concerned, the much-talked-of New England coal market does not exist, as under conditions prevailing now and in the future, West Virginia and Pennsylvania coal can always be sold there at prices below the lowest possible price at which Nova Scotia coal can be delivered and show a profit. One thing that Nova Scotia will always demand of the Federal Parliament is the retention of the coal duties, as if these were removed it would be extremely difficult to see any reason why Nova Scotia should remain in the Confederation.

Legislation.—In connection with legislation affecting the coal mining industry there is little of any importance. The Federal Government have enacted an Explosives Act which deals principally with the manufacture, transportation and storage of explosives, and should have a salutary effect on the quality of explosives, as it provides for Government tests and the preparation of a list of "permitted explosives," as is now required in Great Britain and in the United States. Now that explosives are being manufactured on a large scale in Canada, such a federal enactment was certainly due and necessary.

The Dominion Parliament are also understood to have under consideration a unified Mines Act, which has been prepared after consultation with the Provinces, and has the endorsement of the Canadian Mining Institute. This Act will presumably deal with questions of location and discovery and rights of tenure, and will affect more particularly gold and silver and metal mining. Its bearing on the coal industry will be remote, and it is not, of course, in any sense a Mines Regulation Act.

The Provincial Assembly at the last session appointed a small commission to formulate regulations covering the use of electricity in mines. The existing Coal Mines Regulation Act does not deal with this question, which is now of very considerable importance because of the general use of electricity at the coal mines, both above and below ground. The commission has not yet reported.

Examinations.—The Commissioner of Mines has issued more stringent regulations for the guidance of the Workmen's Boards of Examiners for certificates of competency for miners, shot-firers and examiners. Provision is made for notices in languages other than English, and for examination through interpreters. The fee for a certificate is increased from 50 cents to 75 cents, and the receipts are forwarded monthly to the Commissioner's Department. Formerly, the examiners retained the fees for their own remuneration, but under the new arrangement, which is far preferable, they are paid a salary.

Reading Rooms.—An interesting and commendable innovation during the year was the visit of representatives of the Reading Camp Association, two of whom were located in the Glace Bay district throughout the summer. The special mission of this association is to

supply suitable literature at mining and lumber camps, and to teach foreigners the English language, and generally to improve the status of the immigrant laborer. The tents at Glace Bay were appreciated and did excellent work. It is deplorable, but true, that throughout the mining towns of Nova Scotia there is an utter lack of anything in the way of reading rooms or recreative institutes for the use of workmen. There is not a free library nor a public bath in any mining town in the Province.

Labor matters have been tranquil during the year. The Acadia Coal Company had a dispute with their men which was amicably settled by a Board of Conciliation appointed under the Lemieux Act. The Dominion Coal Company and the Provincial Workmen's Association renewed their wage agreement until the end of 1916. The Coal Company granted an increase of six per cent. to all day-paid labor rated at under \$2 per day in and about the mines, thus raising the minimum rate of the ordinary laborer from \$1.60 to \$1.70 per day, and that of the shiftman from \$1.75 to \$1.85 per day.

The Nova Scotia Mining Society moved its headquarters from Halifax to Sydney, and is now established in nicely equipped rooms, where the society's library has been installed. The first annual meeting in the new quarters will be held early in 1914.

Technical Education.—A strongly supported movement is on foot in Sydney to provide a technical school to serve the needs of the large industrial population, of which Sydney is the natural centre. The Government mining schools at the various mining centres, and the evening technical classes in Sydney have been doing excellent work, but it is felt that an industrial centre of such importance as Sydney needs more commensurate equipment for vocational training, and that proper facilities should be available to enable those who have left school to continue their studies concurrently with their daily work, the course of studies being arranged to bear on the staple industries of the district. It is not proposed to provide anything in the nature of a college, but to have a commodious building with adequate equipment and staff, where the existing technical classes of Sydney can be amplified and co-ordinated, and ambitious artisans and miners can obtain the technical knowledge to which they are entitled. Considerable assistance is expected from the Federal grant, which, it is presumed, will be available when the recommendations of the Royal Commission on Technical Education are dealt with by Parliament. A forward movement in technical education is noticeable throughout the mining districts of Nova Scotia, and there will be very general disappointment if something tangible does not result from the labors and journeyings of the Commission.

Loss of Vessels.—Concerning freighting matters, although the number of vessels lost at sea was not so great as in 1912, the year was marked by the loss of the S.S. Bridgeport, with all hands, at the end of October. A sister ship, the Glace Bay, was wrecked in the spring, when engaged in the ore trade between Sydney and Newfoundland.

These two vessels were among the finest coal freighters afloat, each having a cargo capacity of 10,000 tons of coal, and they were modern ships in every particular.

New Brunswick Coal.—Although this article purports to deal with the coal trade of Nova Scotia, a reference to the coal developments in New Brunswick will not be out of place. The only coalfield in that Province

is the Grand Lake field, in many respects an interesting deposit. It has on several previous occasions been described in the columns of this journal. This coalfield is so far removed from other coal deposits that it possesses a value it would not have if the occurrence were nearer to the Nova Scotian fields. So far as is known, and the fact is practically proved, there is only one seam. It is of fair quality, varying from 16 inches to 24 inches in thickness, and lies almost flat under a thin cover which does not anywhere exceed sixty feet.

A considerable development is now taking place near Minto. Six different companies are now operating on the seam. During the past eighteen months the Minto Coal Company has been vigorously opening up their areas. At the beginning of the year this company had five shafts from which they were obtaining an output of from 150 to 200 tons per day. The output is now 300 tons, and the company is contemplating the installation of plant to give them a minimum output of 500 tons per day during 1914. Among the smaller companies may be mentioned the Kings Mines and the Rothwell Company. Each of these companies is now putting out from 50 to 80 tons daily. The Rothwell Company are putting in coal-cutting machines and hope to increase their output.

Compared with the large outputs of the Nova Scotian collieries these figures seem very small, but bearing in mind the peculiar nature of the deposit, and its distance from any other coalfield, the present developments doubtless have great local importance.

Geological Congress Excursion to Maritime Provinces.

A feature of the year was the visit of a section of the International Geological Congress to the Maritime Provinces, the most interesting portions of the trip being naturally those connected with the coal deposits. A notable outcome of this Congress is the monograph on the "Coal Resources of the World," published by Morang & Co., of Toronto, and edited by members of the Geological Survey of Canada, assisted by leading mining engineers of the Dominion. The work is monumental in its scope, and is particularly valuable for the information it gives of the coal resources of Asia. It is an illuminating fact, and one of great pertinence to Canadians, to know that out of 496,846 million tons of anthracite coal, estimated to be the world's reserve of this most valuable class of coal, not less than 407,637,000 tons, or 82 per cent., are supposed to be in Asia. More significant still is the fact that the whole of this vast anthracite reserve lies in countries populated by the Mongolian races, and 95 per cent. of it lies within the Empires of China and Japan. Among the most interesting visitors to Nova Scotia from the Geological Congress were the two gentlemen from Japan, who prepared the portion of the monograph which deals with the coalfields of China and Japan. The maps in the Atlas relating to Canada are excellent, and particular reference may be made to the maps of the Maritime coalfields and the Sydney coalfield. A noticeable omission in the Atlas is that there are no maps of the coalfields of Germany, Belgium or Russia, and, presumably, the committee must have encountered difficulties, or such important coal-producing countries would have been included in the Atlas.

The Dominion Coal Company Employees' Benefit Society has about the same membership as at the end of 1912, namely, 11,000 members.

The income for 1913 was approximately \$152,000, derived as follows: Company and employees, in equal

proportions, \$128,000; Government of Nova Scotia, \$13,800, and interest on investments, \$9,300.

There was disbursed in weekly payments for relief the sum of \$86,000, or \$17,000 more than in 1912; for death claims \$9,600, against \$7,600 in 1912, and for widows and children of deceased members \$22,200, compared with \$16,700 in 1912, making a total disbursement of \$123,000.

At the end of the year there were dependent on the funds 122 widows and 319 children, an increase during the year of 36 widows and 26 children.

The cost of administration was \$5,300, or about three per cent. of the gross income, which compares

favorably with the cost of administering other societies of this nature.

The disbursements of the year, plus the accrued liabilities for dependents of members deceased during the year, take up practically the whole income of the year. This society has now been in existence almost four years, and has accumulated gross assets of about \$210,000, over and above current liabilities. The records are now sufficiently extended to enable the formulation of a permanent scheme, and the services of an eminent actuary have been retained to examine into the status of the society, and to advise as to what course shall be followed to ensure the permanence of the society and of its benefactions.

THE MINERAL INDUSTRY IN THE PROVINCE OF QUEBEC, 1913

Theo. C. Denis, Quebec.

Generally speaking, the conditions during 1913 have been favorable to an increase in the value of the mineral production of the Province of Quebec, as compared with 1912. As the Quebec Mines Branch collects the statistics for the year ending December 31st, returns from producers are not sufficiently complete before February to give more than generalities.

In the first place it is fitting to mention the International Geological Congress, which held its twelfth session in Canada in 1913, as one of the events of the year in connection with the mining industry. The importance which a convention of this character may have in calling the attention of the world to our natural resources in general, and to our mineral wealth and possibilities in particular, can hardly be exaggerated. Seven of the excursions of the Congress took place in the Province of Quebec, to mining districts and to regions of geological interest, and they were attended, with the keenest interest, by mining engineers and geologists representing fourteen foreign countries.

According to the revised figures collected by the Quebec Mines Branch, the mineral production in 1912 totalled \$11,187,110. It is probable that for the year now ending this figure will be increased to the vicinity of \$12,000,000.

The mining of Asbestos is the mainstay of the Quebec mineral industry. In 1912 our Province shipped 111,175 tons of asbestos fibre, representing over 80 per cent. of the world's supply, and everything points to an increase of production in 1913. The condition of the asbestos industry, although more satisfactory than it has been for the last four years, still leaves something to be desired. There are three main centres of production, Thetford-Black Lake, Danville, and East Broughton. Great activity ruled in the first two districts, but in East Broughton no work whatever was carried on during 1913, where formerly four important mining and milling plants were operated. The rock of East Broughton is rich in asbestos, but the fibre is disseminated and short, the market price of the product being correspondingly low. Only the mines which could produce a certain proportion of long fibre or "crude" could operate in 1913. An idea of how close the margin is may be gathered from the fact that in 1912 the shipments of asbestos were valued at \$3,059,084, on board cars at

shipping points. Of this, some \$500,000 came from "stock on hand" from an accumulation of the previous years, leaving a little over \$2,500,000 of asbestos extracted from 1,870,608 tons of rock, which was the actual quantity of rock mined during the twelve months of 1912. This has to cover mining and milling costs, fixed charges, and all inherent expenses of management, amortization, development work and sales organization.

Copper and Sulphur Ores.—There will be a marked increase in the shipments of copper and sulphur ores from the mines in the Eastern Townships. Everything points to a record year, and the probability is that they will reach 100,000 tons, valued at \$1,000,000, a proportional increase of 60 per cent. as compared with 1912. Although only two mines are operated, there is a very large territory over which the geological conditions are favorable to the occurrence of deposits similar to those worked at Eustis and at Weedon. Dr. J. A. Baneroff, of McGill University, has begun a study of these deposits and of the possibilities of the region. These investigations will be continued during the field season of 1914.

The metallic products of the Province of Quebec only enter for a small proportion of the total. In 1912 they constituted a little more than 6 per cent., and this will not be exceeded by much for 1913. And yet there are in our Province numerous possibilities of the existence of rich metalliferous deposits. Some development work was done on promising occurrences of gold near Lake Kienawasik, and on the Molybdenite deposits of Lake Kewagama, both in the Abitibi region, but no production was recorded.

Prospecting work was continued on the lead and zinc deposit near Notre-dame des Anges, in Portneuf County. This deposit is yet in the early stage of development, but gives promise of good results.

The iron industry has been at a standstill in the Province of Quebec for over two years, and the outlook for the future is not bright. The Canada Iron Corporation, which, apart from large interests in Ontario and in Nova Scotia, operated charcoal blast furnaces at Radnor and Drummondville for the production of high-grade pig iron, placed its affairs in the hands of a receiver pending a reorganization. It is said that the

abolition of the bounties on iron and steel went very hard with this company and they were unable to stand foreign competition.

Graphite.—We have again to record a disappointing year in the production of graphite. The mills of the Dominion Graphite Co. did not re-open during the year, and the shipments of graphite will be less than in 1912. The great difficulty encountered is in the concentration of the ore, so as to produce a high quality of flake graphite. The deposits are extensive; a large quantity of ten to fifteen per cent. ore could be counted upon, but as the graphite flakes are disseminated in a sillimanite gneiss, it is very difficult to eliminate the impurities.

Kaolin.—Work progressed satisfactorily on the Kaolin deposit at St. Remi d'Amherst, in the County of Labelle, and shipments were made to paper manufacturers, which offer a more remunerative market than china and porcelain works.

Structural Materials.—It is expected that the production of structural materials in 1913—stone, lime, brick, cement—will be equal to the previous year's. These figures constitute over 60 per cent. of the mineral production of the Province. They have grown in the last five years from 2¾ million dollars to about 7 millions. This is indicative of the development of the country.

Legislation.—An important amendment to the Quebec Mining Law is at present before the Provincial Legislature. It provides for the reduction of the price of mining land, from \$20 and \$10 an acre, to \$5 an acre. This measure is to meet the wishes of the prospectors, who prefer to own the land in fee simple, rather than hold it for a small yearly rental fee during the development stage, until proved to be worth the higher price previously set. This reduction in price will likely encourage prospecting in the regions north of the Transcontinental Railway.

DOME.

(Special Correspondence.)

Good progress is being made with the construction work at the Dome mill which is being enlarged by the addition of 40 stamps and the other necessary machinery. The enlarged mill will have a somewhat different treatment process from that now in use, by which all the product is slimed, the slimes being treated in pachuca tanks. A feature of the enlarged mill will be the use of the sand leaching treatment. The slimes will be treated with the present equipment. Eventually the slimes may be cyanided direct in the filter presses. Both the original plant and the addition have been designed and erected by the Merrill Metallurgical Company who have also had technical supervision of the milling operations.

During the past few months, the plant has shown a steadily increasing production and the tonnage treated has increased from 9,863 tons in April to 13,820 tons in November. It is understood that the tonnage for December will be approximately the same as for the preceding month, which constituted a record monthly production for the Porcupine district. This increase in tonnage treated is not due to changes of supervision or treatment in the mill; but is the result of overcoming the initial difficulties that are incident to the commencement of operations in any new property and to the gradual building up of an organization capable of the most efficient results.

CANADIAN ROUTE TO CHISANA (SHUSHANNA), ALASKA.

Mr. E. J. White, editor and publisher of the "Weekly Star," published at Whitehorse, southern Yukon, was in Victoria, B.C., a few weeks ago. The "Daily Colonist" printed the following report of what Mr. White said to its representative:

"The season just closed was a good one from a financial point for Yukon, especially the southern portion of the territory. At Whitehorse, which is situated at the northern terminus of the White Pass & Yukon Railway, and at the head of navigation on the Yukon river. The Atlas Mining Co., backed by English and Spokane capital, is developing a great mine in what is known as the Pueblo property which, for many years, has been owned and operated by Byron N. White, of Slocan Star fame, and which is now being operated under a lease from him. The company is shipping an average of 200 tons of copper ore daily for the past 20 months, and expects to largely increase the output by next spring. The ore is shipped to the Tacoma smelter.

"The rush to the Shushanna country the coming spring bids fair to almost rival that to the Klondike during the early days of Yukon," continued Mr. White. "At present fully 800 men are camped at various points along the trail between Whitehorse and Shushanna waiting until the trail is in fit condition for freighting. Both horses and dogs will be used, a 50-pound canine being worth at the rate of \$1 a pound when I left the North three weeks ago."

Asked as to the most feasible route for reaching the scene of the most recent strike, Mr. White said:

"The Yukon route by way of Whitehorse is the only safe and sane one by which the Shushanna can be reached in the winter season. Cordova, Alaska, is boosting its route, leading over the deadly Scolai pass, but experienced 'sourdoughs' are afraid of it. True, it is shorter than that by way of Whitehorse, but as it leads over glaciers nearly all the way, those who have travelled by both are unanimous in recommending the Canadian route."

To the foregoing may be added the following, taken from the "Weekly Star," report of an exhibition of pictures of the trails leading to the Chisana (Shushanna) country taken last summer by Dr. Leonard Sudgen, who endeavored to show the difficulties and hardships to be encountered by those who travel to the new goldfield:

"The pictures of the different outfits on their way to the gold-diggings were certainly good, and considering the circumstances under which they were taken, the doctor deserves great credit for his work. The scenes of the several glaciers along the way were awe-inspiring, and one got some idea of what it would be to cross a glacier in the winter time. Pictures of the trail leading by way of McCarthy also of the Scolai pass revealed the fact that these routes were well nigh impassable.

"The conditions on the Whitehorse-Kluane trail were different altogether. We saw an outfit of an 8-horse team starting out for the new camp, also several dog-teams, and the comparative ease and comfort with which they were travelling gave an onlooker the impression that this surely is by far the sanest and only reliable way to get to the country where the gold has been found."

BRITISH COLUMBIA IN 1913

By E. Jacobs.

An approximate estimate of the value of the mineral production of British Columbia for the year 1913 makes it appear probable that the total will be about \$29,970,000, which amount is \$2,470,000 less than that for 1912. The decrease is attributed chiefly to a smaller production of copper and coal, which, together with lower average prices for some of the metals, accounts for a decrease of nearly \$3,000,000 offset to only a comparatively small extent by increases in output of gold, silver, lead and coke.

Preliminary figures indicate a smaller yield of placer gold than in 1912, which, however, is more than compensated for by an estimated increase in lode gold of about 9,500 oz. Production of silver seems to have been larger by about 220,000 oz., and of zinc by 760,000 lb. Lead is estimated at 2,130,000 lb. more than in 1912, but copper is placed at nearly 4,000,000 lb. less. The decrease in net production of coal, that is after making allowance for the quantity made into coke, was about 493,000 long tons, which loss in value is reduced to some extent by an increase of 20,600 tons in the quantity of coke made.

The next following figures show approximate quantities of minerals produced in 1913 with, in parentheses, for purposes of comparison, the actual amounts for 1912: Placer gold, 26,500 oz. (27,775 oz.); lode gold, 267,000 oz. (257,496 oz.); silver, 3,350,000 oz. (3,132,108 oz.); lead, 47,000,000 lb. (44,871,454 lb.); copper, 47,500,000 lb. (51,456,537 lb.); zinc, 6,120,000 lb. (5,358,230 lb.); coal, 2,136,000 long tons (2,628,804 tons); coke, 285,000 long tons (264,333 tons). Miscellaneous materials—clay products, building stone, cement, etc.—have been estimated at a total value of \$3,400,000, as compared with \$3,435,722 in 1912.

The official figures, to be compiled from returns to the Provincial Department of Mines, will not be available for several months, since they are not yet received by the Department. The foregoing, however, will in all likelihood be found to be approximately correct, though probably a little under what the official statement will eventually show the year's production to have been.

Gold.—Pending receipts of figures of actual production, the yield of placer gold is placed at a total value of \$530,000, as against \$555,500 for 1912. In Cariboo district, for which the estimate is \$196,000, there appears to have been a sufficient decrease in Quesnel division to largely account for a lower total recovery in 1913 from the mines of the district of about \$42,000. Atlin division of Cassiar district is estimated to have made an increase as compared with 1912, of about \$20,000—\$310,000 in 1913, as against \$290,000 in 1912. The remaining \$24,000 for all other parts of the Province compares with \$27,500 for 1912.

An increase of about 10,000 oz. of lode gold is credited to Rossland, Boundary and Similkameen mines while a decrease of 2,000 oz. is estimated against mines in Nelson division. There does not appear to have been much change in the production of other parts of the Province. The chief gold-producing mines were: In Rossland camp, the Centre Star-War Eagle group, Le Roi, and Josie (Le Roi No. 2); in Boundary district, the copper-gold mines of the Granby British Columbia Copper, and New Dominion Copper companies; and in

Similkameen district, the Nickel Plate group of the Hedley Gold Mining Co. These several districts produced about 260,000 oz., leaving only 7,000 oz. for other parts of the Province.

It is noteworthy that only one previous year has been credited with so comparatively large a production of lode gold, namely, 1910 with a total of 267,701 oz. toward which Nelson division contributed much more than it has done in any year since. The outlook for an increasing production of lode gold is decidedly favorable.

Silver.—Of the total of 3,350,000 oz. of silver, about 420,000 oz. came from East Kootenay, nearly all from the Sullivan Group mines; Ainsworth division of West Kootenay yielded about 300,000 oz., Sloean 1,830,000 oz., Nelson 145,000 oz., Rossland 120,000 oz., and Lardau 30,000 oz.; from mines in Boundary district approximately 385,000 oz. was obtained, and from the Coast district 120,000 oz. This, however, is only a rough approximation of the proportions of the total production of the Province contributed by the various silver-producing districts mentioned.

The production of silver, if the estimated output prove about as stated above, will have been the highest for any year since 1905, when 3,439,417 oz. was produced. It is reasonable to look for an appreciably higher yield of this metal in 1914, especially from Sloean mines, and in smaller degree from Ainsworth and Omineca division mines.

Lead.—Preliminary returns show a production of ore containing about 50,000,000 lb. of lead. Of this, 20,000,000 lb. was in ores from East Kootenay (practically all from the Sullivan mines); from Ainsworth division mines ore in which there was some 9,000,000 lb. was sent to the smeltery, most of this having been produced from the Bluebell mine; from Sloean mines reports have been received of about 18,000,000 lb. in ores shipped, chiefly from the Standard mine; while mines in Nelson division shipped ores containing the greater part of the remaining 3,000,000 lb. The actual production of metallic lead, however, seems to have been about 47,000,000 lb.

Mining conditions indicate increase in quantity of lead ore available for extraction, this being the result of developments in mines in East Kootenay and Sloean especially. As in the case of silver, Ainsworth and Omineca mines may be expected to make an increased production of lead, and Nelson division should also add a larger proportion to the total than it did in 1913.

Copper.—A total output of 47,000,000 lb. is estimated. Of this quantity about 30,000,000 lb. was from the mines of Granby, British Columbia Copper, and New Dominion Copper companies, all operating in Boundary district; from Rossland and Nelson mines there was about 2,000,000 lb.; Coast mines, chiefly the Britannia, made an output of something like 15,000,000 lb.

The lower total of copper as compared with 1912 is attributable chiefly to the fact that economies in connection with mining and smelting costs have admitted of the utilization of ore having so small a copper content that, under other circumstances, it could not be handled at all except at a loss. The results achieved by the four companies mining and smelting copper-bearing ores in the Province, are most creditable, especially

where ores containing little gold and silver have had to be treated. The ensuing year will see an important addition to the copper-producers of the Province, for the Granby Consolidated Co.'s Hidden Creek mines, in the Coast district, are expected to commence production very shortly.

Zinc.—Of a total of 6,120,000 lb. of zinc contained in concentrates shipped to Bartlesville, Oklahoma, more than four-fifths was from the Standard Silver-Lead Mining Co., at Silverton, Slocan, and the remaining one-fifth was largely from the Van-Roi and Rambler-Cariboo mines, also in Slocan district.

Experiments in electric smelting of lead-zinc ores are being prepared for at Nelson by the Mines Branch of the Canada Department of Mines. Meanwhile other provision will be made for utilizing much zinc ore not now being utilized, owing to lack of suitable facilities for making it marketable. Fine grinding with Hardinge conical mills is expected to assist in making a 150-ton unit of Minerals Separation flotation process plant a producer at the mill of the Silverton Mines, Ltd., and the concentrating mill of the Slocan Star which in past years did excellent work in zinc-saving is also to be operated, after a long period of inactivity. The Consolidated Co.'s work in the direction of saving zinc in ores sent to Trail for reduction may, as well, ere long, result in the commercial recovery of zinc.

Coal and Coke.—The gross output of coal in 1913 is estimated at 2,576,000 long tons; of that quantity there was made into coke some 440,000 tons. In round figures, the net output was approximately 2,136,000 tons. These figures compare with a production in 1912 of 3,025,000 tons gross and 2,628,000 tons net. In the Crowsnest district, Southeast Kootenay, there was an increase of nearly 90,000 tons, and in the Nicola-Princeton district 56,000 tons, together 146,000 tons. On the other hand, labor troubles at Vancouver Island collieries, extended over eight months of the year, caused the output of Island mines as a whole to be considerably less—595,000 tons—than that of 1912, in which similar difficulties were not experienced.

Of the net production of 2,136,000 tons of coal, the proportion of mines in the Crowsnest district was about 910,000 tons; of those in Nicola valley and Similkameen, approximately 263,000 tons; and on Vancouver island, 963,000 tons.

Returns of coke production show a total of about 285,000 long tons, which is the largest quantity produced in any year since coke-making was commenced in the Province. All this coke was made in Crowsnest district—about four-fifths at the ovens of the Crowsnest Pass Coal Co., and one-fifth at those of the Hosmer Mines, Ltd. The former company made 225,400 tons in 1913, as compared with 219,000 tons, in 1912, and the latter 59,600 tons, as against 45,300 tons in 1912.

District Notes.

The year was marked by progress in the several mining districts, as follows:

While recovery of placer gold was not large in Cariboo district, preparations were made for extending hydraulic mining operations in all three of its divisions—Cariboo, Quesnel, and Omineca. In Atlin division, Cassiar district, beside recovering more placer gold, lode gold had attention, with promise of an increasing yield in the future.

In East Kootenay, developments at the Sullivan Group mines were decidedly satisfactory, while there

is promise of more ore being found in the St. Eugene. Some of the coal mines in this district had, as regards production, the best year in their history.

West Kootenay mining divisions showed progress generally, notably in Ainsworth, Slocan, and Trail Creek (Rossland). Deep-level development in several Slocan mines greatly improved the position for ore-production. In the gold-copper mines of Rossland camp there were opened newly-found oreshoots that ensure profitable working of the mines there for years, while improvements at the Consolidated Mining and Smelting Co.'s copper and lead smelting works at Trail, a few miles from Rossland, provide for more effective and economical metallurgical operations and results there.

In Boundary district, shipment of ore from Franklin camp was commenced on a small scale; the Jewel mine and stamp mill were working the whole of the latter half of the year after long inactivity; and the big copper mines were worked to full producing capacity. The Hedley Co. commenced to prepare for development of more power to admit of an extension of mining and milling operations. In Kamloops division, the Iron Mask mine was productive, and electrically operated power plant was put in. In Lillooet division there was some gold-ore-milling done, and near Hope, in Yale division, lode mining was commenced.

The chief features of the year's metalliferous mining in the Coast district were the enlarged operations of the Britannia Mining and Smelting Co., which put in a Minerals Separation flotation process plant of much larger capacity, in connection with concentration of its copper ores; and of the Granby Consolidated Co. at its Hidden Creek mine, Observatory inlet, where much more development work was done underground, and the work of installing power plant for mine and erection and equipment of a 2,000-ton copper smeltery were well advanced toward completion. Shipment of silver-lead ore from mines in Hazelton district, Skeena river country, was commenced, and some important deep-level development was done in Portland Canal mining division.

Dividends.

A larger total amount was paid in dividends in 1913 by metalliferous mining companies operating in the Province than for many previous years. These included the British Columbia Copper Co., \$88,756 (\$177,513); Consolidated Mining and Smelting Co., \$232,208 (\$232,208); Granby Consolidated Co., \$899,911 (nil); Hedley Gold Mining Co., \$360,000 (\$360,000); Le Roi No. 2, Ltd., \$43,200 (\$29,400); Standard Silver-Lead Mining Co., \$650,000 (\$425,000); total, \$2,326,283 (\$1,224,121). The figures in parentheses show the 1912 dividends. The total amount of net profits earned was much larger than the total of dividend distributions. With prices of metals fairly well maintained and no unlooked for interruption to ore-production, the year 1914 should be an even more profitable one to the companies mentioned above, and to others that were not on the dividend-paying list in 1913.

Mr. L. C. Randolph, advertising Manager of the Canadian Fairbanks-Morse Company, has resigned to open up and take charge of a New York office for the Industrial and Educational Press, Limited, of Montreal and Toronto, publishers of the Journal of Commerce, Pulp and Paper Magazine, Canadian Textile Journal, Canadian Mining Journal, Canadian Miller and Cerealist and the Canadian Fisherman.

COAL MINING IN BRITISH COLUMBIA IN 1913

By E. Jacobs.

Coal mining in British Columbia in 1913 was adversely affected by labor troubles at Vancouver Island coal mines, which caused a decrease in production of nearly 40 per cent. as compared with 1912, the quantities of coal produced from those mines in the two years having been 1,558,208 long tons in 1912 and 962,620 tons in 1913. In other producing districts in the province there was an increase in output which in part offset that decrease, so that the percentage of loss in production in the whole province, as compared with 1912, was a little less than 15 per cent., the total for the two years, respectively, having been 3,025,709 tons for 1912 and 2,576,172 tons for 1913. The quantity of coal made into coke was larger in 1913 than in 1912—440,091 tons, as compared with 396,905 tons—which further reduced the net total of coal sold or otherwise disposed of as such. The net output of coal in 1913 was 2,136,081 long tons, as compared with 2,628,804 tons in 1912.

The districts in which coal was mined, and the proportions of production of the various mining companies, are shown in the following table:

Production of Coal in 1913.

Coal was produced in three districts, namely, on Vancouver island, in Nicola valley and Similkameen, and in Southeast Kootenay. Approximate figures of production follow:

Vancouver Island—	Tons of 2240 lbs.
Canadian Collieries (Dunsmuir), Ltd.	562,705
Western Fuel Co.	218,691
Vancouver-Nanaimo Coal Mining Co.	100,449
Pacific Coast Coal Mines, Ltd.	80,775
Total	962,620
Nicola and Similkameen—	
Inland Coal and Coke Co.	116,000
Nicola Valley Coal and Coke Co.	110,000
Princeton Coal and Land Co.	28,780
Several small producers.	7,988
Total	262,768
Southeast Kootenay—	
Crowsnest Pass Coal Co.	1,040,374
Hosmer Mines, Ltd.	237,500
Corbin Coal and Coke	72,910
Total	1,350,784
Summary—	
Vancouver Island mines	962,620
Nicola and Similkameen mines	262,768
Southeast Kootenay mines	1,350,784
Total production, gross	2,576,172
Less made into coke	440,091
Total production, net	2,136,081

While the foregoing figures for 1913 are subject to some change, owing to production for the month of December having had to be estimated, it is unlikely there will be any considerable difference between the estimated output of coal as shown above and the actual production the revised figures will show later.

A Record Output of Coke.

The quantity of coke made in 1913 is estimated at 285,110 long tons, all at collieries in Southeast Kootenay—225,468 tons at the ovens of the Crowsnest Pass Coal Co. at Fernie and Michel, and 59,642 tons at those of the Hosmer Mines, Ltd. The total quantity of coke made in 1912 was 264,333 tons—218,954 by the Crowsnest Pass Coal Co. and 45,379 tons by the Hosmer Mines, Ltd., so that both companies show an increase in 1913. It is noteworthy that the production of coke in 1913 was the largest yearly output on record in the province, the highest previous total having been that for 1905—of 271,785 tons. No information is yet available as to where all the coke made in 1913 was marketed, but it is known that both the Granby Consolidated Co., and the Consolidated Mining and Smelting Co. of Canada, the former having copper smelting works at Grand Forks, Boundary district, and the latter at Trail, West Kootenay, both in British Columbia, obtain their coke supplies from Crowsnest Pass collieries in the province, although the British Columbia Copper Co.'s smelting works at Greenwood is supplied from the International Coal and Coke Co.'s ovens, at the Alberta end of the Pass.

At Vancouver Island Collieries.

The strike forced upon the coal miners of Vancouver island at the beginning of May by the United Mine Workers of America and which has been in effect ever since, necessarily interfered with important mine development, equipment and construction work previously undertaken by three of the Island coal mining companies. However, much progress was made by the Canadian Collieries (Dunsmuir), Ltd., with its improvements at mines of the Comox colliery, and the Pacific Coast Coal Mines, Ltd., also advanced its development and construction work at its Morden colliery, though not to the extent it would have done under favorable labor conditions. The Western Fuel Co. has been much hampered by the strike, so that little progress was made since last April toward bringing into production its new mine situated some four miles from Nanaimo.

Canadian Collieries.—This company operates two collieries—Comox and Extension. Its chief activities in 1913 were at the mines and other works of the former.

The hydro-electric power station and plant at Puntledge river was completed, and has since been in successful operation. General Electric Co. equipment has been put in, transmission lines constructed to several mines and to the company's shops, coal-washery, shipping wharves, etc., at Union bay, substations erected, and connections made at various places for lighting purposes.

A length of new railway, which cuts off a heavy grade on the old track, has been constructed, this admitting of hauling heavier trainloads than was previously practicable.

At No. 4 mine, development work has been with the object of increasing output of coal. A new Sirocco fan was put in and ventilation of the mine improved. The old haulage steam-operated machinery is being gradually replaced by electrical installations. Similarly at No. 5 mine, steam-driven machinery has had to give way to electrically-operated plant. No. 6 mine is still being worked with the old steam plant, but at No. 7 compressor, hoist, haulage plant, fan, etc., are all electrically operated; more miners' houses and other buildings have been erected, new railway sidings put in the yard, and many other improvements made.

No. 8 is a new mine situated one mile and a half east of No. 7 and four and a half miles from the town of Cumberland. Two shafts—main shaft 11x22 ft. and air shaft 11x16 ft.—have been sunk to a depth of about 1,000 ft. and the mine is being opened rapidly, with coal now being produced. A steel tippie, equipped with Marcus screen, has been erected, and 75 miners' houses have been built. The company's sawmill was destroyed by fire, but this is to be replaced shortly.

At the company's Extension colliery mines production of coal is now only about one-seventh that of Comox—300 tons a day as compared with about 2100 tons, but when the new electric locomotives are in use, in place of those destroyed by the strikers when they set fire to the surface buildings, a much larger output will be made.

Western Fuel Co.—Before the strike 1,300 to 1,400 men were employed at this company's No. 1 Shaft, Protection Island, and No. 4 Northfield (Brechin) mines, but at the close of the year only about one-fourth that number were at work.

At the company's Reserve Shaft mine the two shafts, each 10 ft. by 25 ft. 9 in. inside timbers, reached the coal at a little more than 1,000 ft. depth. Hoisting engines installed are by Andrew Barclay & Sons, Kilmarnock, Scotland; the main engine is 30 by 60 in., Corliss valve, with 12-ft. drums. Both are equipped with special devices to prevent overwinding. Transportation is provided by a standard-gauge railway to the company's shipping docks and loading bunkers near No. 1 Shaft mine, Nanaimo.

Pacific Coast Coal Mines.—Not much change was made at this company's South Wellington mine. A larger compressor was put in, and more houses for miners were built. Output of coal is being gradually increased and it is expected it will shortly be back to normal, as before the strike.

At Morden, two miles east of South Wellington, the company has sunk two shafts—main shaft 9x16 ft. and air shaft 9x12 ft. in the clear—and reached the coal at about 600 ft. depth early in the year, but development of the mine was prevented by the strike of men, so the shaft was flooded. The high-pressure side of a Canadian Ingersoll-Rand compressor has been put in, also high-pressure steam boilers, together, 450 h.p., and a pair of 24x48 high-duty winding engines. The construction of a reinforced steel tippie and coal-washing plant has been commenced, and the installation of a fan, two direct-connected electric units each 150 kw., and the necessary work about the yard are in hand. It is expected this equipment will be completed by March 1. Present development of the Morden mine shows a seam of coal 8 ft. in thickness.

The standard-gauge railway track from South Wellington to the shipping docks at Boat harbor, seven miles, has been relaid with heavier steel.

At the company's Suquash mine, in the northern part of the Island, mine development, construction work, and equipment have been in progress during the time the miners have been on strike. A new shaft, 11x22 ft. in the clear, is being sunk and a pair of slopes being driven to connect the older working with the new. The coal is very regular here, averaging about 6 ft. in thickness. Two 150-h.p. steam boilers and a pair of 24x48 winding engines are included in the machinery equipment. A number of new buildings have been erected.

Vancouver-Nanaimo Coal Mining Company.—This company having conceded the demands of the U. M. W. of A., worked full-headed the greater part of the lat-

ter half of the year. Its production of coal was larger than in 1912, but there is little else of interest to note.

Nicola Valley and Similkameen.

The Nicola Valley Coal and Coke Co. mined less coal in 1913 than in 1912—110,000 long tons, as against nearly 143,000 tons. On the other hand, the Inland Coal and Coke Co.'s production figures are 116,000 tons in 1912, as compared with 31,300 tons in 1913. Diamond Vale Collieries continued of little importance as a producer. The Pacific Coast Colliery Co. is reported to have got into good coal.

The Similkameen district, the Princeton Coal and Land Co., made a similar output of coal to its production in 1912. The Columbia Coal and Coke Co. called a halt and sold its property, and the new owners are doing development work in another part of this field. The United Empire Co.'s operations continued unimportant.

The only company from which information was received is the Nicola Valley Coal and Coke Co., a summary follows:

Production for the year is estimated at 111,684 long tons, this being a rather higher total than is used in the accompanying table, but allowance is made in case of a short month's production being made in December. The decrease, as compared with 1912, is accounted for by unfavorable mining conditions (since overcome), in the first half of the year. Mines Nos. 7 and 8 were opened; in No. 7 the main slope is being pushed ahead, with working places being opened as progress is made. This is in a 16-ft. seam of excellent coal. No. 8 is promising, with 6 ft. 6 in. of coal, but development is yet too limited for much to be said of this. Present working conditions allow of an output from this colliery of 750 tons a day, with a gradually increasing capacity, but high railway freight rates so limit the market that output is kept down accordingly. The railway company itself, formerly a good customer, is now burning oil in many of its locomotives instead of coal.

The Inland Coal and Coke Co. has opened a new slope—No. 5, and is active both in developing its property and finding a market for its coal.

Southeast Kootenay Collieries.

Generally, the position at Crowsnest district mines shows improvement. Both The Crowsnest Pass Coal Co. and the Hosmer Mines, Ltd, made a larger production in 1913 than in 1912. The Corbin Co. had to close its No. 1 mine, owing to a fire, from spontaneous combustion; as a consequence, this mine was unproductive during the greater part of the year.

Crowsnest Pass Coal Co.—At Coal Creek colliery, B seam, lying 320 ft. above No. 1 in the Coal Creek measures, was developed to a producing capacity of 500 tons a day. At Michel colliery two new mines were developed on the north side of the valley, and a skip incline was put in to convey the coal from mines to tippie level. The skips or cages carry eight tons of coal down a grade commencing at 30 per cent. and being 60 per cent. at the lower end. The incline is 1280 ft. in length, and the skips, easily controlled by rotary multiple brakes, travel that distance in 80 seconds. These new openings are expected to yield a profitable production throughout the ensuing year. Prospecting on the south side of the valley at Michel resulted in a new seam being found about 150 ft. above No. 3 seam; it shows a working section of about 10 ft. thick of coal of a general good quality.

Output of coal from Coal Creek mines compares favorably with that of the last good year, while the quan-

tity of coke made at the ovens at Fernie is estimated to exceed the previous highest record by nearly 9,700 tons.

Hosmer Mines, Ltd.—There was not any new development work undertaken at Hosmer colliery during the year. The B incline was double-tracked and another drum added to the engine operating it. An 8-ft. diameter Sheldon-Keith wheel fan was provided for ventilating No. 2 B south mine. A steam locomotive was obtained for the rock bank and hauling boiler coal. Production showed a substantial increase—237,500 tons in 1913, against 188,243 in 1912. Coke output was 107,143 long tons, as compared with 45,379 tons in 1912.

Corbin Coal and Coke Co.—No. 4 mine, known as the "Big Showing," was provided with transportation facilities. This mine is situated nearly 1,000 ft. above No. 1, the latter being near the valley level. In No. 1 mine the coal seam is nearly vertical and varies greatly in size. Mr. W. W. Leach described it as varying from a minimum thickness of 10 ft. to a maximum of nearly 250 ft. This great difference may be due to compressed monoclinical folding. At the upper mine the coal has been stripped near the top of the hill and it is shown in a synclinal basin about 370 ft. in width, the thickness of the coal near the centre having been proved by drilling to be more than 100 ft. During the summer and autumn coal in No. 3 mine was worked in open cuts by a steam shovel, and sent down the switchback standard-gauge railway for shipment. The snowfall being heavy, open cut working is not practicable in winter, but about 150 tons of coal a day is being mined here underground. No. 4 mine is a new opening made after fire in No. 1 necessitated the closing of the latter. The seam in No. 4 is a branch off that in No. 1. Present production is at the rate of about 250 tons of coal a day. A Marcus screen has been purchased, but it will not be put in until next spring.

General Notes.

Little progress was made toward the extensive development of the newer coal fields in the province, these being without railway transportation. Some development work was done, both in the Groundhog basin in Northern Skeena and in other fields in the southern part of that district.

The removal of the customs duty on coal entering the United States has not yet made much difference in quantity exported from British Columbia. No doubt it will eventually affect both the Crowsnest district and Vancouver island, but this year the latter has not been able to supply the British Columbia market, the strike of miners having kept down production—in fact, much coal has been imported from the State of Washington and elsewhere to supply demands from the coast cities of British Columbia.

MINE SANITATION

The United States Bureau of Mines is about to investigate the conditions under which a miner works, believing that the unsanitary conditions which exist in some of the mines, as well as in some of the mining towns, are a factor in the death rate among the men. It is intimated that these conditions not only unnecessarily cause the death of miners through disease, but they are often responsible for accidents which might not have happened if the miners were in perfect health.

The bureau has organized what is known as the Mine Sanitation Section, in charge of J. H. White, engineer.

The bureau hopes to bring about progress by appeal-

ing to the miner, the manager, and the owner, showing that all three can assist, and how all three can be benefited by good sanitary conditions. It will reach the miner by means of illustrated lectures, moving picture exhibits and pictorial circulars. These will show how sickness and suffering are spread by careless habits, and will drive home the importance of personal and household cleanliness. The bureau will assist the managers by pointing out glaring sanitary menaces, and showing methods and costs of abatement. It will describe in bulletins common unsanitary practices and show the evils which follow in their wake. It will submit sanitary rules and regulations and show the best methods for their enforcement.

Engineer White, in talking about the conditions which exist in mining towns, said: "The mining town does not grow, but is built at a single stroke. The effect of this is that the valuable lessons learned by the 'try-out' method and the profit gained by previous mistakes do not exert their powerful influence, so that the errors existing in one house exist in all; if one house is not properly lighted, none of the houses will be properly lighted; if a few houses are placed too closely together, all houses will be similarly spaced; if there is congestion in one section, there will be congestion throughout. Of course, one could have learned from the experience of other mining towns already built, but this information was perhaps not readily available, and local conditions modify each case.

"One of the first investigations which the bureau intends to take up is the house problem, with a view of putting before the miners the best practices and the ones which have stood the tests of time.

"The company ownership is the most important factor entering into housing conditions. Every house reflects the standard which the operator wishes to maintain. It is difficult to stimulate personal pride among the inhabitants and friendly rivalry is absent. However, if improvements are introduced, they are far-reaching, and the tone of the entire town is raised, so that one house does not point the finger of scorn at its neighbour. The employer being also the landlord means, as a general rule, compulsory payment of rent, and the importance of an assured income should be given due weight.

"In discussing the water supply situation, it must be kept in mind that the town site is generally determined by the location of the mine shaft.

"There are few mining towns with sanitary sewer systems. Such a system presupposes a public water supply for flushing purposes. The approximate location of a mining town is determined by the mine shaft, and the topography must be accepted as it is. This is generally rough and hilly, and a single gravity system of sewers is next to impossible, as the cost of leveling off the hills and grading the streets is prohibitive. Moreover, a suitable stream to take the discharge of the sewers might not be near at hand; and the necessity of installing a sewage disposal plant looms up.

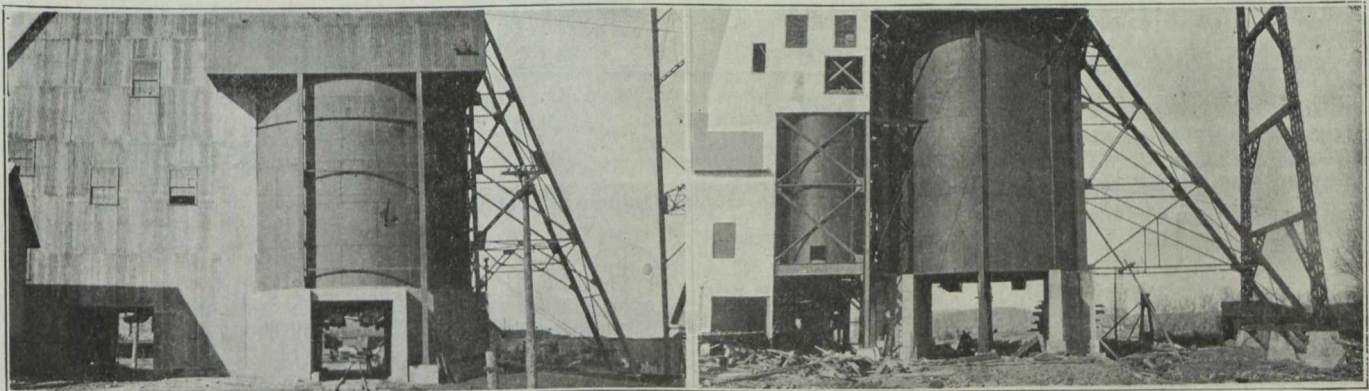
"Mining towns possess many advantages, but the drawback lies in the fact that the initiative in maintaining sanitary and clean conditions throughout the mining town rests entirely with the operator. Indifference on his part may give rise to deplorable unsanitary conditions. The residents have no official voice in the government of the town, and unofficial aggressiveness is seldom exerted, because the total absence of property rights breeds irresponsibility and carelessness. Many of them are blissfully ignorant of the dangers of unsanitary surroundings, and when they protest it is the inconveniences rather than the dangers that bestir them."

ROCK-HOUSE PRACTICE OF THE QUINCY MINING COMPANY*

By T. C. DeSollar, Hancock, Mich.

The Lake Superior methods of handling copper rock, as it is locally termed, have undergone many improvements during the past few years, both with respect to underground and surface operations. It is the purpose of this paper to describe briefly the form and mode of operation of one of the combination shaft-rock-houses commonly known as "Rock-house." As the various rock-handling systems in the district work toward the same end—that of crushing copper rock—it is only the intermediate steps that differ from one another in the rock-houses of the various companies. It is thought that the following remarks relating to rock-house practice at the Quincy No. 2 rock-house might be of interest as illustrating a very economical procedure and the best method that has yet been devised by the Quincy Mining Company. Past experience has shown that it is advisable to break the rock to a size that can be advantageously fed into the steam stamps at the mill.

The skip track above the collar of the shaft has an incline of 54 degrees, and the shaft runners are carried up on this angle to the copper rock dump, where there is an outward curve toward the hanging of the shaft for the wider face of the rear skip wheel to travel upon. The 12-foot wood-filled rope sheaves are located 119 feet vertically above the collar of the shaft, and are securely stayed by means of a batter brace. A room located at one side of the collar of the shaft, is occupied by the lander, one of whose duties it is to transmit to the hoist engineer the signals as communicated to him from the underground chute men. The lander without leaving his room moves a sliding plate by means of levers which allow an opening for the narrow face of the front skip wheels to pass through into a track toward the foot of the shaft, the rear skip wheels, which have a wider face, continuing in the plane of the incline and thus dumping the skip.



Quincy No. 2 Rock House

Allouez Rock House

The material, as it is hoisted to the surface, comes in sizes varying from fine material to large masses of native copper, copper rock, and poor rock, weighing at the maximum several hundred pounds.

General Description of Building.

The building is of steel, with corrugated iron roof and sides, and re-inforced concrete foundations and floors, thus making the building absolutely fireproof. All the bins are of steel and are circular in transverse section. The bottoms of the bins, instead of being built up and costly to maintain, are filled with poor rock until the latter assumes an angle of natural slope, thus making its own bed and causing all copper rock dumped into the bins to discharge through the regular openings. The building is 150 feet long, and 30 feet wide except where the large stamp rock bin, 44 feet in diameter, is located. The crusher floor, situated on top of the stamp rock bin 45 feet above the discharge aprons, is of the same size, but square. This bin will hold upwards of 2,000 tons. This large capacity takes care of variations in car supply and rate of hoisting.

There are three points of discharging: The first for mass copper and dull drills; the second for poor rock from sinking shaft, or bottom level cross-cuts; the third, the regular copper rock discharge. A set of levers, one for the first and one for the second, will permit the opening of the discharge as indicated by the signals. An 8x8 inch steam hoist, located in one corner of the building, is for handling timber, cranes and other supplies; also for the track forms used to take a damaged skip or other conveyor, from the skip road. The man-cars, water skip and rock skips are suspended from cranes and can be quickly swung into place and put in operation.

Rock Handling.

The rock is hoisted in two 8-ton skips running in balance. The skips, as before stated, have three discharges. The first discharge handles the large mass copper and dull rock drills. In this dump the skip discharges into a concrete block faced with old rails (flange up) having a slope of 30 degrees. This slope changes to level and forms a platform of the right height for loading the mass copper onto a railroad flat

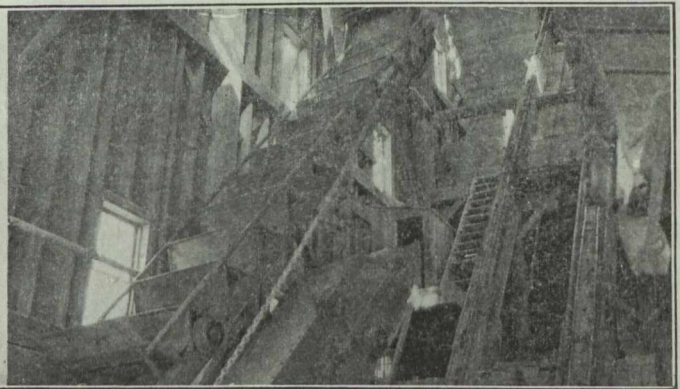
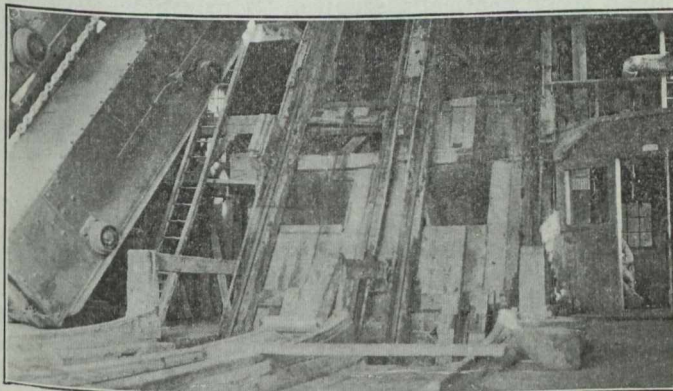
*Prepared for Houghton Meeting of the Lake Superior Mining Institute. Published in Transactions, Vol. XVII., pp. 217-226. Photos by R. E. Hore.

car. Masses weighing up to eight tons are loaded upon the railroad cars by means of 8-ton chain blocks hung from trolleys in either compartment carried by 18-inch 55-pound I-beams extending out over the railroad track. The dull drills are easily loaded onto a wagon or car and taken to the drill shop to be sharpened, while the mass copper is shipped directly to smelter.

When poor rock is hoisted from shaft sinking or the bottom level cross-cuts, the second dump is opened by means of the above described levers and the skip discharges into a reinforced concrete chute, which

ural slope, the rock then discharging onto the grizzlies. It was found during the erection of the building that there was a mistake of about three feet between the blue prints and the steel construction, and a steel dumping plate was substituted.

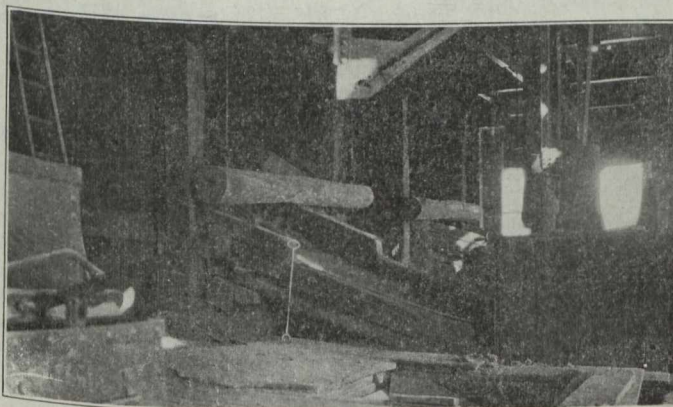
The dumping plate spreads the rock upon 6-inch steel grizzly bars approximately 16 feet long, set at 16 degrees, and having 20-inch openings. Immediately above the grizzly bars is a battery of heavy bars, which serves the double purpose of breaking the fall of the rock and spreading the same upon the grizzlies.



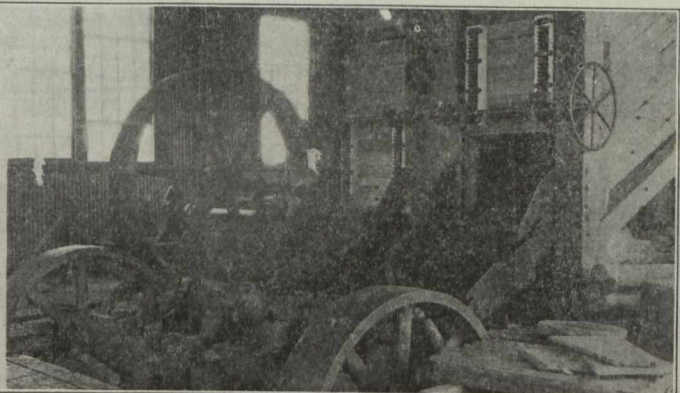
Two Views Showing Skip Roads, Man-Car and Bailer. Quincy Mine, No. 6 Shaft.

empties into a cylindrical steel bin 13 feet in diameter. This rock is drawn off by two chutes, one of which feeds a 24x18 inch Blake type rock crusher, where the rock is crushed to a size adapted for concrete, or road work. Under the crusher is a cylindrical steel bin 9 feet in diameter, where it can be loaded from a chute into railroad cars or wagons. The chute on the opposite side of the 13-foot bin permits the discharge of the coarse rock directly into a vertical cylindrical steel tube

The oversize from the grizzlies passes down to a reinforced concrete chute, striking a second battery of bars, then drops vertically into a bin having its side open toward a 3,000 pound drop hammer. Between bin and hammer is a 15-inch, 42-pound I-beam carrying a travelling 8-inch 2-ton air lift. This I-beam is bent in the shape of a horseshoe and permits the air lift to be used at either crusher, or poor rock chute. Here the oversize, if mass copper, is cleaned of the poor rock



Crusher Floor, Tamarack Rock House.



Crusher Floor, Lake Mine Rock House.

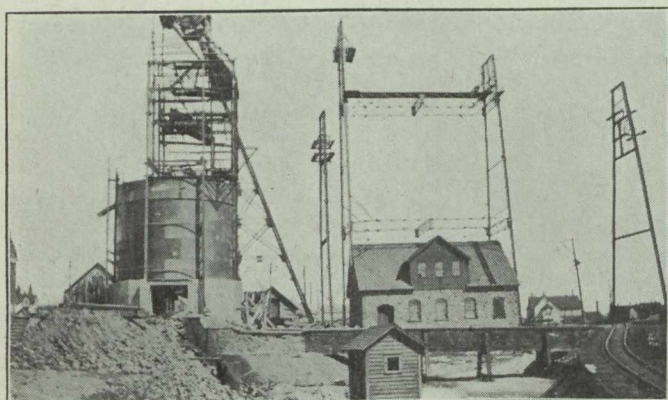
5 feet in diameter, dropping upon a reinforced concrete block slightly inclined, which breaks the fall, and from which it can be loaded through a chute into railroad cars or wagons.

When copper rock is hoisted, the third, or regular, discharge is used and was made as above described in order that the lip of the skip might remain in a position close to the steel dumping plate and not cause the rock to be violently thrown from the skip. It might be stated that the copper rock dump was designed in order that the skip should discharge into a pocket which would fill until the rock took its nat-

under the hammer; if copper rock, it is broken to a size that can be handled by the crushers, or, if poor rock, it is thrown into a chute leading to the poor rock bin.

In case the broken oversize is small mass copper, it is thrown into a mass copper chute leading into a cylindrical steel bin 6 feet 8 inches in diameter, which discharges into railroad cars. If it is mass copper too large for this chute, it is loaded onto a pan, swung from a crane, and lowered outside the building to a reinforced concrete platform at the right elevation for loading on a railroad flat car.

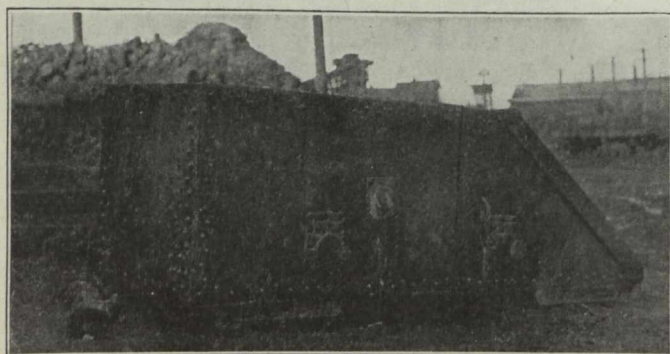
The undersize from the 20-inch grizzlies falls upon a second grizzly composed of 3½ inch steel bars, 6 feet long, set at 30 degrees, and having 2¾ inch openings. The undersize from these last grizzlies passes directly into the stamp rock bin below the crusher floor. The oversize is discharged into a cylindrical steel bin 14 feet in diameter holding approximately 10 skip loads of rock. The outlet from this bin is by two chutes 19 feet apart. Vertically sliding steel doors, 4x4½ feet, with replaceable steel linings, operated by 6x36 inch air cylinders, control the feed into steel chutes set



No. 2 Rock House, Quincy Mine, During Construction.

at 30 degrees. This feed is directed into the two 36x24 inch Blake type rock crushers and regulated by a hinged apron, which is operated by a 6x18 inch air cylinder. One man at each chute feeds the crusher, picks out the poor rock and mass. The poor rock goes into a chute leading to the poor rock bin. The mass is stored upon an inclined semi-circular chute called the "Copper Pan," on which it easily slides to a small steam hammer, is cleaned from poor rock, and thrown into a chute leading to the mass copper bin. This steam hammer is run by a third man, who handles the trolley already described, cleans the mass copper, oils and has charge of the machinery.

The crusher jaws are made of manganese steel, and are set to crush to three inches. The crushers running



Quincy 7 Ton Skip.

at 140 r.p.m. are operated by a 12x24 inch Nordberg Corliss valve steam engine running at 110 r.p.m. A 75 h.p. electric motor occupying less space is installed, and is ready to run in case of a break down to the engine.

The rock from the stamp rock bin is loaded into railroad cars for the mill by means of discharge aprons operated by 5x13 inch air cylinders.

Three men handle upwards of 1,000 tons of rock every 12-hour shift, change man-cars and skips on skip-road, and load all timber and supplies that are lowered underground. Between shifts, when the large mine air compressors are not in operation, power for the operation of the air lifts and air controls is furnished by a small 11x11x12 inch Westinghouse air pump, so arranged that when the air pressure from the mine compressor drops, the air pump automatically starts. A combination of check valves prevents loss of this air into the underground system and, likewise, when the air pressure from the compressor is raised, the air pump is automatically stopped. This system of handling material has shown an average rock-house cost of less than two cents per ton.

CLAYS AND CLAY PRODUCTS.

Clays or shales suitable for the manufacture of ordinary common and pressed building brick, pottery, tile, sewer pipe, etc., are found widely distributed in almost every province of Canada, and are being utilized wherever there is a demand or a market for clay products. Fire clays or clays suitable for the manufacture of firebrick have been found at only a comparatively few points, including Shubenacadie, N.S., Dirt Hills, Sask., and Clayburn, B.C., and as yet are utilized to a comparatively limited extent only.

Kaolin or china-clay has been found in the county of Argenteuil, Province of Quebec, near St. Remi de Amherst, and a washing plant has been erected for the preparation of the material. The extent and importance of the clay working industry is shown by the value of the production which, in 1912, exceeded \$9,000,000, and amongst non-metallic products was next in importance to coal. The consumption probably exceeds this value by at least one-third, owing to the large imports, particularly of firebrick and of earthenware and chinaware.

BOUNTIES ON MINERAL PRODUCTION.

The Dominion Government at the present time offers bounties on the production of petroleum and lead.

The bounty paid on petroleum is at the rate of 1½ cents per Imperial gallon on crude petroleum produced from wells in Canada, and the bounty is payable under the conditions and regulations provided in the "Petroleum Bounty Act."

The "Lead Bounty Act" of 1908 provided for the payment of a bounty on lead contained in lead ores mined in Canada and shipped to a Canadian smelter, at the rate of 75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 pounds, subject to the restriction, that when the price of lead in London exceeds £14, the bounty shall be reduced by such excess. This Act has been renewed in 1913 for a further period of five years. The bounty is payable subject to the terms of the Act and of the regulations provided thereunder.

Bounties were formerly paid on the production of iron and steel, but these expired automatically in 1912 and have not been renewed.

The administration of the Dominion Bounty Acts is under the direction of the Minister of Trade and Commerce, and full information in respect thereto may be had from the Deputy Minister of Trade and Commerce, Ottawa.

WESTERN FEDERATION STRIKE IN MICHIGAN

The Christmas Eve Calamity at Calumet.

Houghton, December 25.

The Christmas season, usually one of joy, is a season of mourning, a season of grief for the whole people of the copper country. A season that usually is blessed with recounting the birth and sweet works of one who came into this world to save little children and big men and women, is immeasurably saddened, for 50 of these little children and 30 men and women lie dead in Red Jacket, children, men and women, who died while attending Christmas tree exercises for the families of the striking mine workers of the Western Federation of Miners. The calamity took place early yesterday evening in the Italian hall on Seventh Street, Red Jacket.

The whole district lies stunned, saddened with grief, following a night during which the people of the community were paralyzed by the horror of the wholesale killing.

Upon the cry of "Fire" little children by the hundreds and women attempted to pile out into the hallway and down the stairs through the narrow exit, the door of which opens outward.

Little children who could not move fast enough to get out of the way of those coming behind were crushed and smothered beneath the weight piling down upon them. The majority were smothered to death. The outside door was opened by passersby, but the children and women were so solidly packed at the bottom of the stairs and halfway to the top of the single flight that they could not be pulled out.

In the meantime others within the building poured out over the bodies of the crushed and lifeless at the bottom of the stairs, using them as a roadway to escape from the building. So solidly were the bodies at the bottom of the stairs packed that it was necessary for the firemen and deputy sheriffs to go into the second-storey windows with ladders and to come down the stairs and pull the children back off the pile.

The awful slaughter was stopped only when the deputies appeared in the hall at the top of the stairs and forcibly prevented more from piling upon those below. It took two hours to clear the hallway, many in the pile dying while being taken out.

The first on the scene to help in the work of rescue were citizens who were attracted by the fire alarm. Many of the bodies were snatched away by grief-maddened parents, as the lifeless little forms lay on the floor of the hall, and were taken to their homes, so the full number likely is not accounted for in the list published.

Seventy bodies were taken to the temporary morgue established in the Red Jacket town hall, where identifications were made as rapidly as possible. Clamoring about the building was a crowd of several thousand people, including hundreds of women. Many whose children were at first thought to be among the dead later found their little ones in the crowd or at home.

President Moyer, of Western Federation, Hastens to Spread False Reports.

Houghton, December 25.

President Charles H. Moyer, of the Western Federation of Miners, said of the catastrophe that he had telegraphed President Wilson, Governor Ferris, Secretary Morrison, of the American Federation of Labor,

acquainting them with the details of the disaster and urging and requesting them to bring about immediate national and state investigation into the cause of the disaster. His information, he says, is to the effect that no striker or person in sympathy with the strike brought about the catastrophe.

There are many, he says, who will testify that a man from the outside came up the stairs of the Italian hall and called out "Fire." There are others who will testify that he wore a Citizens' Alliance button. He also says that he has noticed that public meetings are to be held in Calumet and Laurium to take steps for the relief of the victims and for the burial of the dead.

He wishes to say that the Western Federation of Miners will bury its own dead and that the American labor movement will take care of the relatives of the deceased and that no aid will be accepted from any meeting of citizens who a short time ago met and pronounced "these people" undesirable as citizens of this district.

The meetings referred to in this statement by Moyer were those called by the Citizens' Alliance, following the murder at Painsdale of three non-union men three weeks ago Sunday, while the victims slept in bed. The meetings were held at Houghton and Calumet, and adopted resolutions to the effect that the Western Federation agitators should leave the district.

This attempt on the part of the strike leader to make capital out of the terrible calamity generally was resented throughout the district last night.

The citizens certainly agree that the most searching and detailed investigation of the whole terrible calamity should and must be made so that every fact connected therewith will be brought to the public's attention and the perpetrators and instigators of the disaster speedily brought to justice and punished to the full limit of the law.

It is generally known that no members of the Citizens' Alliance or any others that were not identified members of the Western Federation of Miners or their families and carried their cards possibly could gain admittance to any of the meetings in the hall.

The Facts.

Houghton, January 1.

After considering for more than six hours the evidence submitted before them in the coroner's inquest into the death of seventy-four persons in the Italian hall panic Christmas Eve, the coroner's jury last night returned a verdict declaring that the deaths of the deceased were caused by suffocation in a panic caused by some person "raising an alarm of fire within the hall."

The jury also took occasion to commend the citizens, doctors, firemen and members of the sheriff's force for their prompt action in rescue work and relief of suffering.

The jury returned its verdict shortly after 8 o'clock. The verdict in full follows:

"We find that the said Herman Ala and seventy-three others came to their deaths on the twenty-fourth day of December, nineteen-thirteen, at the Italian hall in the village of Red Jacket. We find by the evidence of the witnesses that the cause of the deaths of the above-named persons was suffocation, the same being caused by their being jammed in the stairway leading to the entrance of the Italian hall, where a Christmas celebration was being held under the auspices of the

Woman's Auxiliary of the Western Federation of Miners, and the stampede was caused by some person or persons, unknown to the jury at this time, raising an alarm of fire within the hall, and we further find that no person or persons were allowed inside the hall where the celebration was being held without producing a union card or having some member of the union vouch for them before they were allowed admittance. We further find by the evidence that the citizens, doctors, firemen and the sheriff's force are to be commended for their prompt action in their efforts to relieve the suffering.—(Signed) Burton Barnham (chairman), Jacob Pesonen, Matt Chop, Dan Yauch, Jacob Talso, George Talbot; William Fisher, coroner."

Moyer Deported.

Houghton, December 27.

Charles H. Moyer, president of the Western Federation of Miners, left the copper country last night. The occasion for his abrupt departure was not made public, and inquiries up to a late hour last night revealed little definite information on the matter.

The siren on the Houghton County Electric Light Company's power station in Houghton blew an alarm at 9.30 o'clock and a big crowd gathered at the Copper Range station on the rumor that Moyer was aboard the train going out at that hour. It was learned later that the whistle was blown because of an unfounded rumor of a riot at Calumet.

The only information that seems to be authentic was that Moyer was visited at his room in the Scott Hotel, Hancock, about 9 o'clock, that some kind of an altercation took place and that immediately Moyer and another man, evidently an associate, went to the Copper Range station in Houghton and there boarded the train, accompanied by three persons who seemed to be guarding them.

It was generally talked around the streets that Moyer's departure is permanent and is based on his fear that his attitude in the Calumet disaster might bring about reprisals from enraged citizens.

Sheriff Cruse and his detectives spent the night in an investigation of the occurrence. The sheriff declared he would make a thorough probe of all the circumstances of Moyer's departure.

Report on Interview With Charles Moyer.

Houghton, December 28.

Concerning the visit made to President Charles H. Moyer, by representatives of the citizens' relief committee in his headquarters Friday night for the purpose of pleading with him to permit the suffering and starving families of the survivors to accept relief from the citizens, the committee issued a statement yesterday afternoon. The committee interviewing Moyer was made up of President Joseph Wills, of Laurium; President Frank H. Schumaker, of Red Jacket; John H. Rice, of Houghton; James T. Fisher, of Laurium, and A. E. Petermann and M. A. Thometz, of Calumet. Moyer refused, point blank, to permit the giving of aid to the sufferers. The committee issued the following report:

This committee was named by the relief committee and they sought to prevail upon him the immediate need of aid. Every effort was met with rebuff.

The committee told Mr. Moyer of the meeting in Calumet, December 25, to devise ways and means of raising money to alleviate the suffering of the victims;

that a committee of twelve was appointed to carry on the work; that the committee had already received contributions of upwards of \$25,000; that they had spent the day in canvassing the situation and in sending out sub-committees to offer assistance to the families who had been injured; that some of these committees consisted of the leading women of Calumet and were of different nationalities so as to reach the stricken people and talk to them in their own language.

The committees, Mr. Moyer was informed, reported that in every instance they were informed that no assistance would be accepted unless it came from people with a union card. The reports as received from all the committees were about the same. The stricken refused absolutely to accept aid from the citizen's committee, saying they had been instructed by the union not to accept aid or relief in any manner from the citizens. Many of these families were destitute, in need of clothes and food. Some wished to accept, but were afraid to do so on account of the orders of the union agents. In one instance, a committee of ladies was ordered from a house. During the afternoon, the committees reported that in almost every instance, people other than members of the families of the afflicted were present and that it was next to impossible to reach the families; that in several of these homes, the families wanted the assistance of the committee, but said they were actually afraid to accept it. The committees reported that there were several families who said they could well take care of their dead without assistance from the union or the relief committee and preferred to do so. A few families refused point blank to take any aid whatever from these committees, but a great many of these families would accept relief if it could be done without the knowledge of the Federation.

The committee told Mr. Moyer that they believed he was not actually aware of the exact conditions that existed among the families. They cited instances of extreme poverty and of the absolute need of immediate aid, regardless of its source. They said they came to ask him, the man they believed to be the responsible head in this district of the Federation, to allow these families to accept the aid which was offered to them by the citizens of the county. He was informed that there had been raised more than \$25,000 with which to aid these people and all they asked of him was to issue a statement that this aid should be or could be accepted by the afflicted.

"We are not representing the Citizens' Alliance or any corporation," said the spokesman of the committee. "We are here simply as members of the relief committee who are asking you to allow these poor, stricken families the privilege of accepting our aid."

As to a response to this question, Moyer was evasive but upon being pinned to answer "yes" or "no" on the question of issuing a statement that these people should accept this aid, the answer was "no." Moyer was then asked whether he was the responsible head of the Federation in the district and responsible for the orders issued, and, if not, who was. To this question he replied: "I refuse to answer."

The ladies' relief committee has visited the homes of fifty-four families, and almost in each instance, immediate need for assistance was evident. Another Calumet woman who was personally investigating cases of destitution and who has been a friend of the families for many years, asserted that many of the scenes are nothing short of inhuman neglect on the part of the agitators. Numerous cases of poverty were told by this woman who asserts that the strike benefits were

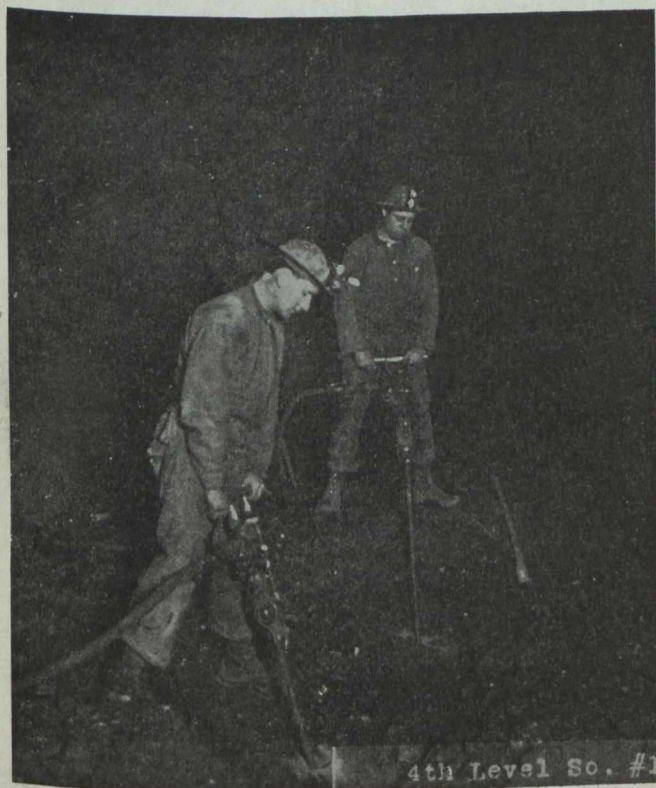
insufficient to provide for any family. Many of the little ones were without underwear and there was barely any food in the houses.

General Manager MacNaughton Falsely Accused by Moyer and Hilton.

Chicago, December 27.

Attorney Hilton, of the Western Federation, questioned concerning statements made by Mr. Moyer concerning Mr. MacNaughton, said:

"There is no doubt about it. Moyer could not have been mistaken. He knows Jim MacNaughton like his own mother, has seen him constantly since the negotiations for a settlement of the strike have been on. MacNaughton and Moyer have been in conferences which I personally attended. MacNaughton ordered him out of the country, said he would hang him if he returned, and then he searched him. Two gun men held him and MacNaughton took two wallets from Moyer's person.



Two One-Man Machines (Jackhammers), Osceola Lode, Calumet and Hecla Mine, Mich.

One of these contained money and this he returned. He kept the other."

According to Moyer and Tanner, the attack occurred at about 8.10 or 8.15 o'clock and they were thrust aboard the train an hour or so later—they were not sure.

According to several of MacNaughton's friends he was in Calumet, twelve miles from Hancock, at 9.45 o'clock. The train is scheduled to leave Hancock at 9.27 o'clock.

Associates of MacNaughton in Calumet state that he has never even met Moyer, that he has constantly refused to have any conferences with him or with any other officers of the Federation of Miners and that Attorney Hilton knows these facts well, as does every copper country person acquainted with the strike situation.

MacNaughton gave out the following statement to an Associated Press reporter at Calumet to-day:

"Any charge by Mr. Moyer that I had any part in the occurrences of last night at Hancock is absolutely and unqualifiedly false. I spent the evening in Calumet, accompanying my wife in calling on friends, and later walking across the street from their home to the Miscowaubik Club for a chat with some gentlemen. I certainly could not have been in Hancock at the hour indicated."

Henry Brett, at whose residence Mr. and Mrs. MacNaughton spent Friday evening, stated: "Mr. MacNaughton, accompanied by his wife, called at our home shortly after 8 in the evening. They remained all evening. About 10 o'clock we went across the street to the Miscowaubik Club and returned to my home at 11. I know positively that Mr. MacNaughton was not in Hancock at any time Friday evening."

Mr. Denton Explains Uselessness of Entertaining Proposals of Strike Bosses.

Houghton, December 31.

General Manager F. W. Denton, of the Copper Range Consolidated Mining Company, yesterday reviewed the strike situation from the side of the companies and of the men now working for the benefit of visiting and local newspapermen.

Mr. Denton discussed the matter very freely, because he believes that national interest now aroused calls for the very frank discussions of the questions involved. His talk covered a period of two hours and would involve a voluminous transcription, including many facts already perfectly known. In general he made this statement:

"The companies could not now treat with the Western Federation of Miners if they would. The men now at work would not stand for it. The introduction into these mines of men holding Federation membership cards and paying allegiance to that organization simply would mean trouble underground. The two classes of men would not mix."

The Various Issues.

Mr. Denton showed that the controversy now has narrowed down to the question of recognition of the Western Federation of Miners and the consent of the companies to treating with that organization. He explained the concessions made to the men, how the one-man drill never was an issue really, how the establishment of a nominal eight-hour time schedule was brought about only after influence was brought to bear by the companies themselves on the miners, who actually did not want this schedule, though the trammers did.

Small Minority in Federation.

Asked as to the various arbitration proposals, Mr. Denton said they could not be considered, simply because they would mean treating directly or indirectly with an organization that has no rights in the district.

"If this organization represented a majority of our workers at the time it called the strike, there might be some justice in asking us to treat with it. But this organization I firmly believe did not number one-tenth of the workers of this district when it called the strike. The mines now have 10,000 men working and it certainly does not represent them. It does represent about 2,500 strikers at this time. Is it right for us to submit to the representative of 2,500 men when 10,000 men now employed refuse such representation?"

Guerrilla Warfare.

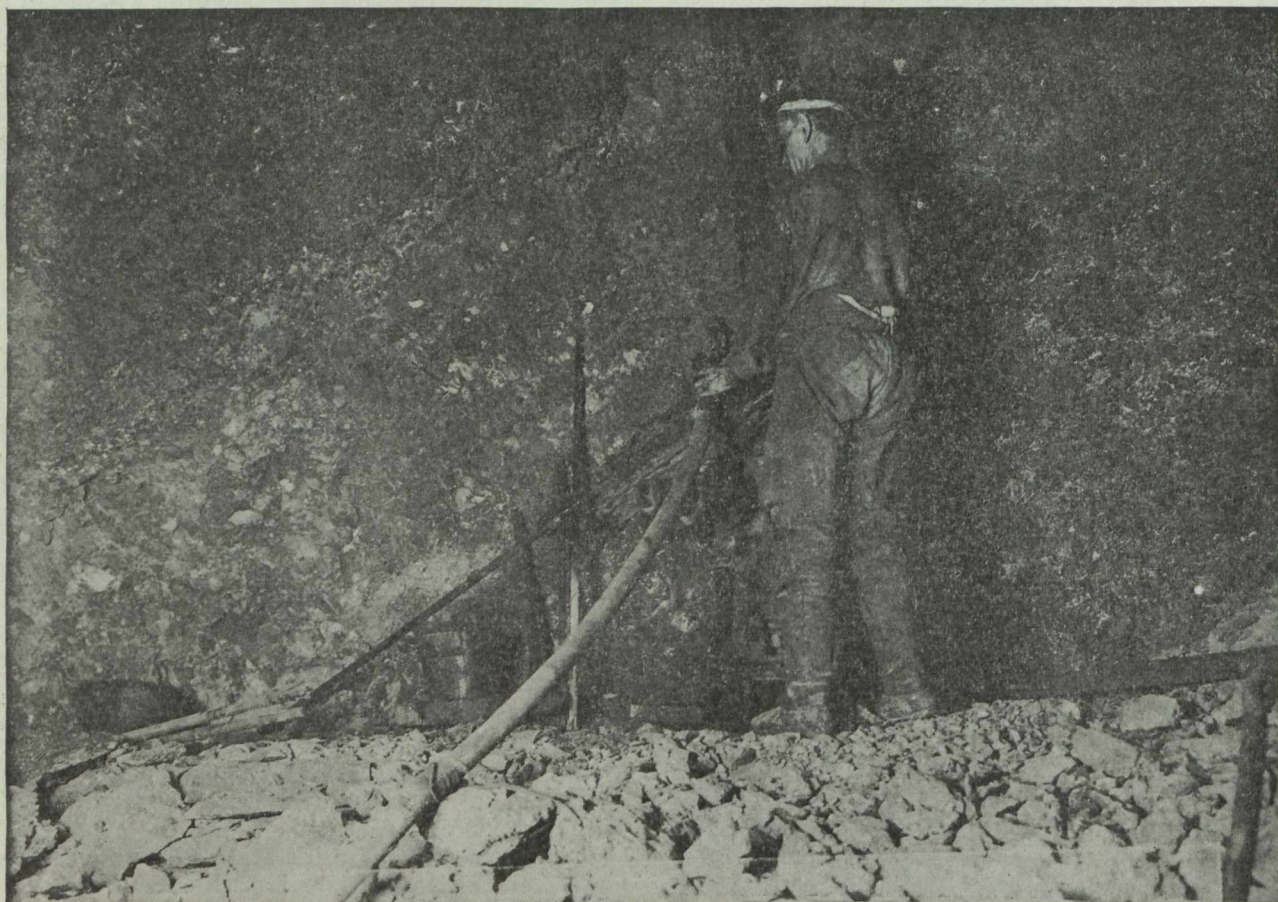
Mr. Denton explained the operations of the Western Federation of Miners as he had seen them in actual practice. He said that after the strike had been in progress for weeks, after fully 50 per cent. of his former employees had been driven from the location by intimidation, some of his men began to come back to work. Then began the campaign of guerrilla warfare.

A house in which lived a number of Lithuanians was shot up, six bullets having pierced it. The return to work was checked.

There was peace again for a time and former employees again took heart and began to return to work and then occurred the murders of Thomas Dally and

the time of the calling of the strike, July 23. The investigators, as far as Mr. Denton ever has been able to learn, did not try to gain access to the Western Federation of Miners' books, or, if they did, they were not successful. No reports of their investigations have been made public.

Mr. Denton takes the stand that only about ten per cent. of the miners of the district have consented to permitting the Western Federation of Miners to act for them and that this small proportion is not enough to override the rights of the great bulk of the workers. He insists that the matter has now gone too far, that the companies have proven that the Federation has no status here as representing the workers, but rather that the workers do not want the Federation recognized,



Miner Working on 65th Level, Conglomerate Lode, Calumet and Hecla Mine, Calumet
The Drill is a One-Man (Butterfly C113) Machine.

PHOTO BY O. GARDNER

the Jane brothers. Mr. Denton characterized these murders as a deliberate enterprise for the stopping or checking of the return to work movement and he admitted that it was an effectual check. That was three weeks ago and it was not till Monday of this week that more men began coming in looking for work.

Government Investigators.

Referring to Government investigations, Mr. Denton said that he and the other managers threw their books open to the investigators, to Mr. Moffitt and to Mr. Palmer. The managers suggested that the only manner in which the right of the Western Federation of Miners in this district could be shown was for that organization to be equally frank and to show how many actual members, by its books, it had in this district at

that they would not accede to it even if the companies would.

Western Federation Will Not be Recognized by Mine Operators.

Houghton, January 3.

There were practically no new features in the strike situation yesterday. At all of the mines reports indicated that there were additions to the working forces, although not in any substantial numbers. Inasmuch as the business interests of the community importuned the mining companies to extend the time for the return to work limitations to January 1, the business people generally now have come to the conclusion that the men still on strike do not desire to work. As a matter of fact, these same business interests now believe that it

would be for the best interest of the district for the mining companies to bring in as many workmen from outside as are needed.

This strike is over as far as the copper mining companies are concerned, and as far as the remaining strikers are concerned, as the latter have forfeited any claim they might have had to their jobs and they may just as well go elsewhere looking for work, as far as their standing with their former employers is concerned.

It is the understanding that the mining companies now will import men to take the places of the strikers.

The Calumet & Hecla does not need to do this. That company, in the Calumet & Hecla mines proper, needs no men. It has a full force. There were applications at the Calumet & Hecla mines yesterday by twenty-two former employees for work and by a number of new men. They were all sent to subsidiary companies, such as the Osceola, Kearsarge, Tamarack, Ahmeek. At Baltic the additions to the working force permitted night shift operations to commence at the No. 3 shaft. Quincy added some men.

It is not believed the companies will find it necessary to go out after men, but that men will come seeking jobs. Of course the Western Federation of Miners is picketing the Chicago railroad stations and trying to prevent men from coming to the copper country, but they are coming, in groups of five, ten, a dozen, twenty. Every railroad station in the copper country sees these little groups of work seekers every day.

It is true that comparatively only a few strikers tried to get their jobs back yesterday, which was the last day left open to them by the companies. At Mohawk, for example, 100 strikers had signed an agreement to go back, but only a very small part of the number carried out the agreement.

At the meeting in Hancock, Thursday, at Kansankoti hall, the strikers voted not to return to work and there were, it is estimated, 1,200 of them there. They probably represented about an equal number of absentees, so that the strike will not end by that route.

There is no doubt that the Western Federation of Miners is trying to close up the matter with as much credit to itself as possible. The leaders here, Attorney Hilton and Claude Taylor, the latter a volunteer, as he has no interest as a labor leader, being president of the Michigan Federation of Labor, are talking settlement.

The lexicon of the copper mining companies contains no such word as "settlement." There absolutely and positively is no plan that the Western Federation of Miners could bring forward that the companies would consider, that the businessmen and the working miners of the copper country would have them consider.

On second thought there is one plan—if the Western Federation of Miners will leave the Michigan copper district, close up its union offices, dissolve the charters of the local unions, turn in all the membership cards of the men and get out of the district absolutely, the copper companies would look upon that as a settlement of the strike, little as the Federation might be satisfied with that view of it.

C. & H. Will Not Recognize Western Federation.

Boston, Mass., January 3.

The Calumet & Hecla Mining Company will continue to refuse recognition to the Western Federation of Miners and to refuse to employ its members, officers of the company declared in a statement to-night regarding the strike at their mines.

"The copper country," said the statement, "has for fifty years enjoyed industrial peace, and our relations with our men have been mutually satisfactory. We never have discriminated and do not now discriminate in employment between those who do and those who do not belong to labor organizations.

"We have, however, during the pending strike, refused, and must continue to refuse, to give recognition to the Western Federation of Miners or to employ its members, for reasons peculiar to that organization."

The statement severely arraigned the policy of the Federation, adding:

"The great majority of the employees have voluntarily and spontaneously petitioned us never to recognize this organization or employ its members."

The statement also said:

"The company, with all the officers and employees of the mines, joins in deploring the tragic accident which destroyed the Christmas happiness of so many of our fellow citizens, and we have been anxious and ready to give every assistance to our stricken fellows that lies within our power.

"The company will continue to do everything in its power to contribute to the safety, comfort and happiness of its employees. On December 1, 1913, an eight-hour day for underground employees and a nine-hour day for surface men were put into effect. The general manager set aside a fixed day every week for hearing complaints and grievances among the men individually or through committees. These improvements are not suggested or hastened by present conditions, but are a part of a fixed programme of progressive improvement which always has marked and always will continue to mark the policy of the company.

"The company desires and will endeavor to make hours, wages and working conditions equal or superior to those obtaining in any copper mines at home or abroad."

The Companies' Stand.

Houghton, January 8.

The companies told the Governor, through Allen F. Rees, senior counsel for the Calumet & Hecla and for all of them in joint legal issues, that the only basis for the settlement of this strike is the return of the men to work after throwing away their union cards, and, further, that the companies adhere to such proposals as were made to Judge Murphy, the Governor's personal representative, early in the strike.

Mr. Rees said, in substance:

"I regret we had no intimation that such a statement might be called for or it might have been prepared in concise form.

"At the time a communication from officers of the Western Federation of Miners was received each company without co-operation, tried to ascertain if the Federation of Miners was justified in claiming to represent the employees. The result of the investigation, by census and by other means, was that less than 25 per cent. of the employees were members of the Federation or had authorized it to represent them. For that reason the companies took the position that the Federation was not justified in its claims. The communication said there must be an answer within ten days or no peaceful settlement of the claims could be brought about. The communication did not specify claims or grievances.

"The strike began July 23. In one mine employing 160 men only two or three struck. The other mines showed similar but slightly varying proportions. The

majority of the men reported for work and continued that day. The night shift men came on to work also in large proportion, but then the rioting broke out and the men were driven from the mines by the strikers. I will not detail the occurrences of the strike."

Mr. Rees referred to the arrival of the State troops and paid them a tribute for conduct and efficiency. Under their protection, he said, 75 per cent. of the employees of the Calumet & Hecla returned to work. "This return to work confirmed the attitude of the companies," said Mr. Rees, "that the Western Federation of Miners did not represent the body of the employees. The position then was taken that the companies would have nothing to do with the Federation. This position is based on the history of the organization in other districts, on the conviction that it is to the interest both of the companies and of the employees that this Federation does not procure the domination of labor in this district."

8,724 Men Now at Work Underground.

Houghton, January 9.

Governor W. N. Ferris announced at yesterday's investigation the figures of Labor Commissioner Cunningham on the number of men employed underground in the mines of the copper country as compared with the number so employed before the strike.

The table follows:

Company.	No. employed before strike.	No. employed now.
Isle Royale	709	295
Centennial	117	135
Superior	162	146
Laurium	25	0
Champion	1,118	594
Quincy	1,580	1,242
Trimountain	570	349
Baltic	960	328
Osceola	1,143	548
Tamarack	591	112
Wolverine	333	106
Calumet & Hecla	4,107	4,203
Hancock, Cons.	161	94
Mohawk	686	103
Ahmeek	582	246
LaSalle	43	29
Allouez	305	171
Franklin	322	23
Totals	13,514	8,724

Attorney A. E. Petermann, speaking for the Calumet & Hecla, said there are on the payrolls of the company 287 men not included in the figures given, who are sick or receiving benefits or were taking a day off on January 6, the day the figures were compiled.

The Governor inquired and learned there are no "gun men" or deputies, office men, mill men, smelter men or any men but underground workers, included in these figures. There also are 150 old employees of the Calumet & Hecla who are working as watchmen and not listed.

Governor Ferris yesterday continued his quest for information regarding the copper strike and he learned among other things this salient fact:

The copper companies operating in the upper peninsula of Michigan, through their personal representatives on the properties, are not opposed to organizations of laboring men as such, but they are opposed to

organizations that teach class hatred, that will not consider labor and capital as partners; to organizations that are officered and conducted in such a manner as it appears to them the Western Federation of Miners is officered and conducted. Finally, the companies are opposed to this particular organization, the Western Federation of Miners, and will not treat with it directly nor indirectly.

PENNSYLVANIA ANTHRACITE.

According to Edward W. Parker, of the U. S. G. S., the production of anthracite in Pennsylvania in 1912 amounted to 75,322,855 long tons, valued at \$177,622,626, a decrease in quantity, as compared with 1911, of 5,448,633 long tons, or 6.7 per cent. Notwithstanding the smaller production, the value exhibited an increase of \$2,670,021, or 1.6 per cent. The smaller production in 1912 was due entirely to the suspension of mining operations on April 1, pending the settlement of certain demands by the miners for changes in the agreement under which work had been carried on during the three previous years. The suspension was practically complete during the entire month of April and most of May. The modified agreement was signed on May 20, and operations were resumed at once. The total production for the month was only about 1,500,000 tons, or approximately one-fourth the normal output. A part of the shortage created by the suspension was partly made up by increased activity in March, in anticipation of the shutdown, and also after operations were resumed, particularly in July, August, and October. In three of these months, namely March, August and October, "record" outputs were made, the railroad shipments for each of the three months exceeding 6,500,000 tons. The previous high record was in March, 1909, when the shipments amounted to 6,333,000 tons. Notwithstanding the loss of time due to the suspension the average working time was only 15 days less than that of 1911.

Of the total production of 75,322,855 long tons in 1912, 65,229,255 long tons or 86.6 per cent. was loaded at the mines for shipment to distant points; 2,113,904 tons or 2.8 per cent. was sold to local trade or used by employees, and 7,979,696 tons, or 10.6 per cent. was consumed in the generation of heat and power at the collieries.

The circular prices for the several sizes of anthracite at the mines in 1910, 1911, and 1912, which are common to all the region, were as follows:

Circular Prices for Anthracite at the Mines, 1910-1912,

	Per Long Ton.		
Size	1910	1911	1912
Lump	\$3.50	\$3.50	\$3.50
Steamboat	3.00	3.00	3.00
Broken (furnace)	*3.50	*3.50	†3.50
Egg	*3.75	*3.75	†4.00
Stove	*3.75	*3.75	†4.15
Chestnut	*3.75	*4.00	†4.15
Pea	2.00	2.00	2.50
Buckwheat	1.50	1.50	1.50
Rice	....	‡.538	‡.634
Barley	....	‡.339	‡.388

*Subject to 50 cents reduction in April, 40 cents in May, 30 cents in June, 20 cents in July, and 10 cents in August.

†Discounts omitted in April and May, but resumed in June.

‡Average price received for all coal of these sizes sold by Philadelphia & Reading Coal & Iron Co.

HUDSON BAY EXPLORING EXPEDITION, 1912*

By J. B. Tyrrell.

On the 18th of April, 1912, I received instructions from The Honourable the Minister of Lands, Forests and Mines of the Province of Ontario, to organize a party, including a properly qualified Dominion Land Surveyor and assistants, and to proceed at as early a date as practicable direct to Port Nelson at the mouth of the Nelson river on Hudson Bay, and after due investigation to carefully select the lands, waterfront and easements to which the Province of Ontario is entitled under an agreement with the Province of Manitoba, ratified by an Order of the Privy Council of the Dominion of Canada, dated the twentieth of February, 1912.

After these lands had been selected, they were to be properly and accurately surveyed.

As much information as possible was to be obtained about the strip of country lying within fifty miles of the shore of Hudson Bay and extending from the southeastern bank of Nelson river to the western boundary of the Province of Ontario.

And, finally, if possible, I was to return home through that part of the District of Keewatin added by the Act of Parliament of Canada of last session to the Province of Ontario, and now known as the District of Patricia, obtaining such general information as to the character, resources and possibilities of this district as it might be possible to procure in the time at my disposal.

In accordance with these instructions, I engaged Professor Lewis B. Stewart, Professor of Surveying and Geodesy in the University of Toronto, as surveyor, and Mr. W. B. McPherson, B.Sc., as assistant surveyor and chainman, and at the same time made arrangements for an assistant geologist to go by ship to Port Nelson in order to accompany me on my journey home through the District of Patricia. I also engaged Mr. Hugh McDiarmid, of Maxville, Ontario, who had already spent some years on Hudson Bay, as chainman and canoeeman.

From Selkirk to Norway House.

On the twenty-seventh of May, 1912, accompanied by Messrs. Stewart and McPherson, I left Toronto and proceeded to Nipigon, where, through the kind assistance of Mr. William McKirdy, four good Indian canoeemen were secured, and thence the party proceeded to Selkirk, Manitoba. Here it is necessary to wait for a few days, for the steamboats declined to start for the north end of Lake Winnipeg until it was reasonably certain that the ice had disappeared from it. On the fourth of June we took passage on the steamer "Wolverine," belonging to the Northern Fish Company, and started from Selkirk. The boat was loaded with fishermen and their supplies for the summer, and it was necessary for us to stop at several fishing stations on the shore and islands of Lake Winnipeg, on the way north. Nevertheless, we reached Warren's Landing, at the north end of this lake, where the Nelson river flows out of it towards Hudson Bay, on the morning of the sixth of June, and on the afternoon of the same day we continued down the Nelson river to Norway House, where the Hudson's Bay Company has one of its oldest and most important trading posts.

Here it was necessary, if possible, to obtain two more canoeemen, for we had three canoes and I needed to

have two expert Indian canoeemen in each canoe. We had already obtained four such men at Nipigon, but they knew nothing of the waters ahead of them, and I had purposely refrained from engaging more canoeemen in Nipigon in order to be able to take two men from Norway House who knew the river from there to York Factory, with its rapids, falls and portages.

Unfortunately others wanted to go to Hudson Bay as well as ourselves. The number of canoeemen at Norway House was limited and there was keen competition for them, so that a delay of several days occurred here before men could be obtained. As far as possible the time was employed in correcting instruments and getting everything in order for immediate work when we should reach the field of our proper labours.

Having at length engaged two Indians, we left Norway House on the morning of the twelfth of June in three canoes, with such provisions as would be necessary to supply us for a month, and started northward down the Nelson river to the mouth of the Echimamish, up the Echimamish to its head, across the narrow rocky divide which bounds the waters of the Nelson river on the east, and then down the Hayes river to York Factory, the great historic trading post of the Hudson's Bay Company, built on the west bank of the river near its mouth, making a track-survey of our route, the distances on the rivers and smaller lakes being estimated, while the lengths of the larger lakes were measured with a boat log.

The Shamattawa river flows into the Hayes river sixty miles from where this latter stream empties into Hudson Bay, and as we were to explore a strip fifty miles wide from the shore of the Bay southward, I decided to begin our survey at this point. Professor Stewart therefore began a careful survey of the Hayes river downward from the mouth of the Shamattawa, taking his bearings from the true meridian with a transit, and measuring his distance with a rod and stadia hairs, checked in several places by careful chainage.

At the same time I went up the Shamattawa river for a few days to investigate the character of the country through which it flows.

Our journey from Norway House to the mouth of the Shamattawa, a distance of 260 miles, had been rather slow, as we were constantly delayed by head winds and stormy weather, but on the twenty-seventh of June, Professor Stewart started his survey downwards from that point and continued it from that time until July 12th, when he reached the mouth of Hayes river. During the latter part of the time in which Professor Stewart was so occupied, I was at York Factory and on Nelson river making investigations as to the character of the surrounding country, and also of the country extending eastward, obtaining all the information that it was possible to obtain from the Indians who have their hunting grounds in this latter district.

After Professor Stewart had made survey of the Hayes river from the Shamattawa river to its mouth, he continued it round the point which separates that stream from the Nelson river, up Nelson river to Seal Island and down its west shore to Flamborough Head. As soon as this was completed I chose a frontage of ten miles on the east side of Nelson river, and Professor

*Extracts from 22nd annual report Bureau of Mines, Ontario, 1913. The report contains geological and topographical descriptions of the country explored and is accompanied by a map.

Stewart marked it with proper posts and mounds, which I also signed with him. We then cut lines back through the forest for a distance of a mile at the north end of the ten mile strip, and for five and a half miles at its south end, the eastern portion of this latter line crossing the Hayes river and connecting with the stadia survey which had been made of the banks of this latter stream.

After choosing the frontage for the Province of Ontario on the Nelson river it was necessary, in outlining a strip of land five miles wide from that frontage eastward to the western boundary of Ontario, to find a feasible crossing place for a railway across the Hayes river. On account of the shifting character of the channel of this stream near its mouth, and of the enormous floods and ice-jams to which it is occasionally subjected in the spring, such a crossing place could not be found nearer than thirty-three miles from Hudson Bay, not far from the junction of a tributary called the Pennycutaway river which empties into the Hayes river from the west.

Therefore, as it was necessary to go up the Hayes river at least 33 miles before a crossing for a railway could be found, it was necessary for me to bend the five-mile strip of land southward from the mouth of the Nelson river along the west side of the Hayes river at least as far south as the mouth of the Pennycutaway, and the survey of this strip so chosen was marked by substantial posts at various conspicuous places, as shown on the accompanying map of the lower portions of the Hayes and Nelson rivers.

It was impossible for me to explore the strip of land eastward from the Hayes river to the boundary of the Province of Ontario in the remaining time at my disposal, but I made a trip in a canoe up the Machichi or Fourteen river, which flows northward into Hudson Bay across the country to the east of Hayes river, and obtained a fairly clear idea of the character of the country along its banks.

By the time Professor Stewart had completed the survey of the land chosen for the Province of Ontario in the vicinity of the mouth of the Nelson and Hayes rivers the summer was almost over, and it was necessary for him to return to Toronto to resume his duties at the University, so, accompanied by Messrs. W. B. McPherson and H. McDiarmid and the Indians from Norway House, he returned up the Hayes river to Norway and thence down Lake Winnipeg to Selkirk and home to Toronto.

On the twentieth day of August the steamship "Stanley" arrived at York Factory, bringing Mr. P. E. Hopkins as assistant to accompany me on my journey homeward.

The annual steamer which brings out the supplies for the Hudson's Bay Company at York Factory had not yet arrived, and some lines of supplies, especially bacon and meat, had run short at this central depot. Consequently the Company was prevented from furnishing the usual supply of meat to its trading posts on the Severn River, which I was about to visit. This was particularly unfortunate for us, because the bacon which had been sent to me on the steamer "Beothic" and delivered to me at the mouth of the Nelson River, was almost all decomposed and quite unfit for use when it was delivered. In spite of its bad condition, however, we were obliged to do the best we could with it and to use parts of it.

From York Factory via Severn River.

On the twenty-sixth of August I left York Factory, accompanied by Mr. Hopkins and the four Indian

canoe men from Nipigon, with two canoes, and took passage in a small sail-boat of the Hudson's Bay Company along the shores of Hudson Bay to Fort Severn, where we arrived eight days later.

On the 4th of September we started southward from Fort Severn in our two canoes heavily laden with provisions, for it was uncertain when or where we would be able to get any further supplies. We ascended the Severn River, hauling our canoes with lines, a distance of fifty-six miles, to the mouth of the Fawn River, which is a beautiful clear stream 150 yards wide at its mouth, with terraced banks 80 feet in height. Thence we ascended Fawn River, walking on the bank and hauling our canoes as before for a further distance of 180 miles, but through much of this distance the journey was made very laborious by the fact that the weather was rainy and stormy and the river was swift, deep and narrow, and overhung with tall willows, so that our progress was often very slow, the tracking line being constantly entangled in the overhanging willows. Fifteen days were occupied in this journey, and at the end of that time we welcomed the occurrence of heavy rapids, past which it was necessary to carry our canoes and supplies, but between which the water was not so swift as before, and it was possible to make some progress with our paddles.

Trout Lake.

On the twenty-first of September, Trout Lake was reached and we had the pleasure of meeting Mr. H. C. Moir, the gentleman who is in charge of the Hudson's Bay Company's trading post for that company. Here we were able to replenish our supply of flour, but it was impossible to obtain any meat, and our own supply of meat at that time consisted entirely of partly decomposed bacon.

Up to this time we had travelled from Severn House without anyone who had any local knowledge of the country, and guided entirely by the map on the scale of sixteen miles to the inch published by the Geological Survey of Canada. From Trout Lake southward across the height of land to Cat Lake, on the waters of the Albany River, the route travelled by the Indians was not known, and as we wished to follow it, it was advisable, if possible, for me to employ an Indian here to go with us and show us the way by which he was accustomed to travel. The Indian obtained for us by Mr. Moir was a man of considerable intelligence named Adam Thunder, and on the morning of September the twenty-fourth we started across Trout Lake with Adam and his wife and two children in a canoe of their own as guides.

From Trout Lake to Windigo Lake.

From Trout Lake we entered a small stream named Mishwamagan or Red Sucker River, and ascended it southward to its source in several small lakes, from one of which we carried our canoes and contents across to Kwiuswagami Lake and thence into Makoop Lake, which empties by an independent outlet westward into Severn River. Makoop Lake is evidently good fishing ground, and some Indians have here two substantial log houses in which they live in the winter, although they move about from one part of their fishing ground to another in the summer.

From Makoop Lake, instead of turning down stream, we entered Negigamo or Otter River, and ascended it for a day's journey, when though it was still a stream of considerable size, we left it and turned westward across a portage somewhat more than a mile in length to another tributary of Severn River, which, at the

point we reached it, was ninety yards wide with low swampy banks on both sides.

On this river, Adam, our guide, decided to leave his wife and family with some friends or relatives whom he met, and to take a seat in one of our canoes, where he would be more useful to us, both by assisting in paddling, and, being close at hand, he would be able to give us information about the country from time to time as the various features were observed.

This river is also a tributary of the Severn, but Adam said that it had no particular name. I have therefore called it Ningitowa River, taking the name of one of the lakes on its course. We ascended it for three days through many lakes and over numerous portages to a lake with a name too long for intelligent English pronunciation, but it means Big White Fish Lake.

From the south side of this lake is a portage twelve hundred yards in length across a rocky hill to a small stream which in a short distance flows into Weagamow lake, and this lake in its turn discharges by another independent stream westward into Severn river, and is fed by two streams from the east and south, known respectively as the Baribou and Saskatchewan.

Weagamow lake also seems to be a good fishing ground, for there was a large band of Indians camped near the place where we entered it, engaged in catching a supply of fish to feed them through the autumn and winter.

From Weagamow lake I had hoped that our route was to take us down stream to the Severn river and thence southward up the main river, but in this I was disappointed, for instead of turning down stream we entered Saskatchewan river and ascended it to a small lake named Augutua lake, from which a number of high sand hills may be seen forming conspicuous features in the landscape.

Windigo Lake.

From the southwest side of this lake we made a portage three and a half miles in length, over one of these sandy hills to Windigo lake, the largest body of water that we had encountered since leaving Trout lake. This, too, is a favorite fishing ground for the Indians, and on its eastern shore they have some small houses around which were gardens, where potatoes had been grown, though at the time of our visit they had been dug and were stored away. Windigo lake also discharges westward into the Severn river by an independent stream, which, however, we were unable to visit, but we were told by Adam that it flowed westward to Niskib or Goose lake, in which it was joined by Weagamow river, and from which the united streams flowed into Severn river. Passing through the lake we ascended a small river for about fifteen miles, when, by a series of long portages, we passed out of it and into the Cedar branch of the Severn river, which we reached at Little Cedar or Geechika lake, the northern limit of growth of cedar trees.

Thus, on leaving Trout lake, we had ascended a small stream to the higher land lying between the watersheds of the Severn and Wenisk rivers, on which are a number of lakes, and we had travelled southward on the western side of the height of land through a chain of lakes, instead of travelling continuously up the main branch of the Severn river. This route leads through small streams and over many long and swampy portages which are often poorly cut out, but the reason why it is used by the Indians instead of the main river doubtless is that it leads through lakes in which fish are abundant, and where game is probably moder-

ately plentiful. Whether it is easier for large canoes to navigate than a route up the main river is uncertain, because the river is as yet largely unexplored.

From Little Cedar Lake we journeyed southward up a small winding stream and over many portages to the height of land dividing Severn from Cat river, which is one of the upper tributaries of Albany river.

Cat Lake.

On the thirteenth of October we paddled up to Hudson's Bay Company's post on Cat lake, and were kindly received by Mr. Lawson, the store-keeper in charge for the Company, and, as he was supplied with provisions for the winter's trade, we were able to get such staples from him as were necessary to carry us through to our destination at Sioux Lookout, on the Grand Trunk Pacific railway. A supply of nice fresh bacon was particularly welcome, as we had become very tired of living on rotten bacon, and besides we had that day eaten the last of both that and our sugar, so that we were quite ready for a new supply.

We were now in the country that had previously been surveyed by explorers from the Geological Survey of Canada, and, as the season was far advanced, we made all haste southward down Cat river to Lake St. Joseph, across a portage to Root river, down Root river to Lac Seul, and thence southward to Sioux Lookout, where we arrived on the evening of the twenty-third of October, seven weeks from the date when we left the mouth of the Severn river. Here our canoes were stored, the men were taken eastward to Nipigon and paid off, and I and my assistant, Mr. Hopkins, returned to Toronto.

Minerals.

No minerals of economic importance have yet been recorded from the vicinity of the route travelled over last summer, but there is little doubt that fuller investigation will determine their existence.

Several areas of greenstone and other similar rocks of Keewatin age were crossed, especially on Trout, Windigo and St. Joseph lakes. Wherever rocks of similar age and character to these have been thoroughly prospected in other parts of Canada, valuable minerals, usually including the precious metals, have been found in them, and there is no reason to suppose that the areas of Keewatin rocks here recorded will form exceptions to this rule. The Paleozoic limestone near the shore of Hudson Bay may also contain beds of salt, gypsum or other valuable minerals of similar character.

TUNGSTEN.

The tungsten bearing mineral scheelite has been found at a number of localities in Canada, but the only place at which it has been worked commercially is at Scheelite Mines, Moose River district, N.S. Here it occurs in quartz veins cutting the quartzites and slates of the gold bearing series. The quartz veins also carry mispickel and several other minerals, but are not gold-bearing. A mill has been erected and about 15 tons of concentrated ore (72 per cent. scheelite) have already been shipped. Scheelite also occurs in the Malaga gold mining district, Halifax County, while at one locality near South East Margaree in Inverness County, C.B., from 300 to 500 pounds of hubernite (Fe, Mn) WO₄, were recovered from a large detached mass of quartz. The mineral has also been noted at New Ross, in Lunenburg County, and at Perry Lake, West Waverley, Halifax County, N.S.

PERSONAL AND GENERAL

Mr. H. Bradley is in Toronto.

Mr. G. M. Colvocoresses is at Humboldt, Ariz.

Mr. R. W. Brock has been appointed Deputy Minister of Mines to succeed Mr. A. P. Low.

Mr. G. G. Gibbins is in British Columbia. His address for several weeks will be 1159 Pendrell Street, Vancouver.

Mr. Harold Whittingham is in Sardinia, with Mr. C. W. Wright.

Dr. Frank Adams has been appointed a member of the Commission on Conservation of Natural Resources.

Mr. Chas. A. Banks, manager of the Jewel-Denero Mines, Ltd., operating near Greenwood, B.C., left that Province recently for New York en route to London, England.

Mr. W. L. Coulson has resigned as general manager for the Canadian Collieries (Dunsmuir), Limited, operating coal mines on Vancouver Island, B.C. Mr. C. F. Compton, assistant secretary, remains in charge of the company's head office in Victoria. Mr. J. R. Lockard, who has been superintendent of the company's Comox colliery, Cumberland, is now general superintendent. It is unlikely another general manager will be appointed for some time, if at all.

Mr. W. B. Dickson, of New York, vice-president of the Hedley Gold Mining Co., was at the company's property in Camp Hedley, Similkameen, B.C., about the middle of December.

Capt. Harry Johns, superintendent for the British Columbia Copper Co., in Kootenay district, has been seriously ill at his home in Nelson. At last accounts his condition had improved.

Mr. Thos. McGuckie has retired from the position of general superintendent for the Western Fuel Co., of San Francisco, California, which has large coal mines near Nanaimo, Vancouver Island, B.C.

Mr. Donald G. Forbes, of Victoria, has gone to England for the winter. During the past field season he had been investigating mining conditions in a number of mining camps in the Coast district of British Columbia, to report on same to the Provincial Department of Mines.

Mr. E. Jacobs has returned to Victoria, B.C., from a month's trip to interior mining camps, including Boundary, Rossland, Slocan, and a short visit to the Coeur d'Alene district of Idaho.

Lieut.-Col. R. G. Edwards Leckie has returned to Vancouver, B.C., from a somewhat lengthy visit to Great Britain.

Dr. E. B. Milward, who for about a year had been developing a mining property near the east shore of Kootenay lake, British Columbia, resigned his appointment as manager some time ago and is now at Ainsworth.

Mr. D. H. Nellis, of Woodberry Creek camp, in Ainsworth mining division, was in Victoria lately.

Mr. M. E. Purcell, of Rossland, B.C., superintendent of the Consolidated Mining and Smelting Co.'s Centre Star-War Eagle group of mines, has been nominated for election as a councillor of the Canadian Mining Institute. Mr. W. J. Sutton, of Victoria, a well-known geologist who is now chairman of the Western Branch of the Institute, has been nominated for election as a vice-president. These nominations have been made to fill vacancies that will be caused by the retirement next March of Mr. R. H. Stewart, of Trail, vice-president, and Mr. Robert R. Hedley, of Vancouver, councillor.

Mr. Hermann C. Bellinger has resigned as general manager for Great Cobar, Ltd., which company has large copper mines and smeltery in New South Wales, Australia. Mr. Bellinger was for years connected with copper smelting works in British Columbia—at Trail in the nineties, and several years afterward at Crofton, Vancouver Island.

Mr. R. Randolph Bruce, of Wilmer, East Kootenay, B.C., is in England, where he was married on January 6. He was manager of the Paradise mine, in Windermere mining division, East Kootenay, when that property was operated some time ago.

Mr. E. J. Conway has been transferred by the Granby Consolidated Co. from a lime property on Portland canal, B.C., on which it is doing preliminary work in case it shall require to use lime flux at its new smelting works, Anyox, Observatory inlet, to the Copper Queen mine, on Texada island, where he has charge of the development work lately undertaken by the company under its option of purchase.

Mr. W. D. L. Hardie, formerly colliery manager at the Galt coal mines, near Lethbridge, Alberta, and since then manager of the Diamond City coal mine, ten miles from Lethbridge, has been appointed mayor and commissioner of finance and safety for the City of Lethbridge, which, as from January 1, adopted the commission form of municipal government. There are three commissioners, with Mr. Hardie at their head.

Mr. G. P. Jones, general superintendent for the Hedley Gold Mining Co., operating the Nickel Plate group of gold mines and 40-stamp mill in Hedley camp, Similkameen, B.C., has returned to Hedley from a business visit to the company's head office, New York, and thence to Los Angeles, California.

Mr. F. S. Norcross, superintendent of the British Columbia Copper Co.'s mines in Boundary district, B.C., has gone on a month's vacation trip to Michigan.

Mr. M. K. Rodgers has returned from Hedley, B.C., to his home in Los Angeles, California, after having been in consultation with some of the officials of the Hedley Gold Mining Co., relative to a new hydro-electric power station and plant, the construction of which on Similkameen river has been commenced, and for which work the directors of the company have authorized an expenditure of \$200,000.

Mr. R. H. Stewart, general manager for the Consolidated Mining and Smelting Company of Canada, Ltd., has returned to British Columbia from Toronto, where, on December 16, he attended the company's eighth general meeting of shareholders.

Mr. Francis A. Thomson, head of the mining engineering department of the State College of Washington, Pullman, Washington, has been elected chairman of the Columbia (formerly the Spokane) local section of the American Institute of Mining Engineers. Professor Thomson is well known in both eastern Washington and in mining districts in British Columbia.

Mr. John Vallance, until last spring superintendent of the Standard silver-lead mine, near Silverton, Slocan lake, B.C., is now at Twodot, Montana, where he has joined one of his sons in a mercantile business.

Mr. Roscoe Wheeler, superintendent of the Hedley Gold Mining Co.'s stamp mill and cyanide plant at Hedley, B.C., has been in California on a holiday vacation.

Mr. D. J. Williams, formerly assistant superintendent for the Pittsmtont Copper Co., of Butte, Montana, in November, went to the Rocher Deboule mine, in Hazelton district, Omineca mining division of British Columbia, to take charge of development and construction work the Continental Development Co., of Butte, planned to do under a lease it had of the upper workings of the Rocher Deboule mine, which is still only in an early stage of development. Progress has been hindered, though, by a minority of the shareholders of the Rocher Deboule Co. applying to the British Columbia courts to protect them from what they claim is an arrangement detrimental to their interests.

The Geological Survey has issued a new geological map of Alberta, Saskatchewan and Manitoba.

A meeting of the Toronto branch of the Canadian Mining Institute was held on Saturday January 10 at the Engineer's Club.

Mr. G. G. S. Lindsey has been nominated for the presidency of the Canadian Mining Institute. Mr. Chas. Fergie, of Montreal, and Mr. W. J. Sutton have been nominated as vice-presidents, and Messrs. John Hardman, J. W. Pyke, W. S. Johnson, J. J. Penhale, M. E. Purcell, G. C. Bateman, and C. E. Smith as councillors.

The 107th meeting of the American Institute of Mining Engineers will be held at 29 West 39th Street, New York City, February 17 to 20, 1914.

Mr. R. E. Hore has returned to Toronto after a visit to the Michigan copper mining district.

The annual meeting of the shareholders of the Porcupine Crown Mines, Ltd., will be held in Montreal on January 28, 1914.

The 16th annual meeting of the Canadian Mining Institute will be held in Montreal, March 4-6, 1914.

Mr. Siegfried Meyer, representing Beer, Sondheimer & Co., recently visited the Cobalt district.

Mr. Chas. Fergie, of Montreal, who recently joined the directorate of the International Coal Mining Co., Ltd., has been appointed president and managing director of the company, as from the first of this year.

HOLLINGER.

Gross profits for the period of four weeks ending December 2, 1913, amounted to \$118,090.74. The mill ran 96 per cent. of the possible running time, treating 13,140 tons, of which 383 tons were treated for the Acme Gold Mines Limited. The average value of Hollinger ore treated was \$15.17 per ton; approximate extraction 96.16 per cent.; milling cost \$1.402 per ton.

Work in the mine continues to yield satisfactory developments. By means of diamond drilling an extension of No. 1 vein to the south upon the 200 feet level was picked up, and subsequent work is proving this to be a very valuable extension. By means of diamond drilling it has been shown that No. 2 vein extends over 200 feet beyond its known limit upon the 100 feet level. By means of crosscutting, No. 2 vein has been picked up upon the 425 feet level. No. 6 vein upon the 100 feet level and No. 5 vein upon the 200 feet level, have also been reached by crosscuts, the latter vein showing a width of 22 feet and carrying \$12.27 per ton where cut. No. 7 winze, which is being sunk below the 425 feet level upon No. 1 vein, had reached a depth of 68 feet below the level on December 2nd, the vein continuing at about 8 feet in width.

CANADIAN MINING INSTITUTE—WESTERN BRANCH.

A meeting under the auspices of the Western Branch of the Canadian Mining Institute was held at Sandon, Slocan, B.C., on December 10, ulto. In the unavoidable absence of the chairman of the branch, Mr. W. J. Sutton, of Victoria, Mr. Oscar V. White, superintendent of the Slocan Star mines, presided.

A review of mining in Slocan district was submitted by the secretary of branch, Mr. E. Jacobs, who, after noting the much improved position of mining throughout that part of West Kootenay, and giving a list of properties on which mining was being, or had been, done during 1913, called attention to the fact that the gross value of the mineral production of Slocan, including about \$5,000,000 from Ainsworth mining division, usually included when speaking of Slocan district, had been to date approximately \$32,000,000. For the year 1913, he estimated a total which would prove the highest in 15 years—since 1898, when it was \$2,620,000.

Mr. G. C. Mackenzie, chief of the metallurgical division of the Mines Branch, Canada Department of Mines, Ottawa, who has charge of the experiments in electric smelting of lead-zinc ores at Nelson, undertaken by the Mines Branch, gave the meeting particulars of the plant and operations of the Dominion of Canada ore-dressing laboratory at Ottawa, and the conditions under which tests of ores will be made for miners, prospectors, and others. Many questions were answered during half an hour's conversational discussion that ensued.

Afterward, in connection with the subject of "Electric Smelting of Lead-Zinc Ores," the secretary gave an abstract of a paper presented by Prof. R. S. McCaffery, of the University of Idaho, at a meeting of two local sections of the American Institute of Mining Engineers recently held at Wallace, Idaho. This led to a discussion, in the course of which Mr. Mackenzie gave much information concerning what was being done in various countries and the progress made, but was not at liberty to say anything about the work he will do at Nelson, leaving that until results shall be available to make public. A vote of thanks to Dr. Haanel, Director of Mines, for authorizing Mr. Mackenzie to attend the meeting, was passed.

Mr. Wm. Thomlinson, of New Denver, read some notes on uncommon minerals occurring in Ainsworth and Slocan divisions, and others supplemented his paper with information of minerals that had come under their notice. The Provincial Mineralogist of British Columbia was thanked for having employed Mr. Thomlinson to collect samples of the district ores, a very fine collection of which had been got together and sent to the Mines Department, Victoria.

A press despatch from Washington, D.C., gives the total value of the mineral production of Alaska for 1913 as \$18,900,000, against \$22,537,831 for 1912. The U.S. Geological Survey estimate is that \$15,000,000 of the 1913 total represents the value of the gold produced, two-thirds of which was from placer mines. The dry summer and the working out of old bonanzas, together account for a decrease in placer gold production and correspondingly in the total of mineral production for the year.

SPECIAL CORRESPONDENCE

COBALT, GOWGANDA AND ELK LAKE

Cobalt Mining Companies Had a Successful Year, Paid \$10,271,694 in Dividends.—The year 1913 will undoubtedly stand as a record for dividends paid from Cobalt mines. The production will be slightly more than in 1912, but considerably less than in 1911, the value in dollars will be higher than in 1911, but less than in 1912. The decrease in dollars is due to the fact that there has been a drop of an average for the year of one cent an ounce.

The production is estimated as being 30,600,000 oz. of a value of \$17,600,000, as compared with a value of \$17,671,000 in 1912. The figures are based on actual production for eleven months and estimated production for the twelfth.

The dividends are more than a million dollars in advance of the previous year. This is due, no doubt, to the fact that as the result of high production and high price of silver in the closing months of 1912 some remarkable dividends were paid in the first months of 1913. These dividends were, of course, earned in the previous year.

The total dividends paid by the Cobalt mining companies during 1913 amounted to \$10,271,694, which figure does not include the Casey Cobalt or the close corporation. Dividends from the inception of the camp amount to \$46,933,818. Returns from close corporations would bring the figures to \$51,638,681. Dividends from the mines in 1912 showed a total of \$9,324,044, giving an increase of nearly one million dollars for the year which has just closed. Three new names appear on the dividend paying list for 1913, bringing the total to 22 dividend payers, both past and present, of which 17 made returns to shareholders during the year. The new names on the list are Seneca-Superior, Cobalt Lake, Caribou Cobalt, and Casey Cobalt. Nipissing, with the continuance of the 30 per cent. rate, paid \$1,800,000, the highest single disbursement by any one mine; the Coniagas, with the help of a big bonus, coming second. Of the total disbursements from the camp the Nipissing has paid back to shareholders more than the entire dividends of the camp during the record year. The list shows eight companies which have redeemed their capitalization, and it is only reasonable to believe that during 1914 this list will be further augmented.

The Beaver Auxiliary is still short of water and development operations have been much interrupted. The damming of the small lake was undertaken late in the spring and not enough water was impounded to carry on work. Therefore it is likely that development may be held up for some time yet.

Walsh.—While drifting on a calcite vein on the Walsh prospect at Gowganda some high grade was struck. The ore has a width of 4-inch, and drifting is now going on, to determine the length of the shoot.

La Rose.—The position of La Rose at the end of the calendar year was as follows:

Tons produced	3,342
Gross ounces produced	2,623,000
Gross value	\$1,559,000
Net profit	9161,000

The production does not show as much of a decrease as the net profit. This is probably due to the fact that the La Rose is now carrying on a great deal of dead work at the La Rose proper, the Lawson and the

Fisher-Eplett, and it raises the cost per ounce very materially.

Trethewey.—The production for the Trethewey mine for the month of November was 52,500 oz., about the same amount as produced in the previous month. The mill treated 3,100 tons with an assay head of 21 oz. The total production of the Trethewey for the year has shown only a slight falling off in comparison with the previous twelvemonth.

Coniagas.—In its usual frank and business-like statement the Coniagas Mining Co. shows that there has been but a small reduction of ore reserves, while a production of 3,572,398 oz. was obtained. Ore reserves are now estimated at 13,339,000 oz. This is tantamount to saying that the present year's production has been obtained at the expense of a decrease of 600,000 oz. in ore reserve; President R. W. Leonard, in his address, noted that dividends paid to October 31, made a total of \$5,360,000. The report shows that the ore is mined and concentrated at a net cost of 8.776 cents per oz., as compared with 8.515 cents per oz. in 1912. The cost includes head office expenses, royalties and all expense exclusive of shipping, smelting, mining and marketing the ore. The average price received per oz. was 60.55 cents.

The total production of the mine since 1905 when the first ore was shipped amounts to 17,662,904 oz., showing an increase in every year save two.

Mr. R. P. Rogers, assistant to the general manager, states that the concentrating mill was operated for 98 per cent. of the possible time. The total tonnage of ore milled was 54,890, as compared with 53,627 tons.

Development of new ore bodies during the year is estimated at 2,950,000 oz., the shipments being 3,572,398 oz.

Draining Cobalt Lake.—Since Mr. Godson, the Mining Commissioner, issued his order permitting of the draining of Cobalt Lake, the company has lost no time in getting to work. A gang of men have been set to work cleaning out the creek, which is the natural outlet of Cobalt lake. This preliminary work of clearing out and widening the channel of the creek will lower the lake six and a half feet. This work is necessary in order to give ample flow for the town sewer and the flume which will carry off the waste water from the mills. This has to be completed before pumping commences. The specifications for the pumps are now out. Plans for the dam across Short lake have been drawn and work there will commence at once, too.

Mr. M. B. R. Gordon, the mine manager, hopes that the lake will be drained of water by the middle or end of October.

PORCUPINE, SWASTIKA AND KIRKLAND LAKE

The Clark property at the Harricanaw river in Northern Quebec, is exciting much attention. The representative of the International Exploration Company, which holds this property, describes the vein as being 8 to 10 inches wide on the surface. At six feet in depth the quartz is three to five inches in width. There was also five feet of schist. Values in the quartz are cited as being \$104 to the ton and \$26 in the schist. Fifteen men are now at work on the property, but this force will be increased almost at once. A shaft will be sunk to the 100-ft. level at once.

La Mine d'Or Huronia.—Three gold bars have been shipped from La Mine d'Or Huronia in Gauthier township. These bars are stated to be worth \$3,375. This represents a run of 400 tons taken from one of the principal veins of the property. This ore was treated in the small mill between November 9 and December 13. It was taken off the plates alone, the concentrates not being available. Owing to the fact that the only power available is a 30 h.p. boiler and engine, it was never possible to run the little mill more than a third of its capacity, and development has been very slow for the same reason. To get more power it has been decided to develop at Victoria Creek Falls. This is only 4,000 feet from the mine. At a recent directors' meeting at Three Rivers it was decided to close down the mill and put all hands to work on the power scheme. It is then hoped to raise the crushing capacity of the mill to 100 tons per day, and also have enough power to run drills on development. The management hope to have their mill running at capacity about April the first. So far all the ore mined has come from an open cut 25 ft. deep by 30 ft. long, averaging between the walls about 6 ft. There is a considerable quantity of copper in the ore.

Dome Lake.—Active mining operations will be resumed at the Dome Lake within a few weeks. The main shaft, which is now 250 ft. down, will be continued to the 400-ft. level where development will commence. From the 180-ft. level a crosscut will head for the No. 1 vein and a raise will be put up on the ore body. A general overhauling is being given to the plant at the property. Two motors and transformers have been ordered. Before starting the mill again it is the intention of the Timiskaming and Hudson Bay to develop more ore at the lower levels. Undoubtedly changes will be made in the flow sheet of the mill, though exactly what those changes will be, has not yet been determined.

Hollinger.—For the four weekly periods ending December 2, the gross profits of the Hollinger mines amounted to \$118,090. The net surplus now amounts to \$785,665. As to development, Mr. P. A. Robbins reports that several extensions of ore bodies have been cut. The mill ran 96 per cent. of the possible running time, treating 13,140 tons, of which 383 tons were treated for Acme Gold Mines, Limited. The average value of Hollinger ore was \$15.17 per ton, approximate extraction 96.16 per cent., milling cost \$1.402 per ton. By means of diamond drilling an extension of No. 1 vein to the south upon the 200-ft. level was found, and subsequent work is proving this to be a very valuable extension. By means of diamond drilling it has been shown that No. 2 vein extends over 200 ft. beyond its known limits upon the 100-ft. level. By means of cross-cutting, No. 2 vein has been picked up upon the 425-ft. level, No. 6 vein upon the 100-ft. level and No. 4 vein upon the 200-ft. level have also been reached by crosscuts, the latter vein showing a width of 22 ft. and carrying \$12.27 per ton where cut. No. 7 vein, which is being sunk below the 425-ft. level upon No. 1 vein, has reached a depth of 58 ft. below the level early in December. The vein continues about 8 ft. in width.

McIntyre.—The November report of the McIntyre shows a total production of \$30,278. The ore milled averaged \$7.6363 per ton, and costs \$6.24 a ton, so that a profit of \$1.3963 per ton was realized. Costs are down almost a dollar a ton in comparison with October, but the grade of ore has dropped also. Ore milled amounted to 3,965 tons. An extraction of 94.3 per

cent. was obtained. Operating costs per ton milled were divided as follows: General charge .659; mining, \$2.175; mine development, \$1,716; milling, \$1.69. Total cost per ton, \$6.24.

Tough-Oakes.—While driving into the foot wall to make the sump at the 200-ft. level of the Tough-Oakes mine of Kirkland lake, a new extension of the vein has been located. It shows a high grade body 18 inch. wide, which runs 65.68 oz. of gold at the point where opened up. At a distance of 20 ft. east of the shaft a crosscut was started and in 8 ft. the extension was encountered. No work had previously been done in the hanging wall and the discovery was quite unexpected. In the west drift 60 ft. from the shaft the vein is 10 in. wide, 4 in. of which ran 57.2 oz., while 6 in. ran 11.64 oz., and, in addition, there are 4 ft. of \$15.20 ore.

QUEBEC

The winter season is in full swing, and coupled with a rapid succession of national and ecclesiastical holidays, gives rather the air of a south German carnival than the diligent hum of a successful mining industry. Despite all this, however, the buoyant tone of the asbestos markets is causing the mine managers to force the production as much as these circumstances will allow.

The Asbestos Corporation has been operating consistently and vigorously. The chief quarry, the King mine, has been giving some very substantial results, though somewhat impeded by the necessity of carrying on considerable development work. Their other important properties, the Beaver, and the British Canadian, have been prospering and shipments from all points are well in advance of last year.

The Jacobs Mining Co. has been pushing operations as much as possible. The newly inaugurated aerial tramway has been giving much trouble and causing a banking up of sand dumps in the vicinity of their mills. This system, while admirable in mountainous sections and where transmission period leaves ample time for repairs, does not appear to advantage where a twenty-two-hour service is required. The fact that it is not how much, but how little, machinery can be employed is fast becoming axiomatic in asbestos.

Martin Bennet.—The recently opened Martin-Bennet mines have been handicapped by the amount of development necessary for the proper opening up of the property. They have recently suspended night milling operations and are devoting the whole force of the night crew to removing barren ground.

The B. & A. at Robertson has been the only working representative for the past two years of the East Broughton-Robertson group of mines. This company has thereby gained no small advantage and the directors hope to report a comfortable balance at the end of the business year. Strenuous efforts have been employed to form a syndicate with the Ling, Frontenac, E. T. and Quebec asbestos companies in East Broughton, but the public are not far enough removed from the scandalous inflations of 1909 and 1910 to render such organization favorable.

The Robertson and Berlin asbestos companies at Robertson have been reported sold, but the truth of the statement lacks confirmation.

The labor market was satisfactory during the past season. An increasingly large foreign population augments the "habitant" class of laborers. Wages have rapidly advanced. Twenty cents an hour is the general

rule, while the large force engaged under the new system of contract work receive from twenty to thirty-five cents an hour.

Power.—There is at present a strong tendency on the part of the mine managers to revert to steam power for operating purposes. The field is practically held by one power company and it is claimed that the prices for power are too high. Ideally electricity has a large advantage over steam, but when the amount of lost time is deducted, it is claimed that steam is cheaper. A much cheaper rate for electrical power is predicted.

BRITISH COLUMBIA

The publication of estimates of the value of the mineral production of the Province in 1913 has redirected attention to the considerable importance of the mining industry. The "Daily Colonist" of Victoria on January 1 printed a statement obtained from the Provincial Mineralogist, in part, as follows: "The value of the mineral production for last year will be approximately \$29,550,000, which is nearly \$2,900,000 less than that for the year 1912. This decrease is due to a shortage of about \$1,600,000 in the value of the coal produced, occasioned by labor troubles on Vancouver island, and a shortage in the production of metalliferous mines due chiefly to a decrease of about \$1,160,000 in the value of the copper output and \$25,000 in that of zinc, which decreases are, however, partly compensated for by increases in the output of gold, silver, and lead. A portion of the metalliferous deficit is due to a fall in the market price of metals." It is noteworthy that the estimate of the Canadian Mining Journal's correspondent, mailed two weeks before the official estimate was made public, gave the total value as nearly \$30,000,000 and the decrease as \$2,440,000.

WEST KOOTENAY.

Slocan.—At the annual meeting of shareholders in the Slocan Star Mines, Ltd., held in Vancouver on December 19, the report of the directors and financial statement were adopted. The directors were re-elected, with the exception of Mr. Byron N. White, who declined re-election on account of ill-health. The company's superintendent, Mr. Oscar V. White, was elected in his stead.

The work of driving a long cross-cut adit at a lower level than any of the existing workings of the Noble Five Group, near Cody, has been commenced. It is intended to continue this work throughout the winter. Meanwhile work at other parts of the group has been suspended for the winter and early spring months.

The Van-Roi Mining Co., Ltd., has sent out from its office in London, England, the following report for the month of November received from the managers of its Van-Roi and concentrating mill, situated on Four-mile creek, about five miles from Silvertown: Total amount of average assay, silver, 12.5 oz. to the ton, lead 2.4 per cent., and zinc 8.2 per cent. This yielded 63 tons of silver-lead concentrate and 126 tons of silver-zinc concentrate; the average assay of the lead concentrate was silver 195.4 oz. to the ton, lead 56.3 per cent., and zinc 13.1 per cent., and of the zinc concentrate, silver 42.8 oz. to the ton, lead 0.8 per cent., and zinc 42.8 per cent. The total approximate value of the mill products was \$10,108, the estimated expenditure for the corresponding period was: On development, \$803; on ore-production, \$4,150; on milling, \$1,842; total

\$6,805. The development work done was as follows: Hanging-wall drift, level 9, main vein; situation about 200 ft. west of stope 1; advance 33 ft. and 33 ft. of parallel driving. In 960 drift, level 9; position 960 ft. from mouth of tunnel, into hanging wall; advance 28 ft. In 960 raise, level 9; position 960 ft. from mouth of tunnel; advance 15 ft.

Rossland.—The Rossland-Kootenay Mining Co., Ltd., at its ninth annual meeting of shareholders in London on November 25th, discussed the recommendation of the chairman of the board of directors that the re-opening of the company's Nickel Plate mine at Rossland be provided for. In order to provide \$10,000 to \$20,000 for this purpose either some form of reconstruction of the company or levying a call of two shillings a share was suggested. The company's consulting engineer, Mr. Bedford McNeil, who visited Rossland last August, spoke in favour of the chairman's recommendation, and a report by Messrs. Alex. Hill & Stewart also encouraged action.

The Richmond Consolidated Co. reports having cut a good-sized body of ore on the 200-ft. level of its Lily May mine, in the south belt of Rossland camp. The mine is equipped with a small but sufficient power plant, so that if later development prove the occurrence there of any considerable quantity of ore of shipping grade, it should be practicable to make production to an extent that would demonstrate that the property has commercial value, which has not yet been done. The chief obstacle to progress in the south belt is that no financially strong operator, whether individual or company, has given that part of the camp active attention in late years. The Blue Bird, also situated in the south belt, is inoperative notwithstanding that a promising orebody has been opened at a depth of between 200 and 300 ft., the owners being without funds for necessary development work to allow of ore production.

The Le Roi No. 2, Ltd, has sent out from its office in London, England, the following report for the month of November, received from the managers of its Josie group of mines, Rossland: Shipped, 1,800 tons of ore and 145 tons of concentrate. Receipts from the smelter were \$33,615 in payment for 2,097 tons of ore shipped, and \$2,043 for 142 tons of concentrate; in all, \$35,658. Estimated costs for corresponding period were: Development, \$8,000; ore-production, \$10,000; milling, \$1,300. Total, \$19,300. Development was as follows: Poorman drift, 900-ft. level; advance 65 ft., of which 25 ft. average gold 4 dwt. to the ton, and copper 0.75 per cent. across 19 inches. Hamilton drift 900-ft. level; advance 110 ft., of which 110 ft. averaged gold 5 grains to the ton, and copper 0.5625 per cent. across 23 inches. No. 9 intermediate drift, 900-ft. level; advance 24 ft., of which 14 ft. averaged gold 7 dwt. to the ton, and copper 10.25 per cent. over 22 inches. South Rodney winze, 1,650-ft. level; advance 17 ft. along which length the average was gold 4 dwt., 4 grains to the ton, and copper 1.625 per cent. across 84 inches.

BOUNDARY.

Grand Forks.—The Granby Consolidated Co. during 1913 smelted more than 1,200,000 tons of ore from its mines at Phoenix. The copper recovered from this ore was between 21,000,000 and 22,000,000 pounds.

Phoenix.—The output of ore from the New Dominion Copper Company's Rawhide mine in 1913, was about 238,000 tons, which ore was smelted at the British Columbia Copper Company's works at Greenwood.

The Consolidated Mining & Smelting Company, during 1913, shipped to Trail, from its No. 7 mine, situated a few miles south of Phoenix, about 4,500 tons of silver-gold ore. Operations at that mine were carried on during only a part of the year, at a time when siliceous ore was required at the company's smelting works.

Greenwood.—The total quantity of ore treated at the British Columbia Copper Company's smelting works here, in 1913, was approximately 622,000 tons, that total including an estimated quantity for the month of December. Rather more than 362,000 tons was from the company's own mines, namely, 304,000 from the Mother Lode mine, near Greenwood; 30,000 tons from the Napoleon mine, in the neighboring State of Washington; and nearly 28,000 tons from the Queen Victoria mine, near Nelson. About 238,000 tons was from the Rawhide mine near Phoenix.

SIMILKAMEEN.

Hedley.—The Hedley Gold Mining Co, crushed nearly 71,000 tons of ore from the Nickel Plate group of mines at its 40-stamp mill, Hedley, during 1913. The assay value of the gold content of that ore was about \$852,260, while the recovery was \$792,330. There was spent on new construction \$5,570. The directors have appropriated \$200,000, to be expended on construction and equipment of the new hydro-electric power system and plant, now being put in on Similkameen river, near Hedley.

Princeton.—Development work is being continued on Copper mountain by the British Columbia Copper Company. Reports as to results are favorable, and it is thought there is not now much room for doubt that the company will complete the purchase of the large group of claims on which they have been working for two years or more.

ROSSLAND.

It is reported that the Richmond Consolidated Mining Company has made an important find of copper ore on the 200-ft. level of its Lily May claim, in the south belt of Rossland camp. Some time ago the company acquired this property, which is the oldest location in the camp, and added it to its Richmond group. A power plant was put in and development work commenced from the 200-ft. level of the Lily May, which is reached by an incline shaft put down years ago. If the reported find prove as valuable as claimed, it will be of much importance to the south belt, interest in which has not been active of late, save that the Richmond Company has continued development work ever since installation of its power plant last summer.

PORTLAND CANAL DIVISION.

The Portland Canal Miner says:—With the advent of winter development on most of the mining properties in the Portland Canal mining division is necessarily suspended, and for the next few months it will hardly be likely that development will be continued at more than three of four mines in the division. For several reasons, principally financial, there have not been as many properties worked this year as in 1912, but those on which money has been expended have more than justified the outlay on them. The number of assessments done was quite satisfactory, and proved beyond measure that owners have faith in the future of the camp, and there is reason to believe that next year, when the Granby Consolidated Company's smelting works shall be in operation,

work will be resumed on several properties now dormant, so as to permit of shipments of ore being made from them. The fact that the Granby Consolidated Company purposes going into the custom ore smelting business, and will eventually put in a lead stack, should give much encouragement to local mine owners desirous of shipping, but whose ore will not stand the larger expense of shipment to southern smelters. The important work being done by the Portland Canal Tunnels, Limited, in driving the long adit to cross-cut the Glacier Creek vein series at depth; the development work being carried on by the Indian Mines, Limited, in the Salmon river district; the opening of the lime deposits at Swamp Point by the Granby Consolidated Company; and the efforts made by many individual prospectors and companies to demonstrate the value of their respective properties, together, speak hopefully for the future of mining in this part of British Columbia. "The Miner" voices the opinion of those most competent to judge that with the advent of capital, Portland Canal mining division will yet rank as one of the largest producers of ore in northern British Columbia.

YUKON TERRITORY.

Dawson.—Travel from Dawson to the Shushanna gold field, Chisana river district, by way of the White River valley, has commenced with dogs and horses. The Dominion Government is constructing a trail, and is otherwise improving traveling conditions by this route to the upper White River section. The Geological Survey of Canada, will make a topographical survey of the whole valley of the White river. Road-houses are now established at distances of about half a day's travel all along the Dawson-Shushanna route. Heavy stocks of supplies are to be sent in from Dawson as soon as the ice is thick enough for teams to haul them over it.

Whitehorse.—Ore is being shipped daily in considerable quantity from the Pueblo copper mine, by the New Atlas Mining Company, of which Mr. Wilbur D. Greenough is manager. Indications were that the total output for November would be larger than for other recent months. It is stated the company will do development work on the property throughout the winter, and will, as well, prospect other claims in Whitehorse copper camp.

COBALT ORE SHIPMENTS.

The ore shipments from the Cobalt camp for the week ending January 9th were:

	High.	Low	Pounds.
McKinley-Darragh	77,990	.....	77,990
Hudson Bay	86,610	.....	86,610
Penn.-Can.	53,790	.....	53,790
Trethewey	50,180	42,410	92,590
Townsite	138,370	.....	138,370
Beaver	63,870	.....	63,878
Coniagas	45,250	.....	45,250
La Rose . . . . .	.....	80,000	80,000
Dominion Deduction	78,850	.....	78,850
Crown Reserve	64,170	.....	64,170
	559,080	122,410	781,490

The bullion shipments for the week ending January 9 were:

	Bars.	Ounces.	Value.
Nipissing	169	196,404.71	\$112,932.66

This is also the first and only shipment of bullion in the new year up to yesterday.

KRUPP CRUOSONWERK ORE TESTING PLANT, MAGDEBURG, GERMANY.

Ore dressing generally involves two distinct processes: preparatory crushing of the ore and subsequent separation of the various components of the disintegrated material. Owing to the great variety, both of the physical qualities and the chemical composition of ores, a great number of possibilities of treatment offer themselves in crushing and still more so in the concentration of ores. In many cases it is not easy to decide which of these possible ways is the most profitable one for the treatment of the ore. For the miner himself it would hardly be possible and certainly not advisable to erect an experimental plant of his own; this would be a costly and inadequate undertaking.

Owing to this fact and in order to assist the Canadian mining industry, the Canadian Department of Mines

Ore crushers, slow and high speed roller mills, dry and wet grinding ball mills, Chilian mills, dry and wet grinding tube mills, several other systems of grinding machines, revolving and shaking screens, hydraulic classifiers, coarse and fine jigs, concentrating tables, round buddles, a light 3-head stamp battery and a heavy 5-head stamp battery (either of which may be used with or without different amalgamating tables), washing trommels, pumps, tanks, elevators, roasting and distilling furnaces, etc., etc.

A separate department of this large testing station is exclusively devoted to electromagnetic separation with various machines for treating any kind of strongly or feebly magnetic ores and minerals by means of the dry or wet process.

As regards the size of pieces which are fed into the separators, these may vary according to their magnetic



The Mitterberg (Austria) Copper Concentrating Plant. Ullrich Magnetic Separators Eliminate the Ferrous Ingredients of the Middlings. The Whole of the Installation, Mechanical and Magnetic was Supplied by the Krupp Works, of Magdeburg.

has of late a Central Testing Station in full operation at Ottawa. This testing station has been laid out in such a way that it allows of making all kinds of tests with ore, which is found within the boundaries of the Dominion. The station will no doubt help a great deal in the development of the rich mineral resources of Canada.

In connection herewith it may be interesting to the Canadian mining companies and owners of mining properties to learn that the Krupp Engineering Works maintain a similar full-sized ore-testing station at their branch works in Magdeburg, Germany.

This testing station has been in full operation for more than 15 years, and is equipped with the most up-to-date machinery applied for ore dressing.

The more important machines in this plant, all of full size, are the following:

and other special characteristics, between about 2½ inches across down to 250 mesh.

To the ore testing station is attached a special chemical laboratory.

With this plant the Krupp Works are in a position to make any kind of test on a full working scale. The engineers and metallurgists, under whose supervision all tests are carried out, are specially trained men, who, by their practice have acquired an intimate knowledge of most of the mining camps of the world and thus have thorough experience of the conditions prevailing there.

The tests already made on ores from all parts of the world amount to over 2,500 and many a difficult problem has been solved.

The expenses of maintaining an establishment like this are naturally very high. Nevertheless the Krupp

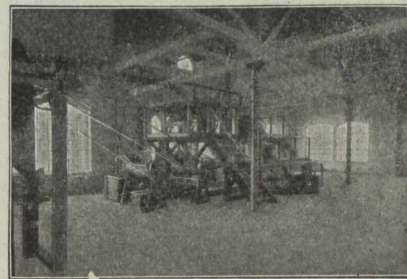
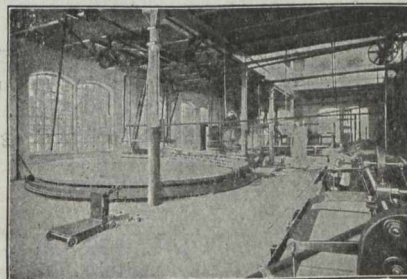
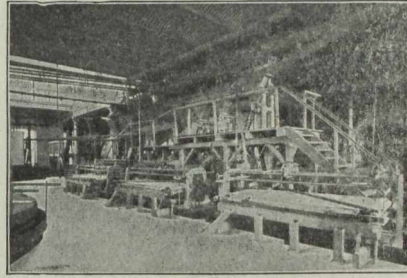
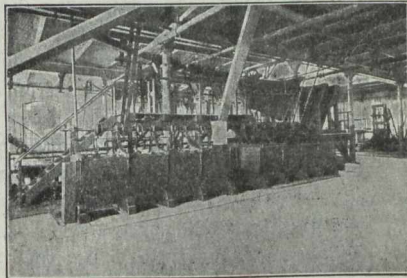
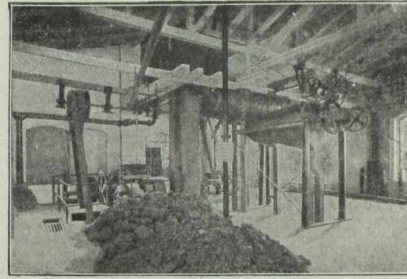
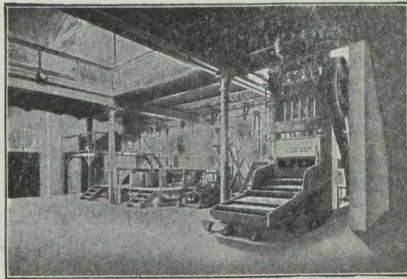
Works do all this experimental work for any mining company at a very moderate and nominal fee. The reports at the same time are very exhaustive and to the mining public of great assistance in the selection of the right plant for the most profitable treatment of their particular ore.

Such reports save the investor a great deal of time and money and show him clearly what can be done with his ore and whether it will be possible to work his property at a profit.

As a rule it is advisable to first submit to the Krupp Works a 10 to 15 lbs. sample for preliminary inspection. If the results with this sample are encouraging, the works will ask to submit 3-5 tons of average crude ore, unbroken for a thorough and exhaustive test.

PETROLEUM.

At the present time the principal oil fields in Canada are situated in the peninsula of Southwestern Ontario, between Lake Huron and Lake Erie. The first oil was found in Lambton County in 1862, and active production has been continued ever since. Until 1907 the Lambton County fields, in which there have been about 11,000 producing wells, were by far the largest producers; since then several new districts have been opened up, the most prominent ones being the Tilbury district in Kent County and the Onondaga district in Brant County. The oil districts are all situated within an area underlain by Devonian strata, usually on an anticlinal axis, and the petroleum is largely obtain-



Krupp Ore Testing Plant at Magdeburg

The reports are forwarded, and, if desired, with samples of the concentrates, etc., without any restriction and the customer is at liberty to buy the machinery wherever he pleases. Naturally the Krupp Works desire a chance of competing with the other makers of ore dressing and metallurgical machinery once it is decided to erect a plant, but no obligation exists in this direction.

Thus it will be seen that Krupp's Ore Testing Plant offers many advantages to the mining public, which should be made use of, whenever the opportunity arises.

Messrs. Jas. W. Pyke & Co., Limited, 232 St. James Street, Montreal, are the Canadian representatives for the Krupp Engineering Works and will be glad to give any further information to interested parties who may wish to send samples of ore over to the Krupp Testing Station for examination.

ed from horizons in the Onondaga formation at depths varying in the different localities. When the wells are first drilled, the natural pressure is usually sufficient to force the crude oil to the surface, sometimes producing what are known as gushers. After the flowing period, the oil has to be pumped. While some of the smaller districts became exhausted in a few years, many of the pools being only a few hundred feet wide and perhaps a quarter of a mile long, others have continued to furnish oil for a long period.

Four refining companies are operating in Canada distilling about 10 million gallons of Canadian crude oil per year, but the greater part being distilled at these refineries is still being imported from the United States. The total production for Canada for the year 1912 was 243,336 barrels, valued at \$345,050.

MARKETS

STOCK QUOTATIONS.

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

Jan. 8, 1913.

New York Curb.

	Bid.	Ask.
Alaska Gold	21.25	21.62
British Copper	2.12	2.37
Braden Copper	7.00	7.12
California Oil	291.00	293.00
Chino Copper	37.37	37.87
Green Can.	29.50	31.00
Miami Copper	22.00	25.00
Nevada Copper	14.87	15.00
Ohio Oil	156.00	160.00
Ray Cons. Copper	18.12	18.25
Standard Oil of N. Y.	192.00	193.00
Standard Oil of N. J.	424.00	427.00
Standard Oil (old)	1350 00	.....
Standard Oil (subs.)	925.00	955.00
Tonopah Mining	6.62	6.87
Tonopah Belmont	7.37	7.62
Tonopah Merger	.51	.53
Inspiration Copper	15.12	15.50
Goldfield Cons.	1.25	1.50
Yukon Gold	2.00	2.12

Porcupine Stocks.

	Bid.	Ask.
Apex	.....	.01
Dome Extension	.07	07½
Dome Lake	.26	26½
Dome Mines	14.75	15.00
Eldorado	.....	.01
Foley O'Brien	.15	.20
Hollinger	17.25	17.50
Jupiter	.06½	.06¾
McIntyre	1.30	1.50
Moneta	.02	.04
North Dome	.....	.25
Northern Exploration	2.75	3.00
Pearl Lake	.09	.09½
Plenaurum	.....	.35
Porcupine Gold	.09¾	.10
Imperial	.01½	.02
Porcupine Reserve	.....	.06
Preston East Dome	.01½	.02
Rea	.15	.20
Standard	.....	.01
Swastika	.04¼	.04½
United	.....	.01
West Dome	.07	.11
Porcupine Crown	1.29	1.31
Teck Hughes	.....	.26

Cobalt Stocks.

	Bid.	Ask.
Bailey	.05	.05¼
Beaver	.30	.31
Buffalo	2.05	2.25
Canadian	.....	.16
Chambers Ferland	.18½	.19½
City of Cobalt	.30	.35
Cobalt Lake	.55	.60
Coniagas	7.50	7.75
Crown Reserve	1.69	1.70
Foster	.06	.08
Gifford	.03	.04

Gould	.02	.02¼
Great Northern	.09½	.10
Hargraves	.02¼	.02¾
Hudson Bay	70.00	71.00
Kerr Lake	4.43	4.49
La Rose	1.75	1.77
McKinley	1.10	1.11
Nipissing	7.85	7.95
Peterson Lake	.23¾	.24
Right of Way	.04½	.06
Rochester	.02	.03
Leaf	.01½	.02
Cochrane	.....	.04
Silver Queen	.03	.05
Timiskaming	.13	.13½
Trethewey	.24	.26
Wettlaufer	.06	.08
Seneca Superior	2.25	2.75

TORONTO MARKETS.

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

Spelter, 5 cents per pound.

Lead, 5½ cents per pound.

Tin, 39 cents per pound.

Antimony, 8½ cents per pound.

Copper, casting, 15 cents per pound.

Electrolytic, 15 cents per pound.

Ingot brass, 10 to 15 cents per pound.

Jan. 12.—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).

Jan. 12.—Coal—(Quotations from Elias Rogers Co., Toronto):

Anthracite, \$8.25 per ton.

Bituminous, lump, \$5.25 per ton.

GENERAL MARKETS.

Jan. 9.—Connellsville coke (f.o.b. ovens):

Furnace coke, prompt, \$1.90 per ton.

Foundry coke, prompt, \$2.40 to \$2.65 per ton.

Jan. 9.—Tin, straits, 36.87½ cents.

Copper, Prime Lake, 14.50 cents.

Electrolytic copper, 14.25 cents.

Copper wire, 15.50 cents.

Lead, 4.10 to 4.15 cents.

Spelter, 5.25 to 5.35 cents.

Sheet zinc (f.o.b. smelter), 7.50 cents.

Antimony, Cookson's 7.37½ cents.

Aluminum, 18.75 to 19.00 cents.

Nickel, 40.00 to 45.00 cents.

Platinum, soft, \$43.00 to \$44.00 per ounce.

Platinum, hard, 10 per cent., \$46.00 to 47.50. per ounce.

Platinum, hard, 20 per cent., \$49.00 to \$51.50 per ounce.

Bismuth, \$1.95 to \$2.15 per pound.

Quicksilver, \$38.00 per 75-lb. flask.

SILVER PRICES. New York. London

	cents.	pence.
Jan. 1	.....	26⅞
" 2	57⅞	26⅞
" 3	57⅞	26⅞
" 5	57½	26⅞
" 6	57⅞	26½
" 7	58	26¾
" 8	57¾	26⅞
" 9	57½	26½
" 10	57¾	26⅞
" 12	57¾	26⅞