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THE EIGHT-HOUR DAY AGAIN.

In our last number appeared an editorial on this vexed question. Several correspondents, after reading that editorial, accused us of "trimming," and of sundry other heinous crimes. We wish, therefore, to present more fully our point of view.

Our editorial of October 1st was based upon the representations made by the mine managers of Cobalt to Commissioner Price. After commenting upon the arguments put forward by the operators, we made the following statements: "In principle the eight-hour day is sound. It has been applied successfully in several countries. It has also been applied unsuccessfully. Special conditions limit its applicability. If it is demonstrated that the special conditions outlined by the mine managers are sufficient cause for the retention of the longer day, the eight-hour day will be a mistake." To this opinion we still adhere.

At the outset, it must be clearly understood that, in the long run, the interests of owners and of employees are identical. Therefore, calm discussion, not violent controversy, is needed. The question then resolves itself into one of expediency. Is it, or is it not, expedient to introduce in any form the eight-hour day into the mines of Ontario? Our own opinion is that it is not expedient. And our reasons we shall give as plainly and as succinctly as lies in our power.

The mining industry of Ontario, although unquestionably in a prosperous condition, has not reached that stage of development where a change in working hours is either necessary or desirable. Prospects and small mines demand longer hours than do highly organized enterprises. The mere lack of working space and the duplication of effort make mining on a small scale expensive. This has been the case all over Ontario. It is particularly true of Cobalt.

Again, outside of Cobalt and Sudbury, how many mines have attained a dividend paying basis? One has little difficulty in counting them. But in a large number of localities there are prospects being opened and mines being worked that hold forth ample hope of profits. In almost every case the money available for this work is very limited in amount. Success largely depends upon speedy work. Any disturbing element now introduced would work havoc.

One fact that has generally been overlooked is that a considerable proportion of the miners do not want an eight-hour day. And this brings us to what seems to be the real gist of the matter.

As was pointed out in our former editorial, the miner is well paid, well fed, and well housed. His employment is less dangerous and brings higher remuneration.

ation than that of almost any other similar class. In fact, the miner in Ontario has every reason, when he compares his lot with others, to be content. Why then this superfluous paternalism? Are there not a score of abuses to be remedied in our factories, on our farms, and in our shops and offices? When these shall have been studied and met it will be time enough to consider the much more fortunate miner. In a word, granting for argument's sake the need of an universal eight-hour day, the miner is much less in need of it than are thousands upon thousands of his fellow-citizens.

By way of contrast, it might be well to let the imagination dwell upon the present effect of an eight-hour day upon the farm. No doubt, when the electric appliances of the future do everything but sign the payroll, the farmer's help will work but one-third of the day. Now, however, the suggestion might not be heartily welcomed.

It is to be remembered that the above is *The Canadian Mining Journal's* opinion as to the expediency of an eight-hour day in the mines of Ontario. Our former editorial dealt solely with the validity of the arguments adduced by the Cobalt operators.

We cannot close without correcting a sin of omission. In the category of those who sigh for remedial legislation we forgot to mention editors.

EASTERN ONTARIO GOLD MINING.

In this number of *The Canadian Mining Journal* we present an article on the Cordova gold mine, a mine that some years ago attracted much attention. Formerly known as the Belmont, it was operated by an English company for a few years. After lying idle for eight years, it has been re-opened by Mr. P. Kirkegaard.

The history of the mine under English control is of little interest beyond the fact that much territory and a fine water power were acquired, and complete overhead equipment installed. The power, which is generated three miles away at the foot of Deer Lake, is in itself a fine asset. At a very low cost, the equivalent of 750 h.p. as compressed air can be delivered to the mine. Provision is also made for 350 h.p. in electric energy.

The mine lies twelve miles north of the C. P. R. main line, the nearest station being Havelock, 100 miles east of Toronto. It is in the centre of a farming district, and within one quarter mile of a spur of the Central Ontario. The holdings embrace about 400 acres. A 30-stamp mill, fitted with cyanide plant, is as good as new. An adequate machine shop, shaft houses, and numerous dwellings, were built by the former owners. These are in good condition.

An extensive system of veins is known, and has been developed in part. The veins are fissure fillings in diorite. Along the fissures the diorite is replaced by chloritic schist, in which are intermingled quartz, calcite, and dolomite. In several places the veins outcrop as large domes of almost pure quartz. Impregnation

by iron pyrites is frequent, and at these points the richest ore is found.

The fissure veins form a complicated network on a large scale. Only three veins have been worked to any considerable extent. From these workings gold to the amount of \$300,000 was won in the early days.

The Cordova mine is now about to enter on a new phase of its existence. Mining will be conducted with the object of developing ore reserves equivalent to at least one year's supply. A close system of cost-keeping will enable the management to effect economies that were not enforced before. The ore will be handled in a cheaper and better manner, and much less "deads" will go through the mill.

As the ore is almost completely free-milling, and as the only sulphide present is iron pyrites (along with small amounts of pyrrhotite) it is believed that milling costs can be brought down to a low figure. The ultimate centralization of ore hoisting will lower underground costs. Hence, there is ground for the belief that Cordova has a profitable life before it.

Other mines are being opened in the same region. The Belmont iron mine is in the hands of the Buffalo Union Furnace Company. A stone quarry is being worked near Havelock. Altogether, the industry is brisker than it has ever been. And this means more for the surrounding country than a score of cheese factories. It brings a large increase of freight to the railways, gives steady employment to several hundred men, and adds directly to the wealth of the nation.

THE CONSOLIDATED REPORT.

The seventh annual report of the Consolidated Mining and Smelting Company of Canada has just reached us. The period covered is from June 30, 1911, to June 30, 1912.

The outstanding features reported are the increased net profit, which is \$310,345.97; the acquisition of Le Roi mines; and the reduction of the company's obligation to the Bank of Montreal to \$343,819.82.

The net amount expended in additions to plant and equipment was \$105,017.19. The expenditure in the purchase and development of new properties amounted to \$337,017.72. The gross value of metals produced at the smelter was \$5,083,078, as compared with \$4,437,901 for the previous fiscal year. Larger quantities of all the metals save copper were produced. The decrease in copper was due to the closing of the Snowshoe mine. Ore to the amount of 296,458 tons was smelted, from which were extracted 129,789 ounces of gold, 1,765,992 ounces of silver, 26,072,074 pounds of lead, and 2,914,181 pounds of copper. From the Centre Star group came 170,082 tons of ore; Le Roi being the next largest producer with 39,345 tons to its credit.

On the Centre Star group 29.55 miles of underground work was accomplished; 19.59 miles on the St. Eugene group, and 13.27 on Le Roi group. In addition to this diamond drilling to the extent of 20,282 feet was done,

the properties drilled being the Centre Star, Le Roi and Sullivan.

Deprived for six months of the regular coke supply from Crow's Nest Pass, the company was forced to pay a high price for Pennsylvania coke. This added an estimated amount of \$120,000 to working costs. This and other unforeseen additions to expenditure were offset by the improvement in the ore shipped from Rossland, the latter ore coming largely from the lower levels of the War Eagle and the upper levels of Le Roi.

The tonnage of customs lead ore has increased markedly. The Kaslo and Slocan Railway, which serves the Slocan district, is being operated by the C. P. R. Shipments are now being regularly made. The report of the general manager of the Consolidated, Mr. R. H. Stewart, speaks most cheerfully of the present condition and the future prospects of silver-lead mining, but suggests strongly the desirability of more government assistance.

EDITORIAL NOTES.

The Granby during the week ending September 28, smashed all records by producing 30,363 tons of ore. This brings the total for the current year up to 936,145 tons.

The Dominion Steel Company's figures of production for September were high. The coke output, 44,540 tons, almost made a record. Pig iron production was 26,030 tons.

September was a particularly satisfactory month for the Nova Scotia Steel & Coal Company. The coal shipments aggregated 87,790 tons, and the iron ore mined, 57,913 tons. Production of pig iron and steel ingots was also large.

The last shipment of ore from the Miller Lake-O'Brien mine, Gowganda, contained about 100,000 ounces of silver. The shipment consisted of 22 tons of picked ore and concentrates.

Few articles have attracted more comment than that contributed to our Nova Scotia Special Issue by Mr. J. H. Plummer. It has been copied in many daily papers and editorially noticed on both sides of the Atlantic.

The annual meeting of Granby Consolidated was held on October 1st in New York. A gratifying surplus of \$2,516,121 was announced. The statement was made that progress on the Hidden Creek property has been satisfactory, and that \$200,000 has been expended there.

Our Porcupine correspondent predicts the likelihood of a one dollar dividend on Hollinger shares shortly after January 1st, 1913. If this be the case Hollinger will have the honour of declaring the first dividend earned in Porcupine, and will have helped in the most substantial way to make mining history.

The Northern Ontario Light and Power Co., Limited, has absorbed the British Canadian Power Company. The former company has declared net earnings during the first eight months of this year to the amount of \$188,347. It owns and operates the hydro-electric plant at Hound Chute on the Montreal River, six miles from Cobalt.

In his speech of welcome to the members of the Canadian Mining Institute, at their recent semi-annual meeting in Victoria, B.C., Sir Richard McBride, premier and minister of mines for the Province, spoke in terms of warm commendation of the manner in which the western secretary, Mr. E. Jacobs, performed his duties. "It has always been a pleasure to me," said Sir Richard, "and to those associated with me in the Provincial Department of Mines, to work with Mr. Jacobs. We have invariably found him painstaking and anxious always to get at the truth of anything that has to do with mining in British Columbia, and ever ready to go to the utmost length. . . . to see that everything he publishes is positive fact." Sir Richard's encomium will be heartily endorsed by all those who have followed Mr. Jacobs' painstaking efforts to give our readers the truth and nothing but the truth.

CORRESPONDENCE

A MATTER OF HISTORY.

Editor Canadian Mining Journal:

Sir,—On returning from several months absence in Northern Ontario my attention has been called to an extraordinary statement in your special Quebec issue of July 1st. Under the heading "The Special Research Work of the Mining Department of McGill University" a writer, whose name is not given, asserts that "McGill was the first of the Canadian Universities to give instruction in mining and metallurgy as a regular course in 1871, and again the first to create and equip an independent department exclusively devoted to the subject in 1896." The facts are that up to 1893 no practical provision had been made anywhere in Canada for education in mining and metallurgy. In that year the School of Mining was opened in Kingston in connection with Queen's University, for the express purpose of filling this gap in education. Since that date there has always been a department here "exclusively devoted to the subject." Such well-known educational advances as the building of the first Canadian Mining Laboratory in 1894 and the organization in the same year of the first extension work in mining camps and the first courses for prospectors were made by the School of Mining and not by McGill. Comparisons are proverbially odious and I shall not follow up your correspondent's ingenious bit of advertising beginning "McGill still holds the premier place." We can all afford to be proud of McGill as a great Canadian University, but we must all regret that any misguided friend should put forward unfounded claims for her. McGill does not need such bolstering. I am

Yours sincerely,

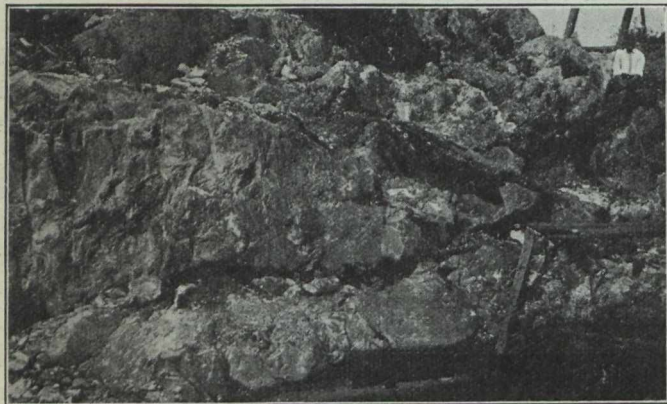
W. L. GOODWIN.

Oct. 1, 1912, School of Mining, Kingston, Ont.

AN EASTERN ONTARIO GOLD MINE.

Written for The Canadian Mining Journal.

To that indefinite entity, "the average reader," it will be a matter of surprise to learn that for many years gold mining has been carried on in Eastern Ontario within a few hours' railway run of Toronto. If, for example, you leave by the morning C. P. R. express and get off your train at Havelock, you can be safely landed at one of the most interesting, and certainly one of the best equipped gold mines in Can-



Surface Outcrop

ada, in ample time to enjoy your mid-day meal. You merely drive twelve miles north from Havelock station and there you are.

Concerning the beginnings of this mine, the Belmont (or Cordova), there is authentic record. Twenty-two years ago a farmer discovered visible gold in an outcrop on the wagon road. For a small sum the property was acquired a few years later by Mr. A. W. Carseallen, and in 1897 sold by him to the Cordova Exploration Company, of Newcastle-on-Tyne, England. From this time on, the history of the mine is a striking illustration of the vicissitudes that attend the search for gold.

The English company lost no time in getting to work. A 10-stamp mill was put in commission in December, 1907. Encouraging results were obtained from the first. In three years time the small stamp mill had crushed 15,267.5 tons of ore, which yielded 4,803 ounces of gold, of a gross value of \$86,519. Thus the average value of the ore was \$5.66 per ton, a good enough figure for a larger plant, but obviously yielding small annual profits from the small plant installed.

With this fact in view, and since the mine itself was in good shape with promise of enough ore to justify a considerable expenditure, it was decided to erect a larger mill, and to utilize a neighbouring water power to produce compressed air. These additions meant cheap and ample power, a larger mill capacity, lower costs, and naturally higher profits.

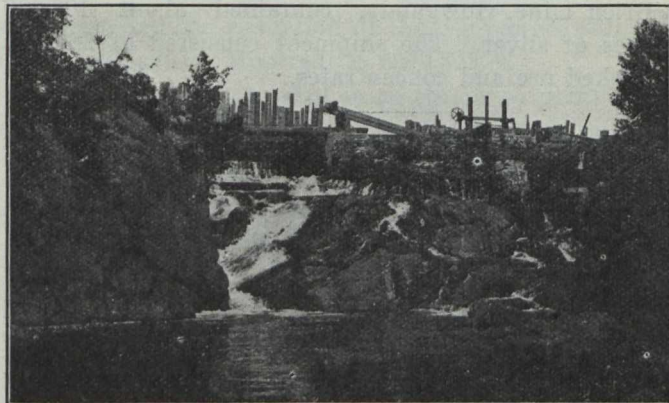
Up to this time about \$75,000 had been expended in developing and equipping the mine. The additions to the plant entailed a heavy outlay, which outlay was apparently justified.

The new mill was completed in December, 1900. Strange to relate, while the estimated cost was \$36,025, the actual cost exceeded this by only \$2,400. The power plant, from which compressed air was conveyed in pipes three miles to the mill and mine, cost in all

\$85,000, as against an estimated cost of \$60,000, not at all a bad showing in view of the engineering difficulties encountered.

The whole plant was in excellent running order during the latter half of the year 1902. The mine had been developed to such an extent that more than 100,000 tons of ore was blocked out. These bodies were reported on by a distinguished English consulting engineer to contain \$5.50 in gold per ton. Thus the ore proved to be ready to hand was worth in the gross at least \$550,000. Of course large unproved bodies of ore were also known to exist. But the 100,000 tons, with complete overhead equipment for mining and milling, constituted a sound commercial basis. The estimated cost per ton, including all charges of running, extraction, development (prospecting), administration, etc., was placed at \$2.75. The mill was expected to handle at least 2,000 tons per month. Loss in tailings, at 50 cents per ton, would bring the total net returns from the ore to \$2.25 per ton. The annual net profit, therefore, was calculated at \$54,000. This was looked upon as a minimum, as it was known that the mine could supply larger quantities to the mill, and it was believed, for excellent reasons, that the mill's capacity could be readily brought up to 2,500 per month, or 30,000 per year, making the net annual profit about \$70,000.

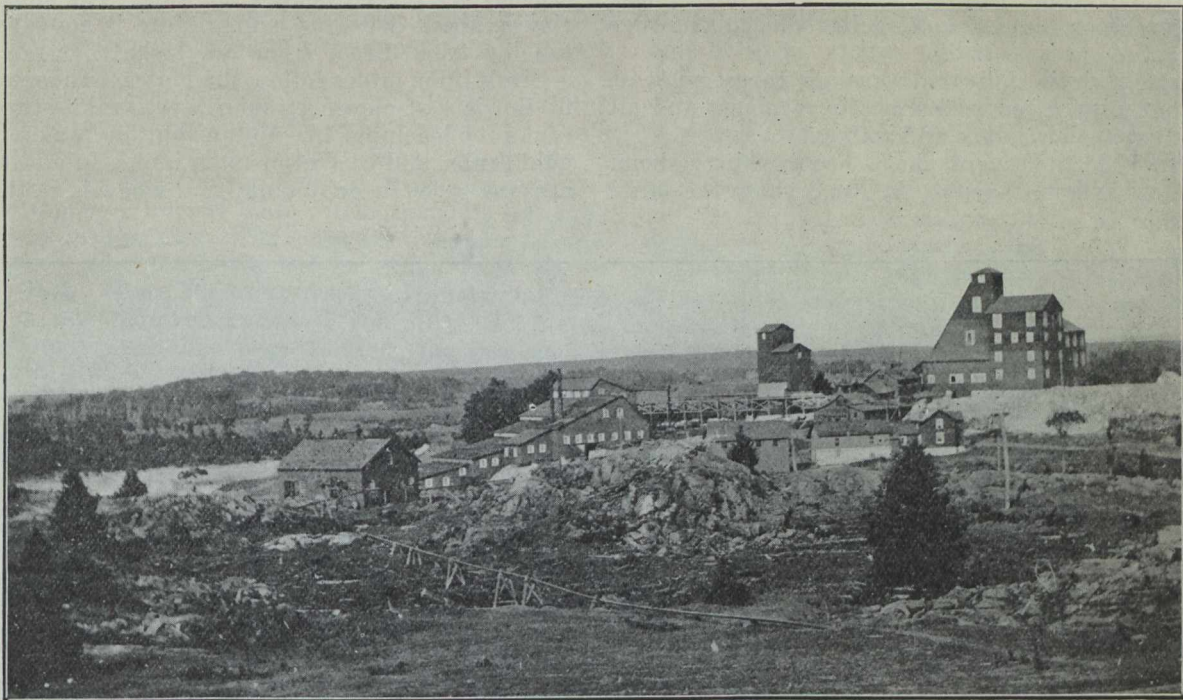
However, clouds larger than a man's hand appeared on the horizon. The engineer in charge, and the consulting engineer could not see eye to eye. Operating costs far exceeded the estimates mentioned. Then one principal owner died, and then another. Everything appeared to conspire against the mine, until in 1903 it was closed. A mine and mill splendidly equipped, hundreds of acres of promising untouched mineral-bearing land; a developed water power; a freehold that cost \$120,000; machinery, residences, and general improvements that implied an outlay of \$500,000, were all abandoned before the only real asset, the mine, had been given a chance to yield returns. Only \$300,000



Below Deer Lake Dam

in gold had been taken out of the mine, and much more was actually available.

Naturally, in the succeeding years the Belmont became the subject of many negotiations. Several Canadian mining investors, among them one whom the high gods smiled upon superfluously in Cobalt, made offers for the property. Offers also came from the United States. But it was not in accordance with hu-

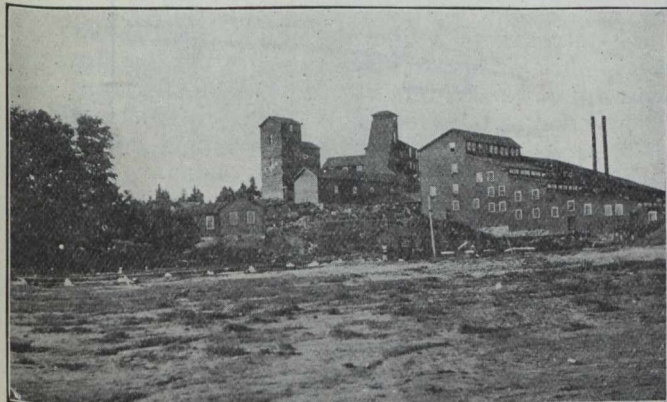


General View of Cordova Plant

man nature for the English unfortunates to part easily with their costly possession. It remained, however, for a Canadian mining engineer to bring matters to a successful head.

Mr. P. J. Kirkegaard, who had been for many years identified with mining in Eastern Ontario, and who has had wide and varied experience in other parts of the world, succeeded in negotiating satisfactorily with the former owners. He is now in possession, and in a few weeks the thirty stamps will be dropping. Meanwhile, the mine has been put into good condition, the large

storey bulding. Here are installed a pair of 50-inch bronze Leffel turbines which are capable of developing 800 h.p. A pair of 30 in. and 40 in. by 4 ft. Walker



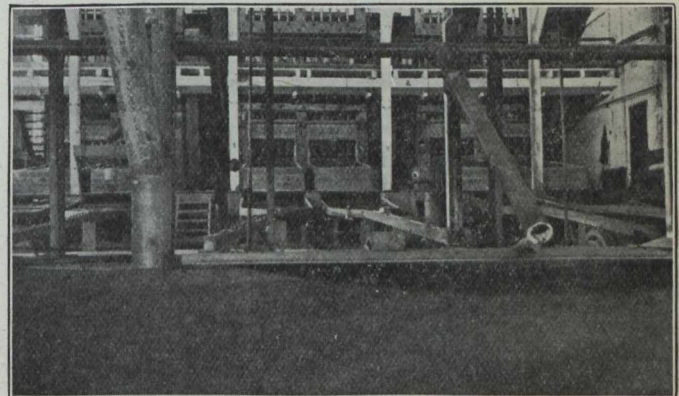
30 Stamp Mill. No. 1 Shaft House and Tank House

compressor, capable of developing 750 h.p., has been thoroughly overhauled, and the installation of electric equipment—equipment already on the ground—will soon be completed. Thereby 350 h.p. will be devolved at the dam and transmitted to the mine. This gives a total of 1,100 h.p. at the cheapest rate in Ontario.

Early in November, therefore, the mill will be treating from 90 to 100 tons of ore per day.

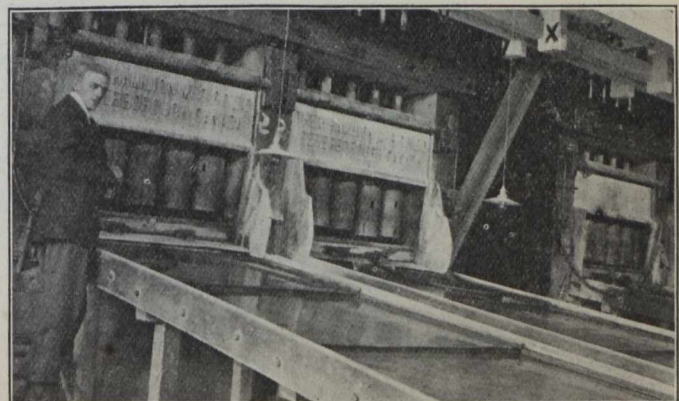
Equipment.

Power Plant.—Two concrete dams at the foot of Deer Lake are the source of power. From the dam a 6-foot wooden barrel flume conveys the water 1,550 feet to the power house, which is a substantial two-



Interior of 30 Stamp Mill.

Bros. compound compressors, fitted with inter and after coolers are driven by means of a 30-rope drive.



Interior of part of 30 Stamp Mill

The electrical equipment, now almost completely installed, includes a pair of 23-inch turbines, with

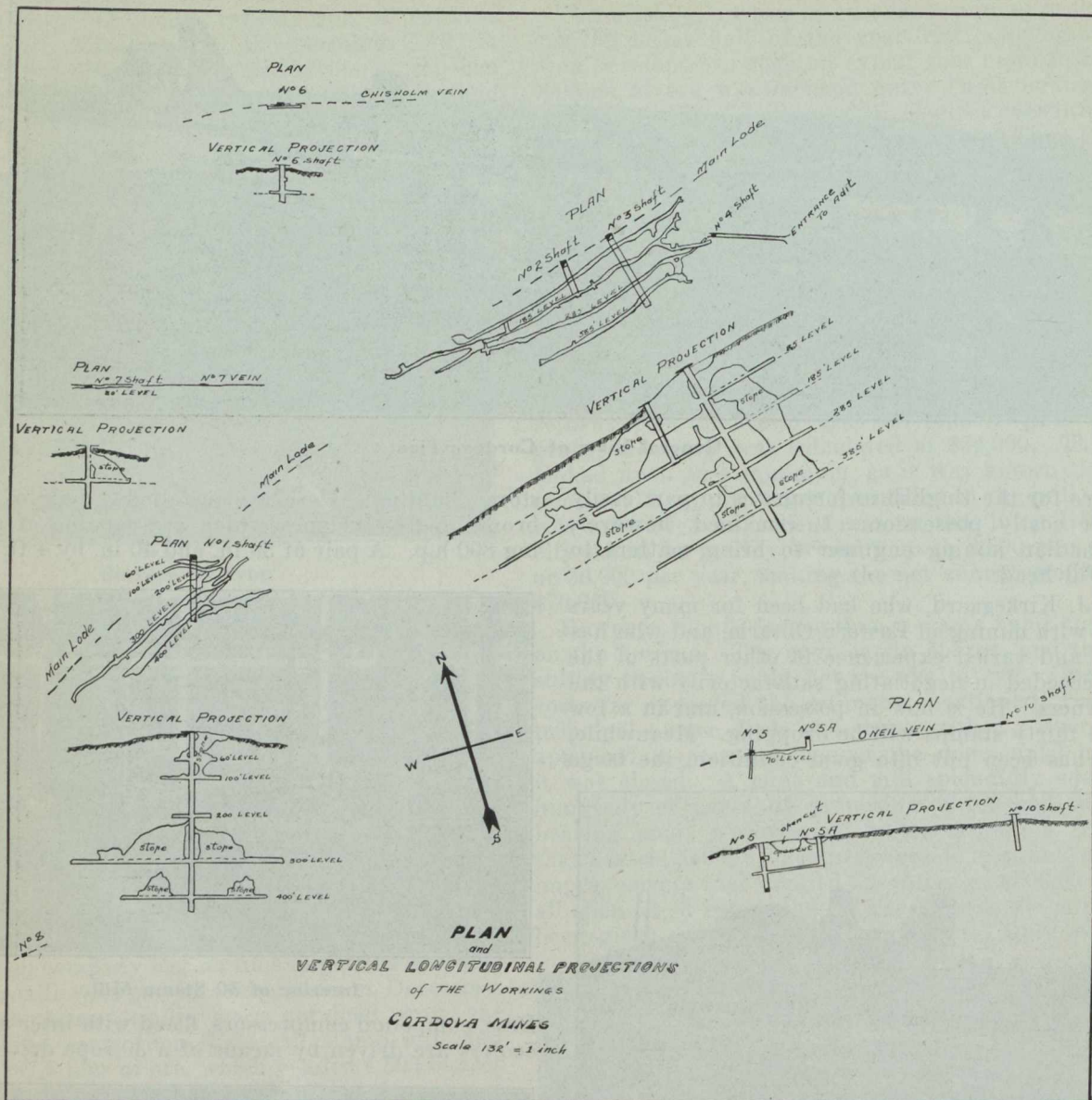
Woodward governor, driving a 250 k.w. three-phase Bullock generator, one 125-volt exciter, and much other machinery.

Compressed air is delivered through three miles of 12-inch steel pipe fitted with two air receivers and all necessary expansion joints and valves.

The Mine.—At the several shafts are five single-drum and two double-drum hoists. At No. 1 shaft the large

crusher are placed behind the bins. The storage capacity is about 500 tons, and the ore is conveyed to the mill by tram direct from No. 1 shaft.

Six Wilfley tables follow the plates. The cyanide outfit consists of eleven circular steel tanks—three 30-ton tanks for leaching, two 10-ton solution tanks, two 2-ton gold tanks, and two 8-ton sump tanks. In addition there are one wooden acid tank, one wooden settling tank,



building contains one large gyratory crusher of a capacity of 40 tons per hour, and other necessary conveying and handling equipment.

The underground machinery includes one 14x7x12 Knowles duplex station pump, eight other duplex pumps of various sizes, three single pumps, five sinking pumps, 15 Mac drills, two baby drills, and an adequate number of skips, cars, and buckets.

Six hundred feet of trestle, on which 8,000 feet of rails is laid, has been erected for ore handling between mill by tram direct from No. 1 shaft.

The Mill.—The mill equipment embraces thirty 850-pound stamps in three sets of ten each. Challenge feeders are fitted to the batteries. The amalgamating plates are 32 feet in length. One 20x10 Blake jaw crusher, one gyratory crusher, and one 7x10 Blake jaw

three eight-compartment wooden zinc boxes, two brick smelting furnaces, and one calcining furnace. The furnaces are lodged in a solid brick annex.

The mill has an independent power house, and an electric light plant.

Other Buildings.—In a two-storey frame building are the machine shop and the blacksmith's shop. Here are one large and one small lathe; one 6-foot planer; and other cutting and threading machines. The warehouse is a two-storey solid brick building. The assay office is a solid brick, five room building containing full equipment. The general office is a frame building attached to the warehouse. In addition to the manager's residence, and a large building for the accommodation of the staff, there are ten dwelling houses and one large general store building, all of which belong to

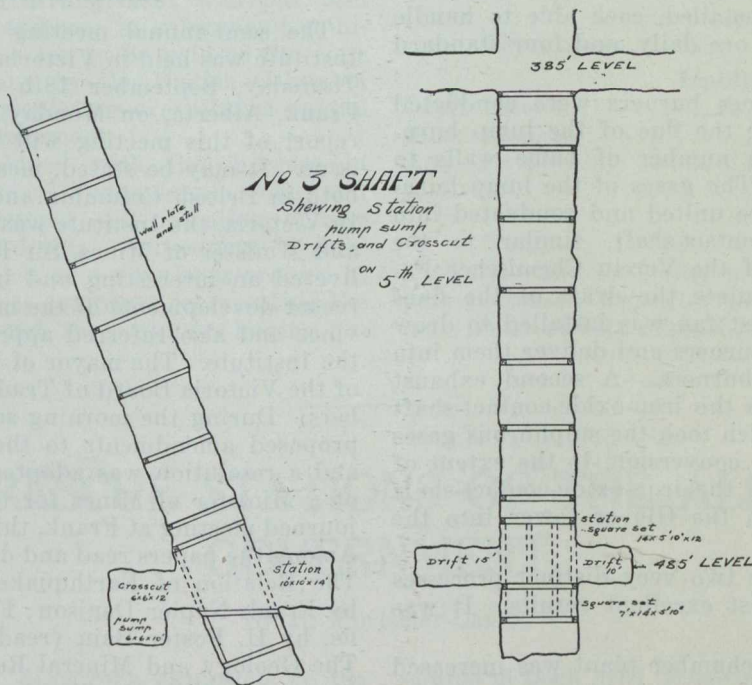
the company. There are, of course, other buildings such as magazines, sampling house, barns, etc.

The ore mined at Cordova is essentially free milling. From two to five per cent. in weight of gold-bearing iron pyrites occurs with the ore. Small quantities of pyrrhotite are also found. The ore itself consists predominately of quartz with which schist is admixed in varying proportions. The veins are irregular fissures in diorite. The workable widths range from six to twenty feet. Huge bosses or domes of quartz outcrop within a few hundred yards of the mill. So far as underground work has been carried, the pay shoots

stamps will drop 102 to the minute, the height of drop will be eight inches, and the screen used will correspond to 40-mesh. The extraction by amalgamation will be about 75 per cent., and cyanidation will bring this up to 90 per cent.

It is proposed later on to add a tube mill to the plant, and to add, also, heavier batteries. This, however, is for the future. The mill can take care of the mine's output for some months to come.

The absence of a high share capitalization, the cheap power, the large size of the ore bodies, and the fact that only very little money has been needed to put the plant in working order, all are favourable factors.



are persistent. While no really spectacular ore is encountered, the range of assay results is wide—all the way from \$2 and \$3.50 to \$18 and \$20. For the future supply of the present mill, however, it is believed that substantial bodies of ore carrying from \$4 to \$6 per ton are available. Later on, if the mill is enlarged, lower grade ore will become payable.

The stamps are light, weighing only 850 pounds. It is the intention to weight them up to 1,000 pounds. The

A recent writer describes the operation of the Erie mine in California. Here the mining and milling costs have been reduced to the surprising figure of \$1.71 per ton of ore. This includes sinking fund and amortization. The mine is a small one employing only 27 men, and the mill has but 20 stamps. While it is most dangerous to institute comparisons, yet it is reasonable to believe that costs can readily be gradually reduced at Cordova.

COMBINATION OF THE CONTACT PROCESS WITH THE ORDINARY LEAD CHAMBERS*

BY WILLIAM WILKIE, Buffalo, N. Y., U.S.A.

Since the introduction of the contact system as a practical method for making sulphuric acid, it has been usually regarded as simply a competitor of the older chamber or tower systems. It may be of interest to bring before you a system in which the contact function is combined with the chamber system, giving a successful working method that shows economics and advantages not generally appreciated, but very worthy of attention.

Some time ago I was called upon to construct a chemical works, which should be thoroughly equipped

for the manufacture of mineral acids, the main problem involved being the construction of a plant wherein sulphuric acid of the various commercial grades and concentrations could be manufactured in the most economical way. My clients had already an installation of the contact process licensed under U. S. Patents of the Verein Chemischer Fabriken in Mannheim, for the production of strong acid, and the question arose whether we could economically and profitably reduce this highly concentrated acid to lower strengths.

* Paper presented at the Eighth International Congress of Applied Chemistry, New York, September, 1912.

In calculating the cost we have to take into consideration the license fee and other fixed charges, and it was found in the end that it was impossible to do this. There was, however, a market for chamber acid; consequently it was thought possible to combine the contact process with the chamber process and attain the end in view.

As a result of the study of conditions, a plant was designed as shown in the illustration. In order to be independent of the constant variations in the pyrites market and the possible scarcity of pyrite fines, the plant was so designed that lump ore as well as fines could be roasted, the burning capacity finally adopted being 24,000 pounds fines, and 36,000 lump ore. Thirty-six lump burners were installed, each able to handle from 900 to 1,200 pounds ore daily, and four standard Herreshoff fines burners.

The gases from the fines burners were conducted into a flue situated above the flue of the lump burners and provided with a number of baffle walls to catch some of the dust. The gases of the lump burners and fines burners were united and conducted into the patented iron-oxide-contact-shaft, similar to the contact process chamber of the Verein Chemischer Fabriken. In order to regulate the draft of the fines burners, a separate exhaust fan was installed to draw the gases from the fines burners and deliver them into the flue over the lump burners. A second exhaust fan was installed between the iron-oxide-contact-shaft and the Glover tower, which took the sulphurous gases after they had undergone conversion, to the extent of 30 per cent., into SO_3 by the iron-oxide-contact-shaft and forced them through the Glover tower into the chamber system.

The combination of the two very distinct processes into one system gave most excellent results. It was found that:

1. The capacity of the chamber plant was increased at least 30 per cent.
2. The conversion of SO_2 to SO_3 in the iron-oxide-contact-shaft averaged about 30 per cent.
3. At the same time the acid produced in the Glover tower was water-white.
4. The iron oxide eliminated 95 per cent. of the arsenic carried by the gases leaving the roasters and flues.

Finally it was proved that the total production of the chamber system could easily be concentrated to 60° Baume or higher in the Glover tower.

Such satisfactory results are all attributable to the introduction of the iron-oxide-contact-shaft between the burners and the Glover tower; in other words, to the suitable combination of the contact and the lead chamber processes.

The iron-oxide-contact-shaft retards the dust and is the best known means of keeping dust from getting into the chamber system; it is an accumulator of heat and acts as an equalizer on any system, such as that described, enabling the operator of the plant to carry out the process more uniformly; it saves 30 per cent. of the nitre consumed in the ordinary plant, on account of the conversion of the catalytic action.

Since constructing the above described plant, the iron-oxide-contact-shaft has been introduced in other existing chamber plants with equally good results.

The combination of the contact and chamber processes for the manufacture of sulphuric acid has been carried out by forcing the gases from lump and Herreshoff fines burners first through an iron-oxide-contact-shaft similar to those of the Verein Chemischer Fabriken, where some 30 per cent. conversion of the SO_2

to SO_3 takes place, and thence through a Glover tower into a set of lead chambers. An increased production of about 30 per cent., with low nitre consumption and clear water-white acid of 60° Be practically free from arsenic is obtained.

Any style of chamber plant can be equipped with such an iron-oxide-contact-shaft and its capacity increased considerably without changing any part of the chamber end of the plant. All that is necessary is to insert this apparatus between the burners and the Glover tower.

THE WESTERN MEETINGS OF THE CANADIAN MINING INSTITUTE.

The semi-annual meeting of the Canadian Mining Institute was held in Victoria, B.C., on Wednesday and Thursday, September 18th and 19th, adjourning to Frank, Alberta, on Monday, September 30th. A full report of this meeting will be published in our next issue. It may be stated, meanwhile, that the meeting, both in British Columbia and Alberta, was successful. In Victoria, the Institute was welcomed by the Premier and Minister of Mines, Sir Richard McBride, who delivered an interesting and instructive address on the recent developments of the mining industry of the province and also referred appreciatively to the work of the Institute. The mayor of Victoria and the president of the Victoria Board of Trade also addressed the members. During the morning session of the first day, the proposed amendments to the by-laws were discussed, and a resolution was adopted urging the appointment of a Minister of Mines for the Dominion. At the adjourned meeting at Frank, this resolution was endorsed. Among the papers read and discussed were, at Victoria: The Relation of Earthquakes to Colliery Explosions, by Frank Napier Denison; Fuel Problems of the Pacific, by H. Foster Bain (read by Mr. D. B. Dowling); The Geology and Mineral Resources of Northern Quebec and Ontario, by Dr. A. E. Barlow; and Notes on Copper Mining in British Columbia, by E. Jacobs; and at Frank: Engineers' Reports on Property, by W. D. L. Hardie; Provincial Mining Legislation, by W. F. McNeill; Jasper Park Collieries, by R. H. Morris; and Notes on the Work and Scope of the Canadian Mining Institute, by H. Mortimer-Lamb.

Before the close of the meeting at Frank, the members present decided to organize what will be known as the Rocky Mountain Branch of the Institute, to which will be attached all members resident between Fernie and Medicine Hat. The following gentlemen were elected to serve as an executive committee of the newly created Branch: Mr. W. R. Wilson, general manager of the Crow's Nest Pass Coal Company, Fernie, B.C. (chairman); Mr. J. T. Stirling, Provincial Inspector of Mines, Edmonton (secretary), and Messrs. W. F. McNeil, Lewis Stockett and O. E. S. Whiteside.

As indicative of the interest and enthusiastic spirit that prevailed it is worthy of remark that at a subsequent meeting of the Branch executive, the chairman, Mr. Wilson, offered to donate three prizes, aggregating the sum of one hundred and fifty dollars, for papers on specified subjects contributed by any member of the Branch to the Institute's Transactions.

NEW DOMINION COPPER COMPANY.

The report of the New Dominion Copper Company, which has mines in Boundary district, B.C., for the fiscal year ended March 31st, last, shows total shipments of ore during the year amounting to 179,605

tons. Four series of shipments were made to the British Columbia Copper Company's smeltery at Greenwood, B.C., under various rates for smelting. The existing rate of April 1st, 1911, was upon the basis of the Dominion Company paying the actual smelting cost of the British Columbia Copper Company, plus 50 cents a ton.

Owing to the strike of the coal miners in the Crow's Nest Pass coal district and the importation of Connellyville, Pennsylvania, coke by the British Columbia Copper Company, the smelting costs of that company were increased and a new arrangement for the smelting of the New Dominion Copper Company's ore was accordingly made. This arrangement was put into effect on June 1st, 1911, and was in substance a minimum royalty of 20 cents a ton to be paid to the New Dominion Copper Company by the British Columbia Copper Company after calculating ore returns on the basis of the previous arrangement.

The grade of ore, combined with the increase in smelting costs, due to use of Pennsylvania coke, and the decreasing price of copper, did not allow of any royalty being paid beyond this. Subsequent to July 1st the ore has been smelted on a new basis arrived at by a committee of impartial engineers representing the respective interests concerned, these engineers having fixed

a definite smelting rate and slag deductions. Apart from this the British Columbia Copper Company guarantees to the New Dominion Copper Company a fixed profit of 15 cents a ton, regardless of whether or not such amount is realized from the ores.

The balance sheet as of March 31st, last, follows:

Assets.	
Mines, smeltery and other properties.....	\$1,311,892
Inventories and ore in transit.....	26,059
Unexpired insurance.....	701
Accounts receivable.....	91,125
Cash in banks.....	114,578
Profit and loss account.....	149,102
Total.....	\$1,693,457
Liabilities.	
Capital stock.....	\$1,178,320
Income bonds.....	491,725
Accounts payable.....	15,778
Reserve.....	7,634
Total.....	\$1,693,457

(Note.—The foregoing information should have appeared earlier, but after preparing it, our correspondent inadvertently mislaid it.—Ed.)

THE RESCUE STATIONS OF THE ALBERTA GOVERNMENT.

By H. Mortimer-Lamb.

One effect of the last disastrous explosion at the Bellevue mine, which resulted in the loss of thirty-one lives, was to bring forcibly home to the provincial authorities the need of providing means for effective rescue work in the case of future colliery accidents in Alberta. To Mr. John T. Stirling, Provincial Inspector of Mines, is due the credit for initiating the plans that were finally adopted towards accomplishing this end. In March of this year, the first Government rescue station was established at Balirmore; another is now being established at Lethbridge; a third will be established at Kipp before the close of the year; while next year there will be stations at Canmore and Bankhead, and in due course every coal district of the province will be so provided. For the maintenance of these stations an annual levy is made on the coal companies, but the administration, operation and control of the stations remains entirely in the hands of the Government, as represented by Mr. Stirling. Each station is in charge of an official, who must hold a mine manager's certificate, and be otherwise specially qualified for the position. The time of this officer is mainly occupied in training men for rescue duty, while should a disaster occur he would be called on to superintend the work of rescue, or of fire-fighting, as the case might be. The men are trained one at a time, the preliminary course occupying a period of six days. Six months later the candidate returns for another day's training, and after a further interval of three months, is subjected to a test for efficiency. If he passes this successfully he is granted a certificate and a distinguishing button. When five men from any one colliery have thus been trained they are constituted a team and are given a special

course in team drill. Eventually team competitions will be held. Before a man is allowed to commence a course of training, he must submit to a very severe physical examination. The requirements in this respect are illustrated in the following form:

Form I.

CROW'S NEST PASS MINE RESCUE STATION

PROVINCE OF ALBERTA

Qualifications of Rescue Men.

Mining men 22 to 45 years old, in good physical condition, who are temperate in their habits and naturally calm and deliberate, are best suited for mine rescue work.

Before a man undergoes training in the use of breathing apparatus, he must be examined by a physician to ascertain his physical condition, especially the action of his heart and lungs and any defects of the nose or throat. Unless a man has a physician's certificate stating that his physical condition is good, he must not be permitted to take rescue training nor to attempt rescue work in a mine.

Physician's Examination.

Date.....Hour.....
 Name.....Age.....Residence.....
 Occupation.....How long so employed.....
 Time of last meal.....Previous illness of recent date, having regard to rheumatism, fits, spitting of

blood, asthma, bronchitis, giddiness, vertigo, or any unsteadiness of gait.....
 Habits as regards smoking and drinking.....
 General appearance, paying special attention to the breathing passages, tonsils and nostrils, also ocular conjunctiva, and any infectious condition.....
 Urine.....General shape and expansion of chest.....
(See that clothing is loose)
 Frequency of breathing.....
 Pulse: frequency.....and character.....
 Condition of lungs.....
 Condition of arteries and veins.....
Heart action.....
 Nervous or composed temperament?.....
 The candidate is.....condition to undergo mine-rescue training.

(Signed).....
 Physician.

Condition After Trial.

After having executed the first one-hour training in unbreathable air:

General appearance.....
 Color.....
 Headache, Giddiness, Vertigo and Unsteadiness of Gait.....
 Frequency of breathing.....Time required to become normal.....
 Pulse frequency.....Character and time required to become normal.....

(Signed).....
 Superintendent.

Rescue training should not be undertaken just after eating, nor less than two hours since the last meal. After having used the apparatus continuously for two hours, a man should rest for six or eight hours before wearing it again. During work or travel in a mine the wearer should frequently rest by sitting.

After the six days' training has been completed, the superintendent of the station fills out a form on which certain information is recorded in respect of each candidate for a certificate. The following is a typical record of the kind:

Form II.

CROW'S NEST PASS MINE RESCUE STATION

PROVINCE OF ALBERTA

Mine Rescue Training Record.

- 1 Car No.....
 Station No.....at.....Wearer's name....No..
- 2 Address.....Occupation.....
- 3 Employer.....
- 4 Chest: Normal.... Contracted.... Expanded....
 Expansion.....
- 5 Age... Weight... Height... Where Born.....
- 6 How long in Alberta..... Can he
 read and speak English..... Married.....
- 7 How long has he been engaged in mining.....
 Coal or metal mines.....
- 8 Pulse and respiration; while standing P....R....;
 after hopping 20 ft. P.....R.....

- 9 Date on which apparatus was explained.....
 Time occupied.....
- 10 Date on which miner charged and set up apparatus.....
 Time occupied.....
- 11 Type of apparatus used in training.....
 Number.....
- 12 Does he hold a First Aid Certificate.....Where
 obtained.....When obtained.....Associ.....
- 13 Month in which training was given.....
- 14 Dates on which training was given.....
- 15 Reading of W. G. before commencement.....
- 16 Schedule of training used.....
- 17 Time occupied, wearing apparatus.....
- 18 Trained in SO₂, smoke or fresh air.....
- 19 Trained in ear, smoke room, or elsewhere.....
- 20 Temperature of air.....
- 21 Distance walked (miles or fractions).....
- 22 Distance crawled (feet).....
- 23 Number of trips over overcast.....
- 24 Height ascended (feet).....
- 25pounds of.....carried (feet).....
- 26pounds Sand bag lifted.....ft. times.....
 Work machine operated
- 27 Size of prop used.....
- 28 Sawed end off how many props.....
- 29 Number of timbers set up.....
- 30 Pulse just before taking off apparatus.....
- 31 Oxygen remaining when taken off.....
- 32 Dizzy (1); Tired (2); Exhausted (3); Head-
 ache (4).....
- 33 Percentage.....
- 34 Total time wearing the apparatus....Hrs.... Mts.
- 35 Has the wearer full confidence in the apparatus...
 36 Would he make a good mine rescue man.....
- 37 Is he entitled to a certificate.....
- 38 Efficiency percentage.....
 Date.....19... ..

Superintendent.

Remarks:

.....

The equipment at the Blairmore Station includes 11 "Fleuss" Proto Breathing Apparatuses, 6 Salvators, 2 compressing pumps, 30 storage cylinders of 100 cubic feet capacity, containing oxygen at a pressure of 1,700 lbs. to the square inch; a Draeger Pulmotor; leather helmets for fire fighting; electric mine lamps fitted with wooden bases (these bases serve a purpose in facilitating crawling); and a stock of other necessary supplies. Canaries are also kept for use in testing for gas.

The station at Lethbridge, which is of a more pretentious character than that at Blairmore, is provided with a washing room, shower bath, reading room, office, store room and smoke chamber. This latter is an air tight room in which much of the actual training is conducted, the men wearing the apparatus while the atmosphere is charged with fumes from burning sulphur. They thus acquire confidence.

At both Blairmore and Lethbridge plans of all the mines of the province are filed and every mine is in telephonic communication with the stations. Thus, in case of need, aid may be rendered with the least possible delay and to the best advantage. Although, of course, the stations are maintained for the protection of the coal miners of Alberta, Mr. Stirling assured me that in the event of aid being required, either in British Columbia or in the States to the south, it would be willingly rendered.

The department, through Mr. Stirling, is meanwhile negotiating with the Canadian Pacific Railway for the use of a car, which it is designed to equip with rescue apparatus and ambulance requirements, and employ both for educational and for actual rescue purposes. It is hoped that the company will place such a car at the disposal of the authorities.

It is interesting to note that in the selection of equipment for the Alberta stations, the Fleuss apparatus has been preferred to other types now in use. The choice in this respect was largely determined by a recent report of a Committee of the South Midland Coal Owners of Great Britain, from which the following extract may be quoted:

"The Fleuss apparatus is undoubtedly the most comfortable one to wear so far as the distribution of the weight is concerned. In mechanical construction it is superior to any we have examined, and the mouthpiece attachment and its connections are excellent. In design the apparatus is simple, and unlikely to get out of order, although under the more severe test conditions several serious defects have been noted. The circulation of the oxygen through the absorbent is carried on by means of the energy of the respiratory muscles, and, comparing the efficiency of absorption with other apparatuses, the results obtained during active and severe exertion are not so good as those obtained with the Draeger and Meco under similar conditions. On the other hand, in no instance under normal conditions has the CO₂ percentage ever reached a figure sufficiently high to produce dyspnoea in any of the tests. A serious defect in this apparatus is the excessive temperature which the inspiratory air attains after the apparatus has been worn for an hour or so with moderately hard

exertion. . . . For work under normal conditions and as the apparatuses now stand, we are of the opinion that the Fleuss is superior to any of the others we have examined; the order of preference for such work being: (1) Fleuss, (2) Draeger, (3) Meco."

Since this report was written, however, the major defect of Fleuss apparatus, as indicated by the committee, has been remedied by the provision of an efficient cooler and saliva trap, so that the main drawback to the apparatus has now been removed. The advantages of the Fleuss, moreover, are very considerable. In the first place, the total weight of the apparatus is but 32 pounds, or five pounds lighter than the Draeger, while this weight is much more evenly adjusted than in apparatus of other makes. Again, all valves are placed at the side and so are readily under control, and at need the oxygen may be supplemented by the use of an emergency or by-pass valve. It may here be noted that all valves are very carefully tested each week by the superintendent of each station, and the results tabulated for record. The forms on which the superintendent makes his weekly returns to the department are here appended:

One point more in favour of the Fleuss: It employs caustic soda instead of potash as an absorbent. Not only is caustic soda obtainable anywhere, but it possesses the advantage of remaining practically hard, dissolving away from the surface only, whereas potash when exposed to moisture becomes a pasty clay-like mass which greatly reduces the area of its absorptive surface. The makers recommend the use of soda in the form of sticks, but Mr. Stirling has proved conclusively that the lump soda, which is a great deal cheaper, gives in every respect, equally satisfactory results.

ABSTRACT OF MINUTES OF MEETING OF NATIONAL MINE RESCUE AND FIRST AID CONFERENCE.

Committee on Rescue Apparatus and Rescue Training.

Resolution No. 1.—The Committee recommends that such breathing apparatus as may be used for mine rescue and mine recovery work shall be of those types that have passed the tests of the Bureau of Mines.

Resolution No. 2.—The Committee indorses the course in rescue training as outlined by the Bureau of Mines' schedule for educational purposes and for familiarizing miners in the use of the breathing apparatus, and further indorses the recommendations of the bureau to the extent that for actual mine rescue work supplemental and practical training of two hours each should be taken at intervals of not more than three months.

Resolution No. 3.—The Committee recommends that all mine rescue stations should be equipped with at least five breathing apparatus and the necessary accessories for the continuous operation of the apparatus for 24 hours, and at remote stations, 48 hours. Such equipment should be so located as to admit of its assembly in one hour at a central point for emergency

Resolution No. 4.—The Committee recommends the keeping of birds and mice at rescue stations for the purpose of detecting carbon monoxide.

Resolution No. 5.—The Committee recommends that all persons, before being admitted for rescue training, present a medical certificate qualifying them for res-

cue work and free from contagious diseases.

Resolution No. 6.—The Committee recommends to the Bureau of Mines that it prepare lists of stations, together with the names and addresses of the persons who have completed training with mine rescue apparatus, and that the names be listed on a mine rescue roll of honor and submitted to the local press for publication in the various mining localities. Volunteers to be compensated for services and considered when promotions are being made.

Resolution No. 7.—The Committee recommends that the smoke room is best adapted for the first course of training. In addition to the above training, as prescribed by the Bureau of Mines outline, supplementary practice to be taken underground is desirable.

Committee on Rescue Operations.

The following resolutions covering Item No. 1, "Use of Untrained Men in Rescue Work," was adopted in meeting of the entire committee:

Resolved.—That in rescue work untrained men should not be permitted to use breathing apparatus except when it is the only chance to save life, and in selecting untrained men it should be remembered that discipline is of equal importance to training.

The following outline of procedure before and after entering a mine following explosions or mine fires, was reported by a sub-committee:

Outside Organization.

1. All openings to be carefully guarded.
2. There should be a man in charge of outside arrangements to see that ventilating appliances are put in condition for operation, so as to be ready to operate when conditions require it.
3. See that good, competent men are placed at all openings to the mine and that they obey the orders given.
4. A competent person to be placed near the entrance to the mine to examine all safety lamps before they are allowed to be taken into the mine.
5. Some specified person to be placed at the entrance to check off all persons and make a record of same when they go into and come out of the mine.
6. Proper provisions to be made in the way of food and shelter to take care of parties engaged in rescue work.
7. A physician to be on hand while rescue parties are in the mine.
8. Safety lines to be established around all openings inside of which lines no open lights should be allowed.
9. A man in charge of the rescue squads to organize and have them ready to enter the mine when called upon.

Inside Organization.

1. A man to have full charge of the inside operations on each shift.
 2. An advance squad under a competent leader to explore the workings in advance of the other squads who are advancing the ventilation, making repairs, and the stretcher squads.
- The squads are to advance in the following order:
- (a) Breathing apparatus or advance squad.
 - (b) Stretcher squads.
 - (c) Temporary ventilation squad.
 - (d) Material squad.
 - (e) More permanent ventilation squad.
3. A station to be established, which point would form a base of operations from which to work, and with a competent person in charge who would re-examine all lights before they pass beyond him to the interior of the mine.
 4. A telephone should be established at this station to communicate with the surface, and to be carried into the workings as fast as possible.
 5. No person to go in advance of the ventilating current except the advance squad, which shall make an examination of the atmosphere for gas, and examine the return air current frequently for indications of fire; also for any other dangers which are likely to exist.
 6. A doctor should be stationed at this inside station with necessary supplies for his use.
 7. While advancing into the mine all unexplored openings to be dangered off.
 8. Strict discipline to be maintained at all times.

A second sub-committee to consider questions Nos. 3 and 4 was appointed, which reported to the committee as follows:

Question No. 3.—The maximum distance rescue crews should proceed beyond fresh air. We recommend that, owing to the different conditions in different mines and the hazardous work undertaken, this question should be left to the decision of the official in immediate charge, in conjunction with the mine officials, and the

probability of being able to save human life, using the time limit on all explorations.

Question No. 4.—Necessary rest for rescue men and limit of hours of work. That the shift should not exceed two hours, except when absolutely necessary. This should be followed by not less than six hours' rest.

Both of the sub-committee reports were accepted as read.

As to Sections Nos. 5 and 6, a resolution was introduced and passed as follows:

Article No. 5, "Cumulative Effect of Imbibing Poisonous Gases," and Article No. 6, "Use of Stimulants," be referred in General Conference to the Doctors' Committee.

Committee on Safety Lamps and Electric Lamps.

Recommendation No. 1.—No open light should be used.

Recommendation No. 2.—In coal mines only such types of safety lamps and electric lamps as have passed the tests of the United States Bureau of Mines to be used.

Recommendation No. 3.—Electric lamps unaccompanied by safety lamps should not be used unless the party is equipped with breathing apparatus.

Recommendation No. 4.—It is recommended that both safety lamps and electric lamps always be used to the point where breathing apparatus is put on and that beyond such point no safety lamps be used except one carried by the leader of the party, if explosive gas is not present in dangerous quantities.

Committee on First-Aid Methods.

Recommendation No. 1.—Be it herewith resolved that it is the sense of this committee that the Sylvester method of artificial respiration be the one adopted, providing no injury prohibits the use of this method.

Recommendation No. 2.—Be it further resolved that it is the consensus of opinion of this committee that in the dislocation of a hip or a shoulder, the dislocation should not be reduced, but that the limb should be fixed in the line of deformity.

Recommendation No. 3.—Be it further resolved that it is the consensus of opinion of this committee that a man injured with a broken back should be handled with as little movement as possible. If found in any other than a recumbent position, he should be kept in that position; if found in a recumbent position, apply posterior splints extending from head to feet, or lay upon rolled blankets.

Recommendation No. 4.—Be it further resolved that it is the consensus of opinion of this committee that in the treatment of all fractures of all long bones it is necessary to apply splints long enough to fix the joint above and below the fracture; for example: if there is a fracture of the leg, you have to apply the splints so that they extend below the ankle and above the knee. Be it further resolved that this committee endorses the forearm and arm splints as designated in Dr. Shields' text book on first-aid.

Recommendation No. 5.—Be it further resolved that it is the consensus of opinion of this committee that it should not be the duty of a first-aid man to reduce a dislocation, except in the case of the lower jaw or the fingers.

Recommendation No. 6.—Be it further resolved that it is the opinion of this committee that the triangular bandage should be used in preference to the roller bandage.

Recommendation No. 7.—Be it further resolved that it is the opinion of this committee that a first-aid man should not be allowed to wash a wound. Be it further resolved that it is the opinion of this committee that an application of any foreign substance to a wound, other than a sterile substance, should be condemned.

Recommendation No. 8.—Be it further resolved that it is the opinion of this committee that in the absence of sterile or antiseptic dressing in case of a severe hemorrhage, the same being controlled by a tourniquet, that no dressing be applied to the wound.

Recommendation No. 9.—Be it further resolved that it is the opinion of this committee that an injured person should be carried on a stretcher feet first unless there be some contrary indication.

Recommendation No. 10.—Be it further resolved that in the case of an electric shock the current be either cut off or short-circuited first if possible; if this is not possible, then insulate yourself, and remove the patient from the body which carries the current, or remove the body which carries the current from the patient. Be it further resolved that this committee recommends that the article in Miner's Circular No. 5, issued by the Bureau of Mines, in regard to the treatment of electric shock be adopted.

Recommendation No. 11.—Be it further resolved that it is the opinion of this committee that in moving an injured man he should be handled by the first-aid corps on the same side as his injury; in other words, the injured side should be next to the men lifting the injured patient. Be it further resolved that it is the opinion of this committee that an injured man should have the right-of-way from the place where he received the injury to the surface in all cases.

Recommendation No. 12.—Be it further resolved that this committee would recommend, if this organization is perfected, that a committee of seven persons consisting of two first-aid men, two operators, two physicians and one representative of the Bureau of Mines be appointed to act as an advisory board or as an executive board. This committee will have the power to accept or reject any new dressings that may be offered in any field contest.

Committee on First-Aid Training.

On motion of Dr. Shields, seconded by Dr. Rountree, Dr. Knoefel was elected chairman of the meeting.

Dr. Shields moved that the duties of a first-aid man are to do something intelligently and efficiently between the time of the accident and the time the injured man is placed in the hands of the physician, surgeon or hospital. Seconded by Dr. Halberstadt. Carried.

Dr. Kennihan made the motion, that Questions Nos. 2, 3, and 4 of Schedule B, be incorporated in one question and that the Red Cross system of first-aid training should be adopted as the standard. Seconded by Mr. Judd. Carried.

Dr. Rountree made the motion, that a committee of three be appointed to formulate a resolution on Question No. 4 to present to the Conference on September 25th. Seconded by Dr. McKee. Carried. Doctors M. J. Shields, W. S. Rountree and J. J. Rutledge were appointed on this committee and submitted the following resolution, which was adopted by the Committee on First-Aid Training:

Resolved—That successful first-aid work at mines must have the personal interest of the company officials, the financial support of the mining company, co-operation of the mine physician, surgeons and employees.

Dr. Halberstadt made the motion, that every mine should have a sufficient number of first-aid men on duty to take care of any injured persons throughout the 24 hours of the day. Seconded by Dr. Rountree. Carried.

Committee on First-Aid Contests.

Recommendation No. 1. Relative Merits of Contests and Exhibitions:

The committee favours contests as opposed to exhibitions for the larger companies having a great many mines, and believes that intra-company contests are to be preferred, while for the smaller companies operating only one or two mines, inter-company contests are preferable.

Recommendation No. 2.—Standardization of Methods of Judging, Number of Judges, Methods of Marking, etc.:

The committee recommends that the method of judging should be by a system of discounts, the following discounts to prevail at all contests:

- 1. For not doing most important things first... .02
- 2. For captain's failure to command men properly .02
- 3. For slowness in work..... .02
- 4. For failure to entirely cover the wound..... .02
- 5. For wrong artificial respiration02
- 6. For loose splint..... .02
- 7. For not padding splints properly..... .02
- 8. For loose bandage02
- 9. For bandage too tight02
- 10. For "granny knot"..... .02
- 11. For awkward handling of patient on stretcher .02
- 12. For lack of neatness..... .02
- 13. For assistance lent by patient..... .03
- 14. For tourniquet too tight03
- 15. For failure to stop bleeding..... .05
- 16. For not treating shock..... .05
- 17. For failure to be aseptic10

The judges should be of sufficient number to that one judge should not handle more than three teams, preferably less, and these judges should rotate. These judges should be first-aid men and surgeons, and each contest should consist of not more than five events.

Recommendation No. 3.—Proper Rating for Speed:

The committee recommends that in all contests, speed should not be an essential element, but that a certain time should be allowed to each event. Failure to finish in the allotted time should be discounted 1 per cent. for each minute over time.

Committee on Hospitals and Safety Stations.

The resolution on hospitals and safety stations is the result of a joint action by said committee and the Committee on First-Aid Training, as follows:

Resolved,—That, in the opinion of the committee, underground surgical hospitals are unnecessary, but that there be deposited at different points in the mine a sufficient number of first-aid packages properly equipped with first-aid emergency dressing. That, in addition, there be located central first-aid dressing stations at the bottom and immediate surface opening of the mine.

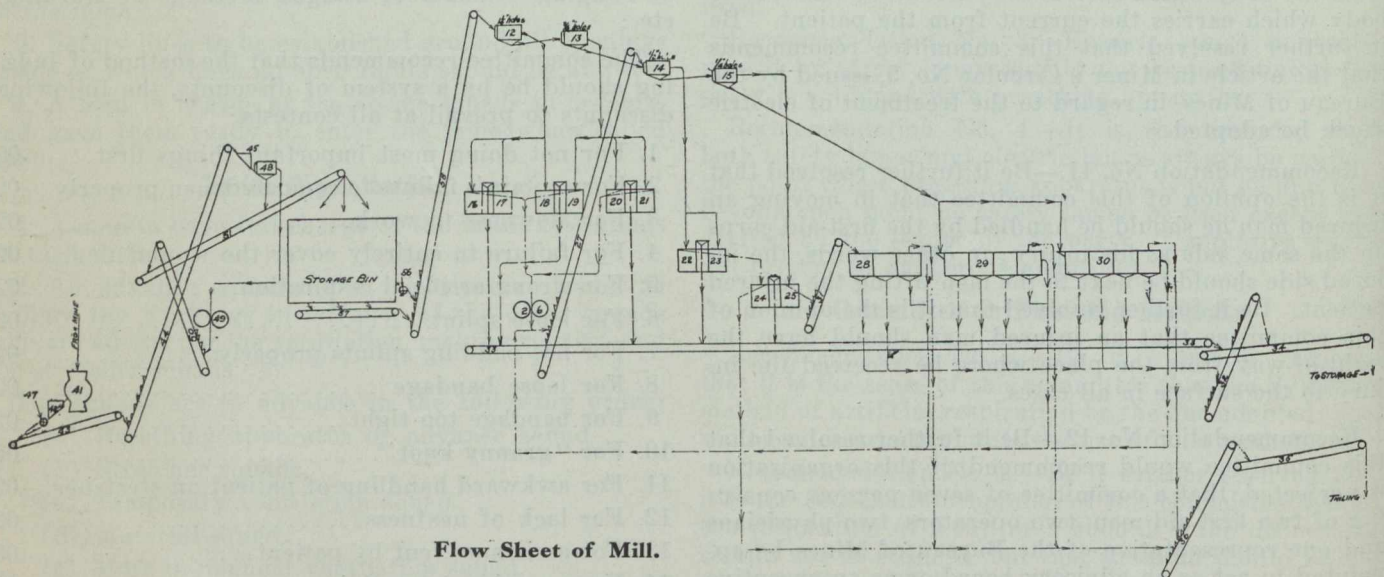
THE BATHURST IRON DEPOSIT, N.B.

(Continued from last issue.)

Concentrating Mill.—The ore discharged from the elevator is flushed into a series of tromeels by a heavy stream of water. There are four of these tromeels or revolving screens to classify the ore into five sizes: oversize of $1\frac{1}{4}$ -in., $\frac{3}{4}$ -in., $\frac{1}{2}$ -in., $\frac{1}{4}$ -in., and undersize of $\frac{1}{4}$ -inch. The easiest plan of following the course of the ore in the mill is by reference to the accompanying flow sheet, by which it is seen that the oversize of $1\frac{1}{4}$ -inch is divided up between three compartments of the large 900-B jigs. The oversize of $\frac{3}{4}$ -inch is also divided up amongst three other compartments of other 900-B jigs. The concentrates produced by these six compartments are discharged on a concentrates belt conveyor. The tailings from these six compartments are dewatered and run through a set of Traylor rolls 42-inch diameter, 16-inch face, set to $\frac{3}{8}$ -inch opening,

to observe either by sight or feel whether he is jiggling to the best advantage. For this reason it has been found necessary to feed an absolutely uniform feed of ore into the mill; the jig man then has only to reject a fixed quantity of tailings. Tests were made to determine this point, and it is also necessary to keep a very careful check on what each particular jig is doing by analysis of concentrates and tailings; each jig is tested every second day, the record being kept on the monthly mill sheet which is similar to the one shown for the Nictaux mill.

The average iron content of the run of mine ore mixed with rock is about 45%. With the mill producing a 50% concentrate, it was found that a large portion of the tailings, which were being wasted ran 46% iron. On this account a slight re-arrangement of the



Flow Sheet of Mill.

thence elevated by a rubber belt elevator with steel buckets attached to the third tromeel where it joins with what is left of the original feed and here classified for further jiggling. The oversize of the $\frac{1}{2}$ -inch consisting partly of primary feed and partly crushed tailings pass to No. 4 900-B jig, the concentrates removed and the tailings retreated on one compartment of No. 5 900-B jig, the tailings from thence passing to No. 7 jig, a three compartment Hartz. The oversize of $\frac{1}{4}$ -inch goes to the second compartment of No. 5 900-B jig, the tailings from which are also retreated on No. 7, 3 compartment Hartz. The undersize of $\frac{1}{4}$ -inch is treated on No. 7 and No. 8, both 4 compartment Hartz jigs. The hutch product and concentrates of the last compartments of these jigs are considered as middlings, and are flushed to the return elevator and thence to the $\frac{1}{2}$ -inch tromeel, and so return through for a second treatment. A complete description of the above jigs will be found in the Nictaux Concentrating Plant, in this issue.

In general, all ore is treated twice, that is, the tailings from the primary treatment are retreated to reduce the loss to the smallest quantity.

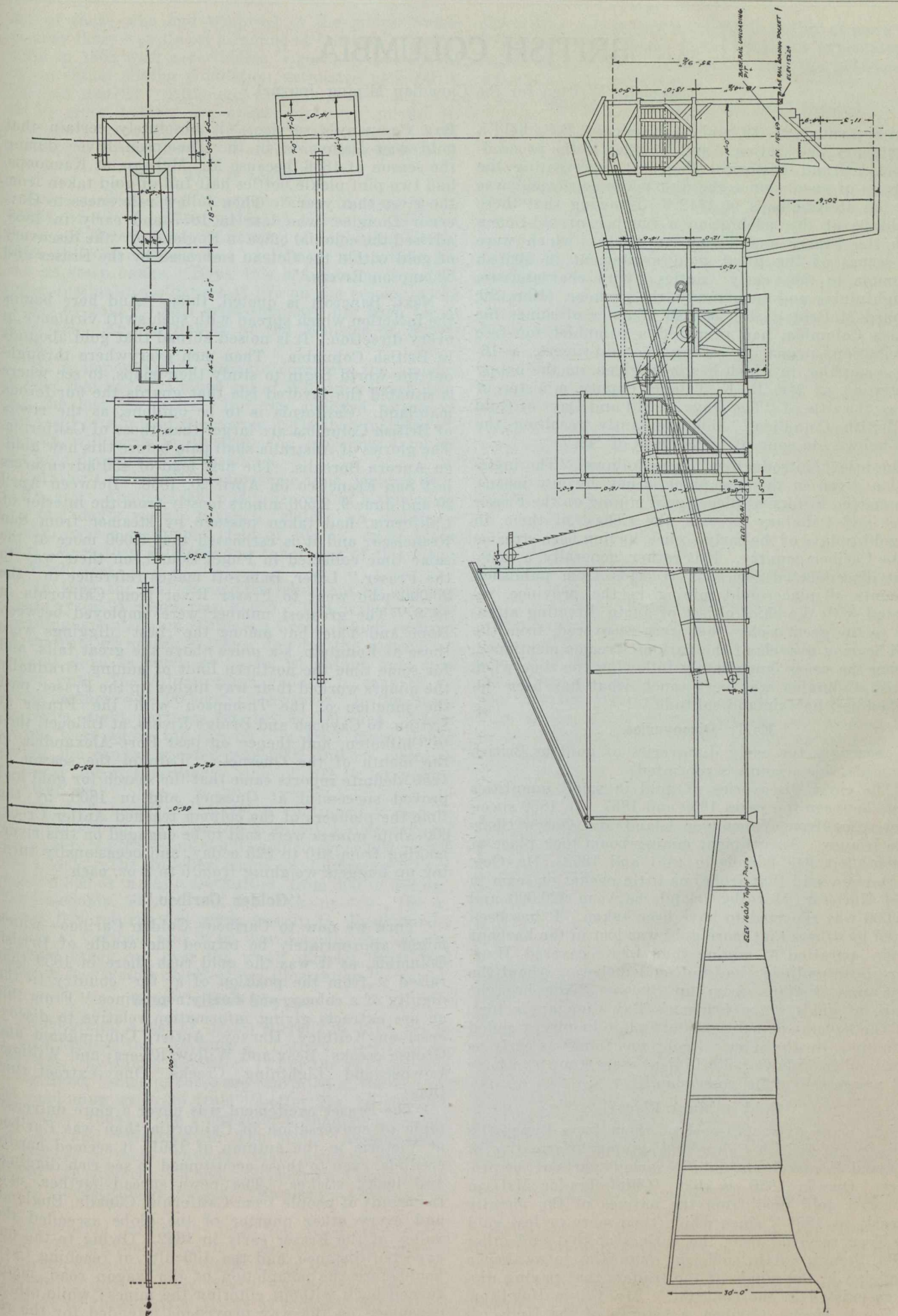
The ore is almost black in colour and the rock has the same colour, consequently there is no colour line between the concentrates and gangue. Further the specific gravity of the rock is very nearly the same as the concentrates, making it difficult for the jig man

flow sheet is being made, by which No. 7, the 3-compartment jig becomes a primary jig, and No. 5 becomes a secondary jig, the concentrates from which are run to an extra belt conveyor to a second grade stock pile of 46% ore. It is expected that this will effect a very considerable economy in the quantity of tailings discarded.

This mill has the same system of circulating water as the Nictaux mill, the water being used over and over again in quantities of 2,000 gallons a minute, while 500 gallons per minute of fresh water is added to maintain a certain degree of purity. This fresh water is pumped to the top of the mill into the tromeel housing by a Knowles 12x12x10 in. duplex steam pump, while the circulating water is handled by an 8-inch single stage American Well Works centrifugal pump, this circulating water being elevated from the settlings tanks in the basement to a large launder located just above the highjigs level.

Concentrates are conveyed to the loading pocket by an 18-inch belt conveyor, while the tailings are handled on a 16-inch conveyor.

The machinery in this mill was designed and erected by the American Concentrator Co., of Philadelphia and Joplin, and is designed to treat 70 tons crude ore per hour. The mill is operated by an 18x20 inch Robb Corliss engine running at 150 r.p.m.



Layout of Concentrating Plant.

BRITISH COLUMBIA.

(Specially Written for the Canadian Mining Journal.)

On September 17, 18, and 19, Kamloops, B.C., held a "Centenary Celebration," and included in the proceedings a "Grand Historical Pageant, representing the progress of events since the first white settlement was founded at Kamloops in 1812." Knowing that there would be at the celebration a number of old-timers from the Fraser and Thompson Rivers, which were the scenes of the great gold excitement in British Columbia in the early sixties, with characteristic thoughtfulness and spontaneity, the premier, (Hon. Sir Richard McBride), who is also minister of mines for British Columbia, had prepared a pamphlet for free distribution, primarily among the old-timers, a 16-page pamphlet, to which has been given, on the happy suggestion of Mr. R. F. Tolmie, deputy minister of mines, the title of "The Days of Old and Days of Gold in British Columbia," this pleasantly recalling the well-known old song of "The Days of '49."

The brief "introductory" is as follows: "The information given in this pamphlet is not, by any means, a connected history of placer-gold mining on the Fraser River and tributary streams, the richest of them, in the golden days of the early sixties, having been streams in the Cariboo country. It is rather, generally, a somewhat disconnected series of excerpts from published accounts of placer-gold mining in the province, reprinted with the chief object of again directing attention to the great riches that were recovered, from the gold-bearing gravels of the various streams mentioned, during the years immediately following the time when British Columbia was very much what has been described as 'the Mainland solitude.'"

Early Discoveries.

Concerning the early discoveries of gold in British Columbia, this account is reprinted:

"The early discoveries of gold in small quantities range between the years 1850 and 1857. In 1850 specimens came from Vancouver Island and Queen Charlotte Islands. An incipient mining boom took place at Queen Charlotte Islands in 1851 and 1852. Dr. Geo. M. Dawson said that from one little pocket or seam in Gold Harbour, Moresby Island, between \$20,000 and \$75,000 was reported to have been taken. It has been stated by others that more gold was lost in the harbour in the operation of mining than was recovered. However, much or little, the 'find' ended there. About the same time Indians from up Skeena River brought pieces of gold to the Hudson's Bay Company's fort, but the several expeditions to find it in places ended in failure. In the interior, gold was found as early as 1852, and in 1854 Colville Indians were known to have had nuggets in their possession."

Gold in Many Places.

Next come extracts, most of them from Bancroft's "History of British Columbia," giving information of reported discoveries of gold in various parts of the province. One in 1858, is that "Chief Trader McLean procured gold dust from the natives of the vicinity as early as 1858," since which time more or less gold has been received from the natives at that and other posts, though not in sufficient quantities to awaken a suspicion in the minds of the traders that paying diggings existed in the country." Mr. Gavin Hamilton, of Lac la Hache, Cariboo, a veteran of the Hudson's

Bay Company's service, "is absolutely certain that gold was discovered in the Thompson River during the season of 1856, because Mr. McLean, at Kamloops, had two pint pickle bottles half full of gold taken from the river that year." Then follow references to Governor Douglas, who late in 1857 and early in 1858, advised the colonial office in England of "the discovery of gold within the Coteau embraced by the Fraser and Thompson Rivers."

Next, Bancroft is quoted, thus: "And here begins the infection which spread with such swift virulence in every direction. It is noised abroad that gold abounds in British Columbia. Then men everywhere throughout the world begin to study their maps, to see where is situated the favored isle that guards the auriferous mainland. California is to be outdone, as the rivers of British Columbia are larger than those of California. The glories of Australia shall pale before this new golden Aurora Borealis. The first load of 450 adventurers left San Francisco on April 20, 1858. Between April 20 and June 9, 2,500 miners mostly from the interior of California, had taken passage by steamer from San Francisco; and it is estimated that 5,000 more at the same time collected in Puget Sound, on their way to the Fraser." Later, Bancroft makes reference to "the 20,000 who went to Fraser River from California in 1858." The greatest number were employed between Hope and Yale, but among the best diggings were those at Fountain, six miles above the great falls, and for some time the northern limit of mining. Gradually the miners worked their way higher up the Fraser, past the junction of the Thompson with the Fraser at Lytton, to Cayoosh and Bridge Rivers, at Lillooet, then to Chilkoten, and thence on past Fort Alexandria to the mouth of the Quesnel. "Late in the season of 1859, definite reports came that the search for gold had proved successful at Quesnel, and in 1860, by the time the pioneers of the column reached Antler Creek, 600 white miners were said to be engaged on this river, making from \$10 to \$25 a day, and occasionally turning up nuggets weighing from 6 to 8 oz. each."

"Golden Cariboo."

"Turn we now to Cariboo—Golden Cariboo—which might appropriately be termed the cradle of British Columbia, as it was the gold rush there in 1859 that raised it from the position of a 'fur' country to the dignity of a colony, and finally a province." From this on are extracts giving information relative to discoveries on Keithley, Harvey, Antler, Cunningham and Grouse creeks; Bear and Willow Rivers; and William, Lowhee and Lightning Creeks. One extract runs thus:

"The Fraser excitement was never a more universal topic of conversation in California than was Cariboo at Victoria in the autumn of 1861; it seemed hardly credible, even to those accustomed to see rich diggings and lucky strikes. The news spread farther, and thousands of people from California, Canada, England, and every other quarter of the globe ascended the valley of the Fraser early in 1862. Owing to the unexpected distance, and the difficulty of reaching Cariboo before the completion of the wagon road, many turned back without entering the mines; while others consumed on the way provisions intended for the re-

lief of those who had wintered in the mines, consequently there was almost a famine at Cariboo. Exploration in 1862 was, nevertheless, vigorously prosecuted by an actual mining population, estimated at 5,000 in Cariboo district. Although extending over an area of 50 miles square, the operations were chiefly on contiguous ground, and resulted in the production of a total yield from Cariboo thus far of about \$3,000,000.

"Boys, This is Lightning."

Space restrictions prevent quotation of many particulars of the fabulous yields of claims on William Creek; of the story of the naming of Lightning Creek, after Bill Cunningham had exclaimed, when descending its steep banks, "Boys, this is lightning," and of other fascinating glimpses of life on the creeks in the "days of gold." This brief summary has been taken from the "Annual Report of the Minister of Mines, 1874."

"It is impossible to estimate correctly the amount of gold that has been taken out of William's Creek during the last ten years. But the annexed return of the yield of a few of the claims in Cariboo in 1861-'62-'63-'64, will serve to illustrate the enormous value of the gold deposits of the district.

"Antler Creek, in 1861, for some time, yielded \$10,000 a day. About \$1,000 was taken out of a sluice-box for one day's work. Steele's claim, on William's Creek, gave a maximum yield of 400 oz., or \$6,524 a day. More than \$100,000 was taken out of this claim of 80x25 feet.

"In 1862, the highest amount taken out by any one company in 24 hours was \$9,050. This was from the Cunningham claim on William's Creek, which realized at the rate of nearly \$2,000 a day for the season; on several days as much as 53 lb. weight of gold was taken out. The Adams claim yielded to each of its three partners \$40,000 clear of expenses. In the Barker claim, eight partners realized \$7,000 each. These claims were above the canyon. In 1863, three claims below the canyon yielded \$300,000; Diller's claim in one day the extraordinary sum of 102 lb. of gold—\$20,000.

"In 1864, many of the claims continued to pay as well as before. On Conklin's gulch, a discovery of that year, the Ericsson claim yielded from 400 to 500 oz. a day. The Butcher claim on Lightning Creek, yielded 350 oz. a day; the Aurora, from 300 to 600 oz.; the Caledonia, 300 oz.; and the Wake-up-Jake, 150 oz. These few returns are given merely to illustrate the wealth of Cariboo, and in no way describe the amount of gold taken out over the whole district; only that from a few claims selected for illustration."

Some Cariboo Rhymes.

After giving a list of prices current in 1875, attention is turned to "Sawney's Letters and Cariboo Rhymes," by James Anderson. "For the Sake o' Auld Lang Syne," some of these are reprinted in the pamphlet, including excerpts from "Letter No. 1," written February, 1864; "The Prospector's Shanty"; "Letter No. 3," and "Waiting for The Mail." Among other references in these rhymes that awaken memories press," facetiously named, "Barnard's Cariboo Express," facetiously named, "Barnard's Cariboo Delay."

The closing part of the pamphlet deals very briefly with "The Cariboo of To-day," and in this an estimate is given of the aggregate value of the gold produced in Cariboo to date, namely, nearly \$41,000,000. Mention is made of recent installations of hydraulicking plant

and works, one having involved an outlay of more than \$1,000,000, as evidence of the confident expectation of continued profitable production from the gold-bearing gravels of Cariboo district.

Suitably Illustrated and Well Printed.

The pamphlet is illustrated with half-tone reproductions of photography of Fraser and Thompson River views, and Cariboo mining scenes, the latter including several old ones—in particular the "Cameron Claim, William's Creek, 1863," and "Old Black Jack and Burns Hydraulic, Cariboo, 1863." The dark-coloured cover is lettered in gold, and is especially appropriate in appearance as a cover for "A Few Reminiscences of the Early Gold Mining Days." In each copy has been placed a book-marker, on which is printed: "With the Compliments of Richard McBride, Minister of Mines, Victoria, B.C."

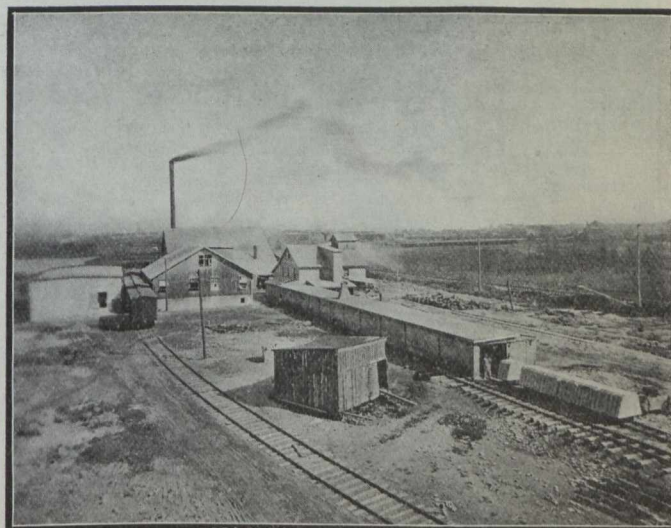
A further kindly remembrance by the Hon. the Prime Minister is of the inmates of the Old Men's Home, Kamloops, Sir Richard having arranged that each of them should be supplied with a copy of the pamphlet. Mr. R. F. Tolmie, deputy minister of mines, who had been at much pains to obtain suitable reading matter and illustrations for the pamphlet, went to Kamloops to represent the minister of mines at the Centenary, since it was not practicable for the minister to attend himself.

SYDNEY PRESSED BRICK COMPANY, LIMITED.

By H. C. Burchell, Managing Director.

The Sydney Pressed Brick Company is manufacturing what may be described as artificial stone from granulated blast furnace slag and a small percentage of slag cement. The granulated slag is obtained in railway hoppers from the Dominion Iron & Steel Co. Part of the moisture is driven out of the slag in a rotary dryer and the proper proportion of cement is then added.

The slag and cement are thoroughly mixed and ground together and pressed (damp) in a machine



View of Sydney Pressed Brick Company's Plant

such as is used in the manufacture of sand-lime bricks. From the press the bricks are taken on small iron trucks to a curing cylinder in which 20,000 bricks are cured for eight or ten hours in steam at about 100 lbs. pressure.

On coming from the curing cylinder the bricks have a good ring and are fit to be used. They, however, go on hardening for an indefinite time, and are improved by exposure to weather and changes of climate. They make an exceptionally strong bond with cement mortar. A wall built of these bricks laid in cement mortar is practically monolithic. The bricks are quite free from warp and are very accurate in dimensions. The dimensions are 8 3-16 in. x 4 in. x 2 3-16 in.

The company manufactures light grey, red, and yellow bricks. The new general office building of the Dominion Iron & Steel Company is built of Sydney red bricks. Various commercial, industrial, educational buildings, and dwellings in Sydney and elsewhere furnish very attractive examples of this new building material.

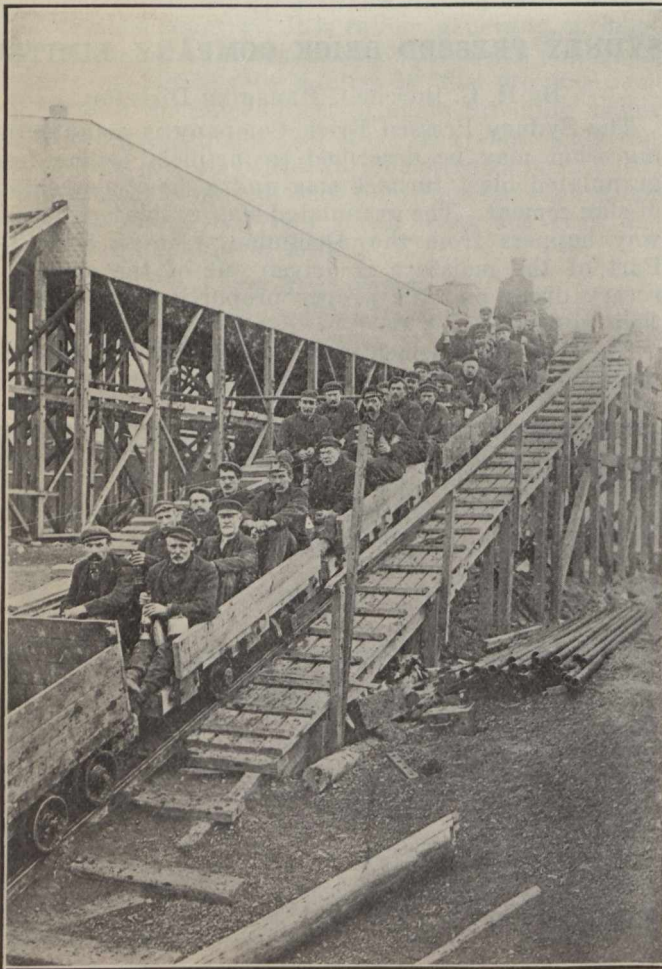
The output of the whole plant is 20,000 bricks per working day of ten hours.

MARITIME RAILWAY & POWER CO., LTD.

Written for the Canadian Mining Journal by G. B. Burchell.*

This company operates the most northerly coal areas in Nova Scotia. This means that their collieries are nearer the large consuming points than any of the rival companies.

The areas held by this company consist of 26 square miles, containing 500,000,000 tons of coal on the northern outcrop of the Cumberland Basin. The southern outcrop of this Basin is being worked by the Dominion Coal Company at Springhill.



Scene at Joggins Colliery

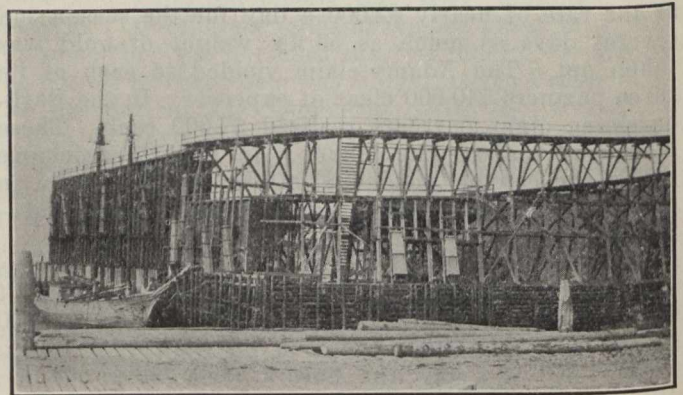
The most important colliery operated is situated at Joggins Mines, which is a seaport on the Bay of Fundy. This mine is equipped for an output of 1,000 tons per day, the ventilating, pumping, coal cutting, and haul-

*General Manager.

age being all done with electric motors, which receive their current from the company's power plant situated at their Chignecto colliery fifteen miles distant.

In addition to the facilities for water shipment at Joggins Mines, which consist of pockets capable of handling 1,500 tons per day, the company has its own line of railway, 15 miles in length, which serves to connect all the collieries with the docks at Joggins Mines and Maccan Junction on the Intercolonial Railway. This junction is the closest in Nova Scotia to the large markets available in Amherst, Sackville, Dorchester, Moncton, and St. John.

Moncton is the headquarters of the Intercolonial Railway and the future terminus of at least two trans-



Coal Dock, Joggins Mines

continental railways. At the present time Moncton distributes over one million tons of coal annually and this one market would absorb the entire output from the collieries of the Maritime Coal, Railway & Power Company, were it available.

Power Plant.

The power plant of the company is situated at the Chignecto Colliery, which is only eight miles from the city of Amherst, where a large amount of power is consumed for manufacturing and lighting purposes. Among the manufacturers who are using the power might be mentioned, The Canada Car and Foundry Company, the Robb Engineering Co., the Amherst Boot & Shoe Co., and the Hewson Woolen Mills, while a ten-year contract is being filled for the city street lighting.

The capacity of the company's generators is now about 2,000 h.p., and plans are being drawn up for an addition, which will bring the capacity up to 5,000 h.p.

EXPLOSIONS FROM FALLS OF ROOF IN COAL MINES.

A most interesting paper explaining the cause of the three explosions at the Bellevue colliery in Alberta, has been submitted to the Institution of Mining Engineers by Mr. John T. Stirling Provincial Inspector of Mines, and Prof. John Cadman. The facts presented illustrate how explosions of considerable magnitude may originate from causes which heretofore have not been reckoned with. By way of introduction the authors point out that the investigation which necessarily follows an explosion is always difficult, and usually hazardous, and although the point of origin may frequently be located within narrow limits, the exact source is often obscure; obscure no doubt, because the investigators are limited in their choice of the igniting agent to the ordinary sources of heat which appeared likely to be forthcoming at the time when the ignition took place. In other words they commenced their investigation with preconceived ideas concerning the origin of the explosion.

The writers adduce evidence to show that the explosions at Bellevue were produced by the ignition of inflammable gas by sparks emitted from falling stones. A few of such cases have already been recorded, but the importance of this source of ignition cannot be lightly disregarded. In the removal of pillars—in the board and pillar working as practised in the north of England—a glow has been observed on such occasions in the goaf when the roof has fallen in, and cases are known in which gas has been ignited from the spark from a pick. The four seams at the Bellevue Mine are known as Nos. 1, 2, 3, and 4, and are intersected at distances 135, 258, 350, and 500 feet respectively from the mine entrance. The explosions occurred in No. 1 seam, which has an approximate thickness of 13 feet, a hard siliceous roof, and has been extensively developed. The method of working was that of driving wide rooms to the rise, and such portions of the ribs extracted as could be obtained before the roof collapsed, or showed signs of collapse. The roof, as stated being of a hard siliceous nature, wide openings were thus left in the waste. Three explosions occurred in the mine in 1906, and were traceable to direct ignition from open lights prior to the introduction of safety lamps in August of that year. No further explosions took place until October, 1910, which was the first of the series of three described by the writers. When this explosion occurred it happened to be "Labour Day," and work having been suspended, no one was in the mine. Subsequent examination revealed that the explosion had originated in the neighbourhood of shoot 71, and that immediately above the counter gangway pillar between shoots 61 and 71, a large fall of roof had taken place. This cave was about 4 feet thick, and extended to the rise for a distance of upwards of 80 feet. The evidence in fact indicated that this fall was the point of origin. Thus according to information supplied by Mr. Elijah Heathcote, the District Inspector of Mines, there was no sign of the explosion at the entrance to the mine, and it was not until shoot 14 was reached that any evidence of the explosion was manifest. From shoot 14 in-by, all the electric lamp bulbs showed a thick coating of mud and dust, and several were broken. Tubs were coated with from 2 to 3 inches of mud, plastered all over the in-by side. In the neighbourhood of shoot 58, evidence of out-by force was found, props were displaced and material dislodged. At shoot 65 much disturbance ap-

peared, and at the bottom of and in shoot 67 evidence of flame was visible in the form of coking on the in-by side of the props. From shoots 67 to 71 there was much evidence of flame, and other evidence corroborates Mr. Heathcote's view concerning the point of origin of the explosion. Although Mr. Heathcote at the time boldly advanced the opinion that the occurrence was attributable to an ignition caused by sparks produced from falling roof, neither the management nor the mining public were inclined to accept the theory and the cause of the explosion was generally regarded as shrouded in mystery.

The next explosion occurred during the afternoon shift of December 9th, 1910. At the time there were forty-seven persons underground, and of these thirty were killed, together with one of the rescue party wearing a Draeger apparatus. This latter fatality is believed to have been caused by a leak in the joints of the apparatus. Meanwhile from an examination of the mine after the explosion by one of the writers, it appeared quite clear that this explosion originated in the locality of shoot 74. At the top of this shoot, and extending for some distance, a large fall of roof had occurred. At this point there is every opportunity for an accumulation of gas, and, given a source of ignition here an explosion of fire-damp would account for all the phenomena observed. At the public enquiry into the cause of the explosion, the jury, for want of a more definite conclusion, favoured the view of one mining engineer who suggested that the explosion was due to what he termed his "percussion" theory, a suggestion which the writers declare may be dismissed at once as it will not bear "the most slender investigation." They add: "In the first place, there was no evidence to support such a theory, even if such a mode of origin were possible. . . . There is no doubt that the explosion was caused by an ignition of fire-damp, ignited by sparks emitted from the falling roof."

A third explosion occurred towards the end of January, 1911, when the mine was closed on account of a general strike. An examination revealed that the explosion had originated from the neighbourhood of rooms 89 and 90. At this point a heavy fall of roof had occurred, and the area was a very suitable one for the accumulation of gas during the time the fan had been standing. The writers made a careful examination of the workings some months later, and after referring to the force of this explosion which was more pronounced on this occasion than on the previous ones, state that at the seat of the ignition ample evidence of flame was obtained, as also evidence of pitting in the form of globules of coke-dust splashed up against timbers radiating from this area. Although the writers do not attach much weight to this, it is worthy of note, particularly as the general evidence of direction clearly pointed to this place as the starting point, and they have observed similar pitting of coke-dust around the area of ignition of fire-damp in other cases.

To prove the correctness of their theory the writers carried on some experiments in the mine. A large piece of rock from the roof, weighing some 60 or 70 pounds, was lifted and dropped into one of the shoots, on the floor of which lay some of the fallen roof. As the lump rolled down the shoot, a brilliant display of sparks was observed. Other experiments demonstrated that sparks from this rock could be produced of suf-

ficient intensity to ignite coal-gas. The rock is a bituminous sandstone, very fine and even in texture, giving the whole a dark grey colour, laminated thin layers of black occurring in it, along which it splits most readily. A hand specimen roasted in a clear gas flame for some minutes yielded on one side patches of glossy black coke, whilst on the other side the black colour had been discharged, leaving a pale grey fine-textured sandstone. The rock under the microscope shows a fairly grained texture, and consists chiefly of colourless grains, chiefly quartz. The brown grains, perhaps a sixth of the rock mass, seem to be of carbonaceous material which exert no action upon polarized light. The blackest grains are doubtless bitumen and have clearly yielded under pressure. Several samples of mine air were taken and on analysis showed the presence of fire-damp, and one sample showed the presence of 0.30 per cent. methane. The writers' remark on this as being specially interesting, for as the ignition temperature of the paraffin hydro-carbons appears to fall slightly as the series ascends, the presence of this higher hydrocarbon in the fire-damp would lower the temperature of ignition, and thus render more easy the ignition of gaseous mixtures by sparks from falls of roof.

The paper concludes as follows: "It is clear, however, that sparks of sufficient intensity can be produced by rubbing together pieces of the roof of No. 1 seam to ignite methane, which has an ignition temperature—according to Dixon and Coward—of from 556 to 700° C., and as other hydrocarbons have been shown to be present, the temperature of ignition will be less, and an explosive mixture will be more readily ignited.

"Wheeler and Burgess, in their research on "The Lower Limit of Inflammation of Mixtures of the Paraffin Hydrocarbons with Air," showed that the length of the spark necessary to ignite the lower-limit mixtures was not material, provided that the temperature was adequate.

"By the abrasion of two surfaces of the rock in question, it appears that a definite amount of energy has to be exerted before sparks of sufficient intensity can be produced to bring about ignition. The writers are satisfied, however, that they have established the fact that sparks can be produced by falls of roof in the No. 1 Bellevue seam sufficient to bring about the ignition of inflammable gas; and as subsequent examinations after each explosion showed that falls did occur, in which large masses of the roof fell, in areas where gas was in all probability present, it seems perfectly clear that the cause of the three explosions at Bellevue has been satisfactorily explained.

"To avoid such calamities in the future is a very difficult and serious problem. The present method of working lends itself to irregular falls in open and ill-ventilated goaves. It is impossible in the present method of working to prevent falls in the open goaf, and it is further practically impossible to ventilate satisfactorily all the goaf-spaces under the system in operation prior to these explosions. A method is now being adopted of putting shoots through to the surface at frequent intervals for the purpose of freeing the upper goaf-areas of inflammable gas. Such a method is applicable only during such time as outcrop-workings are in progress, and at the most can only be said to be a temporary expedient. A form of working which permits of the filling of the goaf-space appears the most satisfactory solution of the problem. Although a practical solution of the difficulty, the introduction of such a method is connected with commercial questions which it is not the intention of the writers to discuss.

It is well known that the origin of a number of explosions in this country and elsewhere has remained obscure, and whilst it is not suggested that sparks from falling roofs are by any means common, it is a subject which deserves the serious attention of all employed in mining."

A DRILL CONTEST.

During the latter part of 1911 an iron mining company, operating a number of properties in the northern part of Hastings County, Ontario, arranged to run a test between a number of the best known makes of rock drills on the market. This trial was to consist of records of footage drilled, cost of repairs, ease of operation, and tests of air consumption. The air pressure at the compressor was to be about 100 pounds per square inch, which pressure was to be maintained. The manufacturer or agent of the drills entering the trial would have the privilege of furnishing a man or men accustomed to operating his drill, which men, however, were to be under the supervision of the company. The drill was to be a standard machine throughout and the manufacturer was to submit tenders to cover a number of drills as specified and agreed on, and to quote prices on drills, mountings, and parts that would hold good for two years from the acceptance of the tender. The pistons of the drills were to be preferably equipped with a Quick Acting Chuck which was to take the steels unshanked.

The Sullivan Machinery Company, of Chicago, Ill., manufacturers of the Sullivan Drill; the Canadian Rand Company, of Sherbrooke, Que., manufacturers of the Little Giant Drill, and Mussens Limited, of Montreal, agents of the Holman Drill, manufactured by Holman

Brothers, of Camborne, Cornwall, England, were invited to enter this trial. These three companies agreed to the conditions laid down by the company, and placed drills in the contest.

The original intention of the company was to use a light drill, either 2¾" or 3" diameter cylinder. With this understanding Mussens Limited sent a 3" Holman, while the Rand sent a 3⅛" diameter machine. The Sullivan sent a 3¼" size drill. The Holman and the Rand Drills were the only machines provided with the Patent Chuck as stipulated in the conditions, the Sullivan having the old-fashioned chuck.

When the drills were placed at work the 3" Holman machine was found to be somewhat light, and a 3¼" machine was, therefore, sent to replace it. Owing to the changes and other unavoidable delays the competition did not start until April 1st, 1912, the final entries being:

Sullivan, 3¼" Spool Valve Drill, with the ordinary Round Chuck.

Rand, 3⅛" Tappet Valve Drill with a Patent Chuck.

Holman, 3¼" Ball Tappet Type Steel Drill with a Patent Chuck.

The Holman 3" Drill was also left on the property to try out.

The contest went on for six days, when the Rand 3⅛" machine was brought to the surface as it was apparently

found the Patent Chuck was not working satisfactorily. The Rand Company was notified to send a 3 1/4" machine to replace but owing to the non-arrival of this 3 1/4" machine the Canadian Rand Company was not represented for some days.

On account of climatic and local conditions, the air was found to be very damp, and the Sullivan runner had some trouble with the valve of his machine freezing. On account of this trouble a Sullivan Tappet Drill was ordered, but unfortunately, when it arrived the piston was

On May 3rd, another piston with the ordinary old type chuck arrived at the mines and the 3 1/8" Rand was again put in commission.

On May 14th, the test officially came to an end. During the time from April 1st to May 14th, the drills were tested as to the amount of air consumed per minute. This was done by meter, the drills working for a certain length of time and the flow of air registered.

The Holman 3 1/4" Drill was tested eight different times. The Rand 3 1/4" Drill was tested five different times.

TABLE NO. 1

Summary of Drill contest between the Holman, Rand and Sullivan Rock Drills at the Iron Mines, Bessemer, Ont.

Dates	Shifts	Size of Drill	Footage Wet	Footage Dry	Total Footage	Stopped for repairs	Cost of Material	Labor in dollars and cents	Total cost of repairs including labor	Average footage per hour	Consumption of air per minute	Air Pressure	Saving in air effected by the Holman Drill over the		Saving in maintenance effected by the Holman Drill over the		Per cent. greater footage effected by the Holman Drill over the	
													Canadian Rand.	Sullivan	Canadian Rand.	Sullivan	Canadian Rand.	Sullivan
TEST NO. 1																		
April 2 to May 14	40	Holman 3 1/4 in.	91.7%	8.3%	890 1/2	Min 20	\$1.80	.09	\$1.89	Feet 3.647	Cub.ft 102	Lbs. 80	49%	14.7%	272%	44%	29.06%	28.3%
April 2 to May 14	48	Sullivan 3 1/4 in.	86.2%	13.8%	813.7	75	2.68	.58	3.26	2.818	117	80						
April 18 to May 14	27	Can. Rand 3 1/4 in.	81.2%	18.8%	354	75	4.00	.76	4.76	2.843	152	80						
TEST NO. 2																		
April 2 to May 14	50	Holman 3 in.	83%	17%	847 1/2	90	5.05	.61	5.66	2.866	101	80	6%		161%		37.6%	
April 2 to May 14	20	Can. Rand 3 1/8 in.	82.9%	17.1%	310	105	5.32	.59	5.91	2.082	107.	80						

TABLE NO. 2.

TEST No. 1

Make of Drill	Size	Number of Shifts	Total Labor Cost based on \$4.60 per shift for driller and helper		Total Cost of Repairs, including cost of Labor making repairs		Gross total cost Labor and Maintenance		Total footage drilled	Average Labor & Maintenance cost per foot drilled		SAVING effected per foot drilled by the Holman Drill over the	
			\$	c.	\$	c.	\$	c.		\$	c.	Sullivan Make	Canadian Rand
Holman	3 1/4 in.	40	184	00	1	89	185	89	890 1/2		20.88	6.68 Cents	15.54 Cents
Sullivan	3 1/4 in.	48	220	80	3	26	224	06	813.7		27.56		
Canadian Rand	3 1/4 in.	27	124	20	4	76	128	96	354		36.42		

TEST No. 2

Holman	3 in.	50	230	00	5	66	235	66	847 1/2		27.82		3.76 Cents
Canadian Rand	3 1/8 in.	20	92	00	5	91	97	91	310		31.58		

found to be bent, which damage was believed to have occurred in transit. The Sullivan, therefore, continued the competition with the Spool Valve Machine.

On April 18th, a 3 1/4" Rand Tappet Machine arrived at the Mines and was put into active operation. This drill was not provided with a Patent Chuck similar to the chuck on the 3 1/8" machine formerly in use, but had the ordinary old type chuck, for which steel had to be shanked. The contest was then continued to the end of April, as originally agreed, when by mutual consent between all three drill representatives, and the representatives of the company, it was decided to carry the trial on for another two weeks.

The Sullivan 3 1/4" Drill was tested eight different times. The Holman 3" Drill was tested five different times. The Rand 3 1/8" Drill was tested five different times. Table Number 1 is a summary compiled from the figures submitted by the company to the drill representatives. From this summary the Holman drill shows a very considerable advantage, not only in saving in air, and saving in maintenance, but also in greater footage effected. The Holman drills also showed considerable saving per foot drilled on labor costs only, as will be seen from table No. 2.

On the basis of this six weeks' competition the initial order of the company for rock drills for the Bessemer property was placed with Mussens Limited, of Montreal, for the 3 1/4" Holman Steel Rock Drills.

A NEW CANADIAN COMPANY.

The C. O. Bartlett & Snow Company of Canada, Limited, has been granted a Dominion charter to deal in, manufacture, and install elevating and conveying machinery, power transmission machinery, engines, boilers, hoisting machinery, brick machinery, garbage reduction and destruction machinery, paint machinery, grain and cereal machinery, and to carry on a general line of engineering, manufacturing and construction work.

The head office of the company has been opened at 282 St. Catherine street west, Montreal, with Herbert S. Hersey, general manager.

This company is the outgrowth of the extensive Canadian business of the C. O. Bartlett & Snow Company, of Cleveland, Ohio, and, although the connection between the Ohio company and the Canadian company will be very close for some time, the organization and management are entirely independent.

The Canadian company has been granted Canadian rights to all patents and licenses owned by the Ohio company, and this, taken in connection with the vast engineering data and designs of the original company, coupled with the wide acquaintance and engineering experience of Mr. Hersey and the engineers associated with him in handling the Canadian business, places the new company on the basis of an old-established concern with years of business experience behind it and with a business reputation of the highest standard as well as a large clientele from which to draw a substantial amount of business from the start.

The C.O. Bartlett & Snow Company has installed a number of the best and most up-to-date coal mine equipments during the past few years in Crow's Nest Pass district as well as having done a large business in connection with the cement interests of Canada and with the coal, gypsum and asbestos interests of the Eastern Provinces.

PERSONAL AND GENERAL

Mr. Arthur S. Herbert, the manager of the Siemens Company of Canada, Limited, has been appointed the representative for Canada for that company. Correspondence hereafter is to be addressed to the Montreal office, at the Transportation Building, Montreal, P.Q.

Mr. Ralph Stokes has been appointed assistant consulting engineer to the Canadian Mining and Exploration Company. Mr. Stokes, who has for years been a prominent technical writer and journalist, has visited nearly every important mining region in the world, and is intimately acquainted with the Rand.

Mr. J. B. Woodworth, mining engineer, Toronto, is in New Mexico examining several properties.

Mr. S. N. Graham has returned from a professional trip to Porcupine.

Mr. A. A. Cole has returned to Cobalt after spending a few days in Toronto and Montreal.

Mr. G. C. Bateman, who now represents the Canadian Mining and Exploration Company in Toronto, is making an examination on Vancouver Island, and will be back in Toronto about November 1st.

Mr. J. B. Tyrrell is expected in Toronto about the first week of November.

Mr. W. F. Ferrier is in Toronto after a protracted absence.

Mr. George R. Rogers, manager of the Mann Mines, Gowganda, visited Toronto on business on October 5. Mr. Rogers reports 20 tons of high grade ore ready for shipment. The silver contents are between 2,000 and 3,000 ounces per ton. The mine has been working for only nine months and is not yet fully equipped. A shipment of 14 tons was made last March when the ore ran between 3,000 and 4,000 ounces per ton.

Mr. G. M. Colvocoresses, manager of the Millerett mine, Gowganda, passed through Toronto on October 4th on his way to New York.

Mr. H. Mortimer Lamb has returned from British Columbia.

Mr. P. Kirkegaard has returned to Toronto from the Cordova mine.

Dr. Alfred E. Barlow, president of the Canadian Mining Institute, returned to Montreal last week after

an absence of some weeks in Western Canada. During his stay in the West Dr. Barlow devoted much time to organization work in connection with the visit of the members of the International Congress to British Columbia next year. He also presided at the semi-annual meeting of the Institute at Victoria on September 18th and 19th and at Frank, Alta., on September 30th.

Mr. Charles Fergie left recently on a visit of inspection to the collieries of which he is consulting engineer at Lethbridge, Alta.

Mr. George C. Lloyd, secretary of the Iron and Steel Institute, was in Montreal recently, coming from New York where he attended a congress of the International Association for Testing Minerals.

Mr. S. R. Heakes, formerly manager of the Kerr Lake Mine, at Cobalt, has abandoned the profession of mining engineer and has taken deacon's orders in the Anglican Church. He has been appointed to a curacy in London, Ont.

Dr. D. D. Cairnes, of the Canadian Geological Survey, returned to Ottawa the last week in September, and reports having completed that portion of the International geological work along the 141st meridian (the Yukon-Alaska boundary), which had been undertaken by the Canadian Government, the United States and Canadian geological surveys having agreed to map the geology along the boundary line from Yukon River to the Arctic Ocean, a distance of about 350 miles. This work was commenced in the spring of 1911, and by the terms of the agreement, the United States and Canadian geologists worked to the north and south respectively of Porcupine River, each extending their investigations at least two miles east and west of the boundary line. This work not only gives a geological section at that longitude through the northern half of the Yukon Plateau, the entire Rocky Mountain, and the Arctic Slope physiographic provinces, but should also assist materially in correlating the geology of Alaska with that of Yukon and British Columbia.

The Northwest Section of the American Institute of Mining Engineers opened its quarterly meeting in Spokane, Washington, on October 2.

Mr. James Ashworth, of Vancouver, B.C., has been examining coal lands on Bear River, which field is not a great distance from Fort George, B. C.

Dr. R. W. Brock, director of the Geological Survey of Canada, was in the West in September. With other officials of the Survey he attended the semi-annual meeting of the Canadian Mining Institute, held at Victoria on September 18-19.

Dr. A. E. Barlow, president of the Canadian Mining Institute, was in the chair at the first semi-annual meeting of the Canadian Mining Institute. He reached Victoria on September 16 and remained a week in that city. While there he had an interview with the Premier of British Columbia, Sir Richard McBride.

The British Columbia Copper Company is reported to have increased the wages of its miners 25 cents a day under a sliding scale basis agreed upon with the men. If the price of copper shall reach 13 cents a pound a similar further advance in pay will be given the men. The company's net profits for August are stated to have been about \$36,000.

Mr. Herbert Carmichael, provincial assayer, who is also assistant provincial mineralogist in British Columbia, about the middle of September left Victoria for Tete Jaune Cache, in the Upper Fraser River district, to investigate the mineral resources of that part of the province. Aside from mica, authentic reports of the occurrence of minerals there have been very few in past years.

Dr. DeLorne D. Cairnes, of the Geological Survey of Canada, has, with the permission of the Director of the Survey, contributed a paper entitled "Some Suggested New Physiographic Terms," which paper was published in *The American Journal of Science*, Vol. xxxiv, July, 1912. The table of contents is as follows: Introductory. Definition of Terms. Classification of Physiographic Processes. Equiplanation. Deplanation. Applanation. Conclusion.

Mr. W. J. Elmendorf, of Victoria, B. C., formerly general manager of the Portland Canal Mining Company, Limited, is again directing mining operations in Portland Canal district, this time as manager of the Portland Canal Tunnels, Limited.

The *Engineering and Mining Journal*, New York, recently published the following among other persons: Edward Dedolph has disposed of his patent rights for four European countries on his process for making zinc oxide out of low-grade zinc ore to the Metallurgische Gesellschaft of Frankfurt-on-Main, which is going to exploit it. Mr. Dedolph is at present at McGill University, Montreal, where he is engaged in research work on electric zinc smelting in behalf of the Canadian Government.

Mr. C. D. Emmons, of Eugene, Oregon, who is directing operations for a Vancouver, B.C., syndicate engaged in boring for oil on Graham Island of the Queen Charlotte group, has been spending a week or two at Victoria, having gone to that city in September after coming south. Those chiefly interested are sanguine they will find oil in commercial quantity on Graham Island.

Mr. W. F. Ferrier, of Toronto, general manager of the Natural Resources Exploration Co., Limited, who has been travelling since June in the interests of his company, reached Victoria, B.C., on September 27, and two days later left for Vancouver on his return to Toronto.

Mr. A. Gordon French late in September announced his intention to make a demonstration at Nelson, B.C., early in October in connection with his claims to have

discovered metals of the platinum group in ore and dike matter occurring near Nelson. He has suggested that beside having discovered a new metal, which he has named canadium, he has found indications of still another metal at present unknown. As the provincial mineralogist was notified that the provincial department of mines might send a representative, that official took advantage of the permission thus granted and went to Nelson to ascertain what was going on. It is yet too early, at the time of writing, to learn what was done and with what result.

Mr. Joseph G. S. Hudson, of the Mines Branch of the Canada Department of Mines, went from Alberta to British Columbia in September, in performance of the duty he is engaged in, namely the collection of data for a new edition of the "Report on the Mining and Metallurgical Industries of Canada." The new edition of the report will be issued in handy form and, consequently, will be a welcome contrast to that issued two or three years ago.

Mr. F. August Heinze was in British Columbia a few weeks ago, in connection with his half interest in a comparatively large area of lands in that province granted to the Columbia & Western Railway, the construction of which line he commenced before the Canadian Pacific Railway Company purchased his smelter and railway holdings in the Trail Creek district. The Provincial Government is stated to have purchased the C. P. R. Company's interests in the lands mentioned and it was understood that Mr. Heinze went to Victoria with the object of coming to an understanding with the Government relative to his interest in the aforementioned lands.

The Hedley Gold Mining Company has paid another five per cent. dividend, making 15 per cent. for the current calendar year. It is thought probable the company will this year make its December dividend 10 per cent., as it did last December.

Mr. Robert R. Hedley has retired from the management of the Canadian Mining Operators, Limited, of Vancouver, B.C., and will practice as a consulting mining engineer in that city.

Mr. Harry Howard Johnson, of the firm of Johnson & Hoffmann, mining engineers, London, England, has been examining mining property on Vancouver Island. It is probable his principals will undertake important development work there.

Mr. W. W. Leach, of the Geological Survey of Canada, having concluded his season's field work in the Blairmore-Frank district, southwestern Alberta, paid a visit to Vancouver and Victoria, B.C., before returning to Ottawa.

Mr. H. Mortimer Lamb, secretary of the Canadian Mining Institute, was in the West for several weeks in September and October. After the semi-annual meeting had been held at Victoria, B.C., he left there for Frank, Alberta, where preliminary arrangements had been made for holding a meeting of local members and probably organizing a branch of the institute.

Mr. Thos. J. Lloyd, underground superintendent at the Van-Roi silver-lead mine, near Silvertown, Slooan Lake, British Columbia, was married on September 26, at Victoria, to Miss Mummery, an English lady who spent last winter in the home of the resident manager of the Van-Roi Mining Company.

Mr. E. C. Musgrave, who some years ago opened the Tyee Copper Company's profitable gold-copper mine at Mt. Sicker, Vancouver Island, but of late years engaged in mining in Mexico, has been paying a visit to old friends and family connections in and about Victoria, B.C. It was his intention to leave that city early

in October, on his return journey to Mexico.

Mr. M. E. Purcell, of Rossland, B.C., superintendent of the Consolidated Mining and Smelting Company of Canada's Centre Star, War Eagle, Le Roi group of mines, attended the semi-annual meeting of the Canadian Mining Institute, of the Western Branch of which he is this year's chairman.

Mr. Wm. Fleet Robertson, provincial mineralogist for British Columbia, returned to Victoria late in September, after having been on a three months' trip of investigation in part of Northern British Columbia, chiefly in the Groundhog coal basin, Upper Skeena River.

Mr. James Rutherford has returned to Victoria from a visit to Great Britain. For several years he has represented in British Columbia some Old Country people who are understood to be largely interested in the Peace River district.

The Standard Silver-Lead Mining Company paid another dividend on September 9, this being the sixth this year. Last April the first dividend, totalling \$25,000 was paid, and since then there has been a monthly distribution of profit at the rate of \$50,000 a month, so that the total for the six months is \$275,000.

Announcement has been made of the intended marriage of Dr. Alfred W. G. Wilson, of the Mines Branch of the Canadian Department of Mines, Ottawa, to Miss Russell, also of that city.

Mr. J. W. Astley and Mr. A. B. Willmott recently examined the Wilbur iron mine.

SYDNEY CEMENT COMPANY, LIMITED.

By H. C. Burchell, Managing Director.

No doubt the most important principles of modern business and industry, are efficiency and conservation of resource and by-product. Some of the industries of Nova Scotia have been most successful in applying the principle of conservation. The Dominion Iron and Steel Company use only bye-product ovens in their work, rather than the old-fashioned bee-hive ovens, and blast furnace slag from their furnaces combined with hydrated lime is now being utilized by the Sydney Cement Company for the manufacture of hydraulic cement.

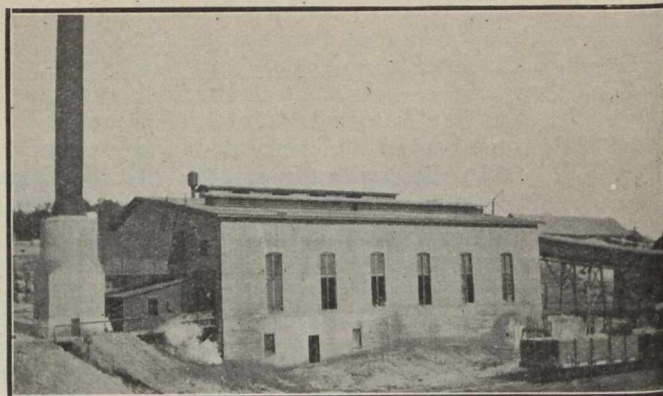
Analysis of basic slag from the blast furnace:

	Per cent.
Lime.	50
Silica.	32
Alumina and ferric oxide	12
Magnesia.	3
Sulphur	1.5

In the manufacture of Sydney cement, the first operation is the granulation of the slag. Until a few weeks ago this was accomplished by running a stream of water into the slag spout of one of the blast furnaces. The molten slag coming in contact with the water was granulated and deposited in cars in a state similar to coarse sand. Recently a granulating pit like those in use in the United States to granulate slag for the Universal Portland Cement Company, was installed. This does the work better and allows of a selection of slag from any of the furnaces. The result is a better and more uniform material.

The granulated slag is dried in a rotary dryer, put through crushing rolls, and stored in a bin close to similarly stored hydrated lime. The slag and hydrated lime are then automatically measured, mixed dry in a rotary mixer, and passed to Krupp tube mills for fine grinding. The cement is ground so that 92 per cent.

passes through a 200-mesh sieve equal to 40,000 openings per square inch. The finished cement is carried away by the usual conveyors and elevators to storage bins. The packing house is equipped with Bates packing machines. The capacity of the plant is 500 bbls. per day of 24 hours.



Sydney Slug Cement Co.

This Sydney cement is somewhat slower in setting than ordinary Portland cement. On the other hand, concrete made from it continues to acquire strength for a longer period than concrete made from Portland cement. It is always perfectly sound, never swelling or cracking. The colour is nearly white with a slight lilac tone, and it has been used by some architects to obtain a very pleasing effect, when it is used as mortar in red brick work.

This cement has been found to show excellent results when used in sea water, having been found satisfactory for concrete piles, retaining walls, etc., under salt water. It is considered by local contractors to have special merit for use in stucco work and brick laying. It is also used in the manufacture of pressed brick. This Sydney cement, indeed, has proved reliable in concrete work of every description.

A LETTER FROM ATLIN, B.C.

A prominent resident in Victoria, British Columbia, recently received from a friend, writing from Atlin camp, in Sassiard district, the following notes:

I think the camp looks more hopeful than it has done for three years. Ruby Creek is showing up well. Jack Black is making good on Boulder Creek. Wright Creek boys are now in rich ground. Wm. Gairns in Upper Wright Creek is taking out half to one-and-a-half ounces per day single handed. Maluin thinks Otter Creek good enough to spend lots of money on. Spruce Creek is a winner. McCluskey is taking out wonderful gold. Geo. Adams was appointed manager on McKee Creek, vice Hamshaw, and he has had some dandy clean-ups. The first paid all expenses for the year. Old R. McKee has struck it rich on O'Donnell Creek—only in the drill hole, of course, and at 94 ft.—but he is elated with his prospects (three feet of rich pay above bedrock). Hamshaw is in again, buoyant as ever, and has raised the wind somehow. He is using the Keystone drill on Lower McKee Creek, and is sanguine, and then some.

There has been a new placer strike in Burdette Creek, a tributary of Wilson Creek, and some splendid prospects have been shown round town. The White Pass mining expert has visited the camp and says this camp has not yet begun to live. He predicts great things in the near future. How is all that for a rosy prospect?

STEAM HYDRAULIC FORGING PLANT.

(Specially Written for the Canadian Mining Journal.)

The present corporation known as the Nova Scotia Steel & Coal Company, Limited, had its birth as a country forge shop with a capital of four thousand dollars. The steady growth from this small beginning up to the large company of to-day with its iron and coal mines, lime quarries, steel works, rolling and finishing mills, and fourteen millions of capital, is one of the most interesting and illuminating stories of Canadian industrial evolution.

The company has always specialized in heavy forge work and has quite recently installed an entirely new plant for this purpose. The older equipment which was replaced consisted of large and small steam hammers. The large steam hammer has never been perfectly satisfactory for the production of the massive, intricate forgings demanded by modern industry. Nasmyth, who invented the steam hammer in 1833, revolutionized the forging process of his day. With the enormous development of engineering generally and in shipbuilding and naval armament particularly, the hammer became less and less able to produce the results required. The hammer gave such a quick hard blow that its effect did not penetrate far enough below the surface of the piece being worked and the shock caused excessive vibration with the consequent large amount of wear and tear on the parts of the machine.

In 1860 a hammer was installed at the Krupp works, at Esson, Germany, with a 50-ton ram and a 1,000 ton anvil intended for heavy forgings. Even as late as 1901, a 125-ton hammer was set up at the works of the Bethlehem Steel Company in Pennsylvania, but it was discarded after only a few months of operation.

The desirable thing in making large forgings is to get penetration in working the red-hot pieces of steel. The action of the heaviest steam hammer on a large piece, produces only a comparatively slight skin effect. This causes the steel to have a much different character on the outside from what it has in the interior. The action desired in shaping a massive forging from a bloom or ingot is a kneading action which will penetrate to the centre. This kind of working tends to produce a fine crystallization throughout and a uniformly tough, ductile finished piece of work. It has been demonstrated that forgings made by hammering are subject to all sorts of internal strains, due to differences in compression and differences in cooling. When such a forging is cut as for making a key-seat, a distention of form follows as the result of certain stresses that have been released. A large forging requires a pressure great enough to penetrate to any part of the great mass of metal, so that the flow of metal resulting shall take place uniformly throughout. Such a flow requires time and a pressure that cannot be obtained by a quick hammer blow, however often repeated, thus the hammer does not produce the same effect as does the persistent pressure of the hydraulic forging machine.

A machine was invented to give just such a kneading action as is most necessary in heavy work, and this was called a forge press. In this machine the hot pieces of steel is subjected to enormous hydraulic pressure which acts more slowly than the lightning-like blow of the hammer, but which squeezes and deforms the piece throughout. Among the first of these presses to be brought into use was the one constructed at the Arm-

strong works at Newcastle-on-Tyne in England in 1860. These forge presses have been found to be most efficient for heavy work and have been built in enormous sizes.

Recently there has been developed a machine which combines the good qualities of both the steam hammer and forge press. In this machine the blow is struck with the "tup" as in a hammer, and then the blow is followed up by applying hydraulic pressure and thoroughly kneading the piece as in a regular press. In this apparatus, steam pressure actuates the "tup," or striking piece, which thus moves with the speed and force of a steam hammer, while constant hydraulic pressure of high intensity may be applied at any stage of the stroke by a large water cylinder. The high pressure water is intensified and delivered from a separate part of the apparatus called an "intensifier." In the most modern type, of which the new installation at the New Glasgow works of the Nova Scotia Steel & Coal Company is an example, this feature enables larger work and a greater range of work being performed with the same machine.

The new plant of the Nova Scotia Steel & Coal Company consists of two presses complete with all the necessary accessories such as accumulators, furnaces, etc., housed in a steel, brick, and concrete building 240 by 72 feet. Two electric cranes of 50 and 30 tons capacity serve the entire building. One press is rated at a capacity of 4,000 tons, and the other at 600 tons. The larger press is 128 by 64 inches between the supporting columns, has a total stroke of 80 inches, weighs 740,000 lbs., and is capable of handling forgings up to 75 tons in weight. As the presses are exactly alike except in size, a detailed description of one will suffice.

Each installation consists of the press proper, the pre-filling water tank and the patent hydraulic intensifier. The press consists of a heavy base plate, embedded in the concrete foundations, on which stands the anvil, together with the four forged steel columns which support the press head. Situated near the top of the press are two return steam-cylinders, and the hydraulic or ram-cylinder which is located on the centre line of the press.

Immediately below the press-head is situated the press-traverse, the upper end of which is firmly attached to the piston rods of the three cylinders above referred to. Below the traverse is fastened the upper forging tool or tup. The traverse has four bushed guides, encircling and sliding on the supporting columns, to keep it in alignment and take up the heavy side strains when the ingot is not exactly under the tool centre.

The pre-filling water tank is an air chamber equipped with a pump for charging to a certain level at a pressure of 65 lbs. to the square inch. This tank supplies water to the ram and intensifier cylinders and again stores the water which leaves the ram-cylinder when the piston rises, the flow being automatically controlled by a water valve.

The intensifier, which produces the high hydraulic pressure, consists of two cylinders, a large one, with steam actuated piston, placed immediately above a smaller one containing water. They have a common piston rod, the lower end of which, extending through and working in the water cylinder, acts as the plunger

of a force pump. When the steam cylinder piston moves upwards, the water is forced from an opening near the top of the lower or water-cylinder, at very high pressure, owing to the difference in their diameters, and enters the ram-cylinder giving a greatly increased pressure there. The intensification is 50 to 1, and gives a water pressure of $3\frac{1}{2}$ tons per square inch in the ram-cylinder. All the valves controlling the various operations are at the side of the intensifier and are all operated by a single lever, so adjusted that the press follows its movements in speed and stroke.

The press may be operated in four separate ways and under each the tup may at moment be arrested instantly and a new stroke inaugurated by a single movement of the controlling lever. The tup may be actuated (1), by the steam cylinder alone, the press then operating like an ordinary single acting steam hammer; (2), with the intensifier giving high pressure only toward the end of the stroke. This is the method used in ordinary forge work; (3), with the high pressure throughout the entire stroke, used in pure press work, cutting, etc.; (4), with intensifier and under steam cylinders which results in rapidly repeated heavy blows delivered at a fixed height. This method is used for finishing work to exact size, the length of the stroke being automatically controlled.

When making heavy forgings, whether under the hammers or presses, the piece must be frequently moved and turned, especially when the finishing

strokes are being given. To do this speedily and cheaply, a mechanical handling equipment has been installed, the forging being suspended and rotated by an endless chain driven by electric gear attached to the forging crane. This crane may be operated from the usual suspended cage and also from a pulpit at floor level, close to the presses. There are two hydraulic operated rests on each side of the big press for supporting long forgings. These travel twenty feet each way. Hydraulic manipulating gears are provided for adjusting the different bottom anvils. On the large press, the range of this appliance is about 12 feet.

The low pressure hydraulic installation operating this mechanism consists of a dead-load accumulator supplied by an electrically-driven three-throw vertical pump. The motor is 50 horse power, and the pump supplies 50 gallons per minute against a working pressure of 720 lbs. per square inch to the accumulator ram.

Rapid working, range of utility, economy, and every other requirement of modern forging practice are fulfilled by this plant. The steam consumption is extremely low as the cylinders do not have to be kept filled continuously.

From the viewpoint of the consumer, the product of the steam-hydraulic forging press has many advantages. This is not only because forgings may be produced at a lower cost, but the improvement in the quality of forgings is even more important.

NOTES ON THE MURRAY MINING LABORATORY, HALIFAX, N.S.

A general outline of the equipment and course of treatment is as follows:

Broken first in a 7x10 in. Blake breaker or an "O. D." Gates breaker, the ore, after sampling, runs by gravity to a pair of 10x12 in. laboratory rolls. From these rolls the ore is elevated by a 6 in. rubber belt elevator, and dumped into a set of three 16x24 in. trommel screens. These so size the ore that the coarse material may be sent back to the rolls for recrushing or to a $3\frac{1}{2}$ ft. Huntington mill; the product from this mill returning to the elevator.

The medium size product of the screens goes to a laboratory size Hartz jig, which may make three products, concentrates, middlings, and tailings. Either of these last two products may return to the Huntington mill for regrinding.

The finer sized product of the screens may be sent to a laboratory size Richards pulsator jig, or may pass to a half size Wilfley table for treatment. If desired, the finest of the screened products may run to a hydraulic cone classifier, whose spigot product goes to a standard 4 ft. Frue vanner, the overflow to a James slime concentrator.

The above unit is arranged so that any of the separate machines may be run by itself when used to test ores in small quantities.

To the west of the concentrating unit comes the stamp mill unit. As will be seen by the flow sheet, the gold ore can be broken in either of the two coarse breakers, sampled, and fed by a Challenge feeder into a battery of five stamps, weighing 300 lbs. each. The crushed pulp issuing from the battery, flows over an amalgamation plate eight feet long. The Huntington

mill mentioned above is set at an elevation sufficient to allow any gold ores which might be ground in it to flow over this same amalgamation plate. From here the pulp after passing an amalgamation trap, flows to a Frenier sand pump, and is elevated to a height sufficient to allow it to flow to the cone classifier mentioned in the concentration mill scheme; and from here to the same Wilfley, vanner or slime table.

In connection with this gold milling unit, a small cyanide plant of usual laboratory design has been installed. This plant is in an unoccupied space, 40 ft. by 25 ft., to the south of the concentration unit. Thus the laboratory has sufficient room for future growth without crowding the machines, as the only other occupant of this space at present is a small magnetic concentrator.

The space at the extreme west of the building, 24 by 52 feet, is devoted to apparatus unique in the history of college metallurgical laboratories. For the purpose of familiarizing the student with the ordinary steam and air mining machinery, a small steam air unit has been installed. It consists of a 30 h.p. upright steam boiler, connected to a 10x10x10 inch straight line air compressor. The air end of the compressor is in turn connected to an air receiver, and this air line gives power to various rock drills or coal cutting machines as the work necessitates. The steam and air lines are also connected to a small duplex reversible steam hoist. From the hoist a wire rope leads over a model head-frame to a model mine cage.

If the innovation is successful in its purpose of teaching the student to familiarize himself with this common phase of mining work, an underground section will be added to the laboratory, where the principles of timbering and underground mining may be learned first hand.

SPECIAL CORRESPONDENCE

NOVA SCOTIA

The very singular circumstances under which Neil Stewart, a deputy-overman employed in the No. 3 colliery of the Nova Scotia Steel & Coal Co., was lost in mine for over five days, have been given large publicity in the newspapers. The incident reads like a page from the "Wide World Magazine," and gives large scope for imaginative writing. Mr. Stewart's duties included the examination of old workings, and he was last seen in the forenoon of Monday, the 9th of September. He was missing until discovered by a search party about noon on the following Saturday. In avoiding a fall of roof Mr. Stewart's lamp was accidentally extinguished, and he was left in darkness in an air-course. After repeated attempts to find his way out Mr. Stewart crawled through a small opening in a cross-cut and entered what may be termed a cul-de-sac in No. 3 room on No. 7 landing. In this small aperture Stewart remained from Monday night until his discovery on Saturday morning. He kept his watch wound up, and relieved his thirst by moistening his lips with oil from his safety lamp. Naturally the occurrence caused great excitement among the Sydney Mines people and throughout the mining community of Cape Breton. The experience is one which no one will envy Mr. Stewart. It is not an unusual occurrence for men to lose temporarily their way in old workings, but such a protracted solitude as that experienced in the present instance is most rare indeed.

An obvious safeguard against the recurrence of such a happening is that every man whose duties include the examination of unfrequented and abandoned workings should be provided with an electric flashlight, or if danger from gas is apprehended, with some form of electric hand lamp in addition to the ordinary safety lamp.

The occurrence must have been a costly one for the Nova Scotia Steel & Coal Co., who lost a week's output and presumably were put to large expense in searching for the missing examiner. It is satisfactory to know, however, that the persistent efforts of the search parties were rewarded by the finding of the missing man before it was too late.

DOMINION COAL OUTPUTS.—The September output of the Glace Bay collieries was approximately 380,000 tons, comparing with 324,311 tons in September, 1911. It goes without saying that this is the largest September output yet produced. August output was 411,000 tons, and the apparent falling-off is explained by the fact that September had only twenty-four working days, whereas August had twenty-six. The rate of production therefore remained at the same high level as in August. The aggregate output for the nine months ending 30th September, amounts to 3,321,000 tons, comparing with 2,974,000 tons for the same period of last year, showing a gain of 347,000 tons. It is hoped that in October a further marked advance will be made, as in October, 1911, the production was hindered by various delays to shipping.

The Springhill collieries put out in September 31,707 tons, slightly exceeding the figures of last September. The total output for the nine months ending 30th September, is 312,700 tons, comparing with 158,894 tons for the same period of 1911, or an increase of 154,000 tons.

The combined increase from the mines at Glace Bay and Springhill is therefore slightly in excess of half a million tons when compared with the production during the corresponding period of last year.

The new coal washer which the Dominion Coal Company have constructed near the International piers at Sydney is completed with the exception of adjustments, and trial washings are being made.

A site is being prepared at the rear of the coke-oven plant of the Dominion Steel Company in Sydney for a new banking station for the Dominion Coal Company. The new mines at Lingan are nearer to Sydney than to Glace Bay, and as the banking station in Glace Bay will be fully taxed to deal with the coal from the Glace Bay collieries during the stocking season, it has been decided to stock coal in Sydney. The projected banking station in Sydney will necessitate considerable expenditure in railway tracks, sidings and trestles, and will include a modern re-screening plant. The site will be laid out to cover the future requirements of the new collieries, which will be considerable and will increase for some years to come.

ONTARIO.

COBALT, GOWGANDA, SOUTH LORRAIN

Low Grade Disappearing.—The gradual elimination of the low-grade ore is proceeding apace. The Nipissing is actually at the present time the only mine shipping any quantity of less than 300 ounces to the ton, and after November all their silver will go out as bullion. The Butters process of reducing concentrates to bullion has led to another decrease in tonnage and the Buffalo ore after this year will all be shipped out as bullion. It is a by no means uncommon occurrence to have over \$100,000 a week in bullion sent out, and one day this month that amount left on the Montreal train for the English market. For the first time for years a Cobalt mine has been paid for a by-product. Both the Drummond and the Temiskaming have received a small addition to their cheque from the copper in their ores, and there is a slightly better demand for cobalt, though smelters are paying nothing for it as a by-product yet.

Crown Reserve.—The Crown Reserve has run into another good shoot of ore quite unexpectedly on the Ross Extension vein at the 150-foot level. At the 200-foot the Ross Extension showed no ore of value, and the present discovery will add to the ore reserves. The vein is three inches wide of very high grade ore. At the 550-foot level the same vein picked up, at the 500-foot is exhibiting native silver again. At present the ore is patchy so that the discovery is more interesting than commercially important.

Bailey.—The Bailey has made a shipment from its new shoot of high grade ore. While this property has been carefully developed for the past two years it is only this summer that it has shown any of the earmarks of a mine. There have been patches of ore but nothing to justify the title of a mine. Now this vein has been followed for over 60 feet and it shows three or four inches of two to three thousand ounce ore. On the top of Diabase Mountain the Alexandria is starting up again in the hope of picking up the continuation of this rich lead.

King Edward Lease.—Work on the King Edward mine under the lease obtained by H. E. Jackman should soon be commenced by the New York Ontario Silver Mines Company, the syndicate of Syracuse men who will operate the lease. The Silver Queen, another derelict, has been taken over by an English syndicate, and Foster is being worked by the T. J. Flynn syndicate at the 70-foot level. The deal for the Cochrane has not yet been put through, but in all probability it will, and the Temiskaming will open it up. The Townsite is drifting into the Cobalt Townsite which it purchased, and the Buffalo is opening up the Nancy Helen. The Gould Consolidated has gone into liquidation, so that its lease on Peterson Lake will revert to the Peterson Lake Mining Company, which will no doubt continue its development, as when intelligently operated it appears to have a good chance of making good.

South Bay Specimens.—Mr. J. O. Adsit, of the South Bay Mines, is exhibiting some very choice samples from a strike on that Gowganda property. Not so lucky were the gentlemen, who came out with rich specimens from, it is said, the Bruce claims. They were robbed of their silver on a Michigan Central train and the report outlining the robbery stated that "the samples had been purchased in Cobalt." This must be an error which the gentlemen concerned should see is contradicted at once.

On September 30 the Temiskaming and Hudson Bay paid their 42nd dividend, and have now returned to their New Liskeard shareholders 21,400 per cent. on the original investment of a little less than \$8,000. Seven thousand dollars odd has bred \$1,660,854 in five years.

In the annual report of the Kerr Lake Mining Company Mr. Robert Livermore, the manager, states that of the estimated 6,660,091 ounces of ore reserves, 2,781,400 ounces is under the lake. This cannot be touched until Kerr Lake is drained. This project was discussed three years ago, but none of the mines desired to take upon themselves the expense of cutting the canal, and therefore it has been allowed to drop.

The Northern Ontario Light and Power Company has absorbed the British Canadian Power Company, and is now the sole purveyor of electric power in the north country. The parent company was the Cobalt Hydraulic, then the Cobalt power was taken over and the franchises of the New Liskeard and Haileybury secured. A consolidation was effected with the Cobalt Light, Heat & Power Company, and the company assumed its present name. This year the company has taken over the Waiwaiten Falls power project, and more recently the Porcupine Power Company. The absorption of the British Canadian completes the long list of mergers.

PORCUPINE AND SWASTIKA

Hollinger.—Reports that Hollinger will pay a dividend on or before the New Year and the excellent results obtained at the same property and the Dome mills discoveries on the Jupiter and Pearl Lake and the steady development of the Plenaurnum, the McIntyre, the Vipond, the Dome Lake, the McEaney, and the Porcupine Lake have placed mining upon a sound basis in Ontario's gold camp.

It is currently reported in the camp that the Hollinger will pay shareholders a dollar a share as a Christmas or New Year's gift and though this is as yet without the official cachet, it is certain that they will have the money if they wish to go on a dividend basis at once. Such an action would stimulate interest in the camp

very materially. Mill troubles are now almost past history, everything is to be used except the pan amalgamators, and as it is running to-day the process is saving 98 per cent. of the gold at a cost of, it is reported, only \$1.50 a ton. With the thirty stamps falling 300 tons from the dump and the first level are being run through every day. A minor irritant is the refining of the gold. The Hollinger has no refinery as yet, though one is to be built and the bullion was returned from the Ottawa mint and afterwards from New York, with a note to the effect that they could not handle it direct until it had been purified. It is now being shipped to one of the American smelting companies across the line, who of course, make a charge for treatment.

Before the annual report is issued it will be possible to point to development at the third level as a direct confirmation of the promises made in the report of last year. The main vein has been cut and is fully as wide and as rich as on the other levels as far as it has been drifted upon. A new motor driven compressor has just been installed and it will almost double the amount of power available for development.

The Dome.—At the Dome where the capacity of the mine has always been well ahead of the mill another tube mill and slime press are to be installed so that 450 tons per day can be treated. It has been found that when a coarse screen is used the plates under the stamps scour badly and these are to be abandoned and the ore will be crushed in solution. The inclined tramway from the rock house to the ore shoots has been continued down to the 100 foot level. Most of the ore is still being dropped down from the surface to the 60-foot level, but some is coming from development at the hundred. The management of the Dome has always relied upon the results of the diamond drill campaign, and so far they have proved quite trustworthy. The values in the drift have invariably been higher than the assays obtained from the diamond drill core.

Pearl Lake Drilling.—Those who have and who are opening up properties and erecting plants on the strength of diamond drill results will be gratified with the discovery of ore on the Pearl Lake mine. Mr. Thompson found ore for the company at 400 feet running about \$8 to the ton; the drift shows about six feet of \$12 ore. In the same campaign Mr. Thompson struck another ore body of 800 feet, and if results at 400 feet were reliable it is most probable that they will not fail at 800 feet. The Porcupine Lake Mining Company is like the Dome, basing the whole scheme of development upon the good results obtained in their diamond drill cores during their exploration work under and near the lake last winter and this spring. Camps are being rushed up and a power plant to drive a big compressor has been ordered. Before the winter underground work should be in full swing. Diamond drilling to locate ore bodies has, also, been quite successful at the Dome Lake. So far where the core showed gold there gold was found in the drift. As a general rule the average of gold content found in the core was much lower than actually recorded in the drift.

Stamp Mills Multiply.—Four mills are at present running in the camp, and three are under construction. These latter are the McEaney, the Dome Lake, and the McIntyre. The McEaney is the farthest advanced, for here the foundations are almost completed. The McIntyre is well advanced with its concrete work and the Dome Lake has almost finished excavations. The McEaney should have five stamps of their ten dropping by the end of November, the McIntyre by

the first of January, and the Dome Lake perhaps a little earlier. Altogether before the snow leaves the ground next year there ought to be more than a thousand tons of ore crushed every day in the year.

Jupiter Plans.—The conservative policy of Drummond development slowed down the progress of the Jupiter this summer when one series of veins did not prove up well at the 300-foot level. The other series in the southern portion of the property is now showing such excellent ore that there is no longer any doubt of the fact that the Jupiter is a mine. This winter will be set aside for development and exploration, if everything continues as satisfactorily as at present it is pretty certain that a mill will be built next spring.

McEaney.—The development of the McEaney has surpassed all expectations. The third level as it appears to-day shows the widest exposure of quartz and the best values in the mine. The mine has to-day three-quarters of a mill in sight, \$90,000 of which is in the dump. It is estimated that for about a thousand feet in drift and raise the vein averages three feet and a half of \$28 ore. On the 300-foot level 250 feet have been developed 42 inches wide of better than two-ounce ore. On the 200-foot 450 feet of about an ounce and a half, and on the 100-foot, 200 feet of ore. A raise being put through to the surface is still in good ore so that it is probable that it will be possible to reckon reserves from the grass roots down. It is estimated that the five stamps can be fed from development work and the proceeds will pay running expenses at least.

BRITISH COLUMBIA.

Two of the metalliferous mining companies operating in British Columbia have lately declared dividends, namely, the British Columbia Copper Company and the Standard Silver-Lead Company. That of the former was of 2½ cents a share on its \$2,000,000 shares, total \$50,000, and the latter 15 cents a share on its 591,709 issued shares, total, \$88,756.35. The Standard Company's dividend is its regular monthly distribution, while the British Columbia company's is a quarterly dividend, the second during the current half year.

The Coronation Mines, Limited.

A Victoria correspondent of Mining and Scientific Press, San Francisco, has sent to that journal the following information:

"The Coronation Mines, Ltd., of Cadwallader Creek, Lillooet, is doing a fair amount of development, and twelve miners are at work. The cross-cut on the 400-foot level at the Little Joe claim cut the lode, which is from 18 to 24 inches wide, and the shoot has a length of 35 feet. A rise is being made to No. 3 level, and gold is visible up the rise and along No. 3 drift. At the Countless claim, some 1,200 feet away from the former, a lode which outcropped on the surface 700 feet west was cut 415 feet from the portal of the cross-cut. This is 190 feet from the surface, and shows free gold and pyrite over a width of 4 to 5 feet. Driving is under way for the Little Joe vein, which has been opened on the surface for more than 600 feet, the ore assaying \$18 per ton throughout."

Enquiry Under the "Coal Mines Regulation Act."

Recently an enquiry was held at Merritt, Nicola Valley, by Mr. John Stewart, of Ladysmith, Vancouver Island, who was appointed under the "Coal Mines Regulation Act," at the instance of the Hon. the Minister of Mines for British Columbia, concerning the

conduct of Mr. Benjamin Browitt as manager of the Diamond Vale Colliery at Merritt, and holder of a first-class certificate of competency.

The notice of the intention to hold the enquiry, sent to Mr. Browitt by the Minister of Mines, was as follows:

"The enquiry in this case will be into representations that have been made: That you, as manager of the Diamond Vale Colliery at Merritt, B.C., did, in violation of the 'Coal Mines Regulation Act,' (1) Unlawfully employ as a fire boss in the No. 3 mine of the said colliery, on the 7th day of March, 1912, and divers days previously, one Henry J. Grimes, who was not the holder of a Certificate of Competency to act as a fire boss. (2) That you, being the only holder of a Certificate of Competency to act as fire boss in said mine, did delegate your powers as such to the said Henry J. Grimes, who was not the holder of a certificate, as aforesaid. (3) That by reason of your negligence the said mine was not examined as required by the 'Coal Mines Regulation Act,' before the men were admitted thereto. (4) That on the 7th day of March, 1912, an explosion occurred in the said mine whereby seven men lost their lives. (5) That you have been convicted of an offence against the said 'Coal Mines Regulation Act,' and (6) that by reason of the foregoing you are unfit to be the holder of a Certificate of Competency under the said 'Coal Mines Regulation Act.'"

Prior to the sending to Mr. Browitt of the notice of intention to hold an enquiry, he had been prosecuted and fined for the offence against the Act, as above narrated. The Commissioner who held the enquiry decided that the representations made to the Minister of Mines were proved by the evidence taken by him to be fully sustained, so he cancelled Mr. Browitt's Certificate of Competency.

On the same day he heard a charge against Andrew Pilkonen for making up dummy tamping cartridges, these having clay at each end and coal dust in the middle, in violation of the Act, with the object of deceiving the shot-lighter. The Act provides that clay only shall be used, so the defendant's certificate of competency as a miner was suspended, the charge made against him having been proved.

The Portland Canal Tunnels, Limited.

Late in September Mr. W. J. Elmendorf, who during the whole period of the erection equipment, and operation of the Portland Canal Mining Company's concentrating plant was in charge of the company's mining and concentrating operations, returned to the Portland Canal district to commence the work of driving a 2,000 foot cross-cut tunnel, which enterprise has been taken by a newly organized company, named the Portland Canal Tunnels, Limited. This company was incorporated in August with an authorized capital of \$700,000, divided into 2,800,000 shares at 25 cents each. The following is an excerpt from a published statement relative to the purposes for which this company has been organized:

"The Portland Canal Tunnels, Limited, has been incorporated for the purpose of driving a tunnel, about 2,000 feet in length, to tap the main fissure zone upon which are located some of the most important mineral properties in Portland Canal camp. The tunnel will be of a sufficient size and capacity to amply fulfil the objects of its construction, which may be briefly summarized as being the accommodation of all probable future traffic, and the providing of drainage, ventilation, and

the most economical means of development for all properties in the main fissure zone.

"Some indication of the wide scope of the company's proposed operations may be gathered from the list of mining properties, situated along the main fissure zone above referred to, which will be affected by the construction of the tunnel. They are as follows, reading from south to north: Ben Bolt, Jumbo, Chicago No. 1, Chicago No. 2, the Portland Canal property (a group of about 16 claims), O. K. fraction (two claims), Portland Wonder, Glacier Creek (six claims), Stewart Mining and Development Company (ten claims). In addition to these company claims there are a number of individual claims, practically all on both sides of Glacier Creek.

"It will be seen that the Portland Canal Tunnels, Limited, will serve a very extensive mineralized area, in which are situated a large proportion of the most prominent mining properties in the camp, the construction of the tunnel placing them in direct connection with railway shipping facilities to tidewater."

Information quoted from a report by Mr. Elmendorf makes it appear that conditions are favourable to success in developing much ore. He mentions that 15,000 tons of ore has been taken out of the small stopes of the Portland Canal Mining Company's property, which would have shown more profit had this tunnel been available.

Consolidated Mining and Smelting Co.'s Exhibit.

The Consolidated Mining and Smelting Company, of Canada, Limited, made an exhibit at the Trail exhibition, concerning which the Rossland Miner said:

"It was a complete exhibit. In it was shown raw ore from every mine owned by the company; then the forms which the ore passed through in the process of extraction by the fire process; crushed silver-lead and gold-copper ores; also briquettes, matte, and bullion. In miniature the method of refining the bullion was displayed in the shape of anodes and cathodes from the refinery; then there was the refined gold, silver and lead, also copper and bluestone (sulphate of copper). There was a gold brick—not the kind sold to 'come-ons' in New York, but of almost pure gold, valued at \$14,000—and a bar of silver weighing 1,264 oz. The pig lead was of the finest quality, containing only a fraction of one per cent. in impurities. And there was lead pipe, ranging in size from half an inch to four inches in diameter, of any weight required.

"Large photographs of the Trail smeltery, the Centre Star and War Eagle mines at Rossland, the Snowshoe mine at Phoenix, and the St. Eugene mine at Moyie, also formed part of the exhibit, which was in the charge of Richard Truswell, foreman of the company's refinery at Trail, and John F. Miller, superintendent of the refinery."

Consolidated M. and S. Co.'s Operations.

Following the foregoing notice of the Consolidated Mining and Smelting Company's exhibit of its products, the time is opportune to give some information concerning the company's operations during its last fiscal year, which ended June 30, 1912. It may be, though, that the figures that follow will not agree in full detail with those that will shortly be available when the company's printed report shall have been issued, for these were obtained before the report was prepared.

Le Roi.—During the latter part of the fiscal year about 4,000 tons of ore was shipped monthly from this mine; its aggregate output for the year was 39,345

tons. A number of small bodies of high-grade ore were worked. Not much work was done on the lower levels, the chief operations having been on several levels down to the 600-foot. Only one stope each on levels 8 and 9 was worked. The lower levels will have attention later; meanwhile prospecting is done as operations are carried along. It is satisfactory to note that there has been a gradual improvement in the general average grade in the ore mined.

Concentration Experiments.—A small plant has been put in on Le Roi ground for the purpose of making concentration experiments with some of the more silicious ore from this mine. Encouraging laboratory results have been obtained, so one unit of the Elmore Vacuum Process plant has been put in, together with some plant from the ore testing works at the St. Eugene mine. The capacity of the experimental plant is about 40 tons a day.

War Eagle.—On the thirteenth level of this mine, at a depth of about 2,000 feet from the surface, two shoots of ore have been worked, these giving ore containing comparatively high value in gold. Their joint length is about 450 feet, and they occur on the present lowest level of this mine. A cross-cut is being driven from the Centre Star twelfth level to open the War Eagle at 150 feet deeper than its thirteenth level. This cross-cut will be about 1,000 feet long; when the mine was visited two months ago, the cross-cut had been driven about 250 feet. As progress had been at the rate of 170 to 180 feet a month, it is probable this drive is now in more than 600 feet.

Other Rossland Properties.—During the year the company took over the Virginia and Iron Horse properties, which lie north of its Idaho and Enterprise mines, and east of the Iron Mask.

St. Eugene, East Kootenay.—Production has fallen off very seriously at this mine. For six months ended December 31, 1911, only 13,374 tons of ore was mined and milled, and from this there was produced 1,957 tons of lead-silver concentrates averaging 56 per cent. lead and 26.5 oz. silver per ton. This compares proportionately with 47,705 tons mined in the year ended June 30, 1911, from which was obtained 7,708 tons of concentrate containing an average of 59.4 per cent. lead and 26.5 oz. silver per ton. Figures of production, if any, during the first half of the current calendar year were not obtained. At the time above mentioned as that at which information was applied for, some 20 to 25 men had been put on to do further prospecting in the St. Eugene mine, after operations had been suspended for a while.

The ore-testing plant at the St. Eugene concentrating works was not much used during the fiscal year under notice.

Sullivan.—Additions to plant, equipment, buildings, etc., were completed, these including ore-crushing and sorting plants, and a compressor driven by water power. Besides maintaining shipments of lead ore, there was also sent to Trail 898 tons of iron sulphide.

Molly Gibson.—A cross-cut tunnel was driven about 800 feet to allow of ore being mined to a greater depth of 250 feet. The concentrating plant was put in order for the purpose of concentrating the lower grade ore. Both crude ore and concentrate are the shipping products from this mine, which is situated north of the west arm of Kootenay Lake and about 20 miles from Nelson.

Richmond Eureka.—Production was small at this Slocan mine during the last fiscal year, only 1,628 tons

compared with 3,168 tons for the fiscal year ended June 30, 1911.

Other Properties.—Nothing was done on the No. 7 mine in Boundary district. The option of some claims in Sheep Creek district, Nelson mining division, was relinquished, results of development work done not warranting purchase of the property by the company. In Ainsworth camp, sorting and shipping ore was in progress at No. 1 mine, some work was done on the Tiger, and the Highland was also prospected. The aerial tramway that had been on the Le Roi, Rossland, was sent to Ainsworth, for erection between the No. 1 mine and the Highland shipping wharf on Kootenay Lake, to facilitate shipment of No. 1 ore.

Trail Smelting Works.—Changes were made in the method of handling low-grade matte. The old method was to crush and granulate the low-grade matte, roast it in O'Hara's roasting furnaces, cinter in Heberlein pots, and re-smelt with 15 per cent. of coke. The present process is simply to crush and re-smelt with 3 per cent. coke and 46 to 50 per cent. silicious ores. This is a regular pyritic process.

The Dwight-Lloyd cintering plant is not being used for lead-zinc ores; only for copper-gold concentrate. The Huntington-Heberlein plant here gives better results from treatment of zincy ores. This plant is to be rearranged during the autumn, and a 20-ton electric crane will be put in for handling the Heberlein converting pots. A new crusher, Farrel, 36 by 24, is to be added to the plant.

COMPANY NOTES

HILLCREST DIVIDEND.

Notice has been given that a dividend of 1¼ per cent. has been declared on the preference capital stock of this company, payable October 15th, 1912, to shareholders of record September 30th, 1912. This is the ninth quarterly dividend.

GRANBY ANNUAL.

At the annual meeting of Granby Consolidated, held in New York October 1st, a surplus of \$2,516,121 was shown. The company's production of copper, silver and gold for the year amounted to \$2,874,759, although the lack of coke necessitated the closing of the Phoenix and Grand Forks mines and smelter for four months.

The development work at Hidden Creek progressed satisfactorily during the year, upwards of \$200,000 having been spent on work preliminary to the building of a smelter. This property now stands on the company's books at \$979,461.

The following officers were elected for the year: W. H. Nichols, president; Jay P. Graves, vice-president and general manager; W. H. Robinson, vice-president; Edwin Thorne, vice-president; Geo. W. Wooster, treasurer.

The board was reduced from 15 to 13, Messrs. George M. Luther and A. L. White retiring.

STATISTICS AND RETURNS

DOMINION COAL OUTPUT.

The Dominion Coal Company output for September was approximately 380,000 tons, somewhat below the August figures, but the best September the company has had in its history. At the present rate of output the figures at the end of the year will total 4,500,000 tons.

NOVA SCOTIA STEEL AND COAL OUTPUTS.

The output of the Nova Scotia Steel & Coal Company for September is as follows:—Coal mined, 67,889 tons; coal shipped, 87,789 tons; pig iron made, 7,490 tons; steel ingots made, 6,722 tons; iron ore mined, 57,913 tons; shipments of iron ore, 61,800 tons.

COBALT ORE SHIPMENTS.

The shipments from the Cobalt camp for the week ending October 4 were:—

	Tons.
La Rose, 2h	76.85
Buffalo, 2h	61.82
Crown Reserve, 1h	17.56
Coniagas, 5h	158.54
Bailey Cobalt, 1h	21.57
Cobalt Townsite, 1h	29.00
O'Brien, 1h	43.23
Beaver Con., 1h	24.26
Timiskaming, 2h	66.56
	<hr/>
	499.39

BULLION SHIPMENTS.

	Ounces.	Value.
Nipissing	126,426	\$81,429
O'Brien	16,938	10,671
Crown Reserve	16,000	10,000
	<hr/>	<hr/>
	159,400	\$102,100

BRITISH COLUMBIA ORE SHIPMENTS

Shipments in detail for week ended September 28:—

	Boundary.	
	Week.	Year.
United Copper	52	1,041
Nickle Plate, milled	1,500	56,600
Granby	30,363	936,145
Mother Lode	7,380	280,646
Rawhide	8,102	177,759
Napoleon	240	7,418
Unnamed	148	9,516
Other mines .....	....	20,012
	<hr/>	<hr/>
Total	47,785	1,489,137

Rossland.

Centre Star	3,179	118,321
Le Roi No. 2	309	19,112
Le Roi	781	33,654
Inland Empire	22	22
Le Roi No. 2, milled	300	6,500

Inland Empire, milled	90	1,170
Other mines . . . . .	.....	237
Total	4,681	179,016

Nelson.

Queen	68	523
Second Relief	20	20
Hudson Bay	84	460
Granite-Poorman, milled	250	10,600
Mother Lode, milled	350	6,100
Queen, milled	300	9,600
Molly Gibson, milled	300	5,400
Other mines . . . . .	.....	5,106
Total	1,372	37,809

Slocan and Ainsworth.

Standard	306	6,673
Richmond-Eureka	65	1,074
Ruth	34	475
Van-Roi	31	1,852
Whitewater	22	595
Silver Hoard	25	60
Bluebell	63	1,194
Standard, milled	400	13,200
Van-Roi, milled	1,100	43,700
Bluebell, milled	200	2,100
Other mines . . . . .	.....	9,013
Total	2,246	79,936

East Kootenay.

Sullivan	510	22,968
St. Eugene	100	314
Monarch	72	1,071
Monarch, milled	425	7,725
Other mines . . . . .	.....	235
Total	1,107	32,313

Consolidated Co.'s Receipts.

Trail, B. C.

Centre Star	3,179	118,321
Le Roi No. 2	309	19,112
Le Roi	781	33,654
Inland Empire	22	22
Queen	68	523
Second Relief	20	20
Hudson Bay	84	460
Standard	306	6,673
Richmond-Eureka	65	1,074
Ruth	34	475
Van-Roi	31	1,852
Whitewater	22	593
Silver Hoard	25	60
Bluebell	63	1,194
Sullivan	510	22,968
St. Eugene	100	314
Monarch	72	1,071
United Copper	52	1,041
Other mines . . . . .	.....	20,605
Total	5,743	230,034

Granby Smelter Receipts.

Grand Forks, B. C.

Granby	30,363	936,145
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B. C. Copper Co.'s Receipts.

Greenwood, B.C.

Mother Lode	7,380	280,646
Rawhide	8,102	177,759
Napoleon	240	7,418
Unnamed	148	9,516
Other mines . . . . .	.....	17,003
Total	15,870	492,342

TORONTO MARKETS.

Oct. 10 (Quotations from Canada Metal Co., Toronto)—

Spelter, 6.50 cents per lb.

Lead, 6.15 cents per lb.

Antimony, 10 cents per lb.

Tin, 51 cents per lb.

Copper, casting, 18½ cents per lb.

Electrolytic, 18½ cents per lb.

Ingot Brass, 11 to 15 cents per lb.

Oct. 10—Pig Iron. (Quotations from Drummond, McCall & Co., Toronto)—

Summerlee No. 2—\$23.50 (f.o.b. Toronto).

Midland No. 1—\$22.00 (f.o.b. Toronto).

Midland No. 2—\$21.50 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, \$5.50 to \$6.75.

Coal, bituminous, \$3.50 to \$4.50 for 1¾-inch lump.

Coke.

Oct. 7.—Connellsville Coke (f.o.b. ovens).

Furnace coke, prompt, \$3.00 to \$3.25 per ton.

Foundry coke, prompt, \$3.40 to \$3.50 per ton.

Oct. 7.—Tin, Straits, 50.15 cents.

Copper, Prime Lake, 17.70 to 17.80 cents.

Electrolytic, Copper, 17.70 to 17.75 cents.

Copper Wire, 19.00 cents.

Lead, 5.10 to 5.12½ cents.

Spelter, 7.55 to 7.65 cents.

Sheet zinc (f.o.b. smelter), 9.00 cents.

Antimony, Cookson's 10.12½ cents.

Aluminium, 26.00 to 26.50 cents.

Nickel, 45.00 cents.

Platinum, ordinary, \$45.50 per ounce.

Platinum, hard, \$48.00 per ounce.

Bismuth, \$2.00 to \$2.25 per lb.

Quicksilver, \$42.00 per 75-lb. flask.

SILVER PRICES.

	New York.	London.
	Cents.	Pence.
September 21	63¾	29¼
September 23	63¾	29¾
September 24	63¾	29¾
September 25	63¾	29¾
September 26	63¾	29¼
September 27	63¾	29¾
September 28	63¾	29¾
September 30	63¾	29¾
October 1	63¾	29½
October 2	64½	29¾
October 3	63¾	29½
October 4	64	29¾
October 5	64½	29¾
October 7	64	29¾