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## The Canadian Mining Journal

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Editorials:	Page.
Educational Reform . . . . .	129
Civil Engineers Discuss Fuel and Power Problems. . . . .	131
Plate Mill for Sydney . . . . .	133
Accuracy in Coring with Diamond Drills, by Joseph S. Mitchell . . . . .	134
Origin of Sudbury Nickel-Copper Deposits, by H. M. Roberts and R. D. Longyear . . . . .	135
Correspondence:	
Bore-Hole, Exploration by . . . . .	137
The Whitley Scheme, by C. V. Corless . . . . .	138
Personal and General . . . . .	139
The Ross Automatic Grizzly Feeder . . . . .	140
Special Correspondence . . . . .	141
Coast Copper Company . . . . .	144
Markets . . . . .	144

It has been made plain by Alberta coal operators that much more coal could be produced if an all year round market could be obtained. At present there is a period of several months when some of the mines must be idle. Could not the railway companies co-operate by giving a special low rate during the months that cars are not in great demand for grain? Mr. John T. Stirling, Inspector of Mines of Alberta, in his report for 1915 said: "There is no reason in my opinion why the mines in Alberta should not be supplying the Winnipeg market."

When we consider that over 4,000 employees of the Dominion Coal Company alone have enlisted, it is not surprising that the output of coal in Nova Scotia has decreased during the war. Can nothing be done to help Nova Scotia operators to secure miners to take the place of the men who are in France?

### EDUCATIONAL REFORM.

During the past few years there has been more or less general recognition of the fact that capital and labor are getting so far apart that a crash must come after the war. In the years just before the war it was believed by many that a crisis would be reached in another year or two. Some believe that the war has merely postponed the crisis, the united action of men of all classes against the common enemy naturally causing differences to be more or less hidden but not removed.

Many believe that a better understanding between classes must result from the life on the battlefield, and there can be no doubt that such belief is well founded. Threats of strikes at home, strikes which might sacrifice the lives of those at the front, prevent anyone from assuming, however, that more than a temporary solution of the labor problem has been found. If differences are so difficult to reconcile while the enemy threatens, is it surprising that many expect an industrial revolution after the war?

Expectation of trouble is based on the assumption that little effort will be made to remove the differences that exist. Whether expectations are realized or not will depend on the success of those who endeavor to solve the problem that is always presenting itself. We can take it for granted that the old condition of affairs will not be accepted as satisfactory. How can a satisfactory basis be found?

Mr. C. V. Corless, of Coniston, Ontario, who has taken a keen interest in this problem for years and who has recently presented his views to members of the Canadian Mining Institute, believes that we must start at the bottom. He considers that the indispensable groundwork upon which a change for the better must be founded is a thorough social and economic training along sane lines, running through our entire educational system from common school to university. Mr. Corless' papers and addresses have attracted a great deal of favorable comment and we may expect to hear much discussion on educational reform in the near future. The Canadian Mining Institute has already taken action as a result of Mr. Corless' efforts and passed the following resolution, submitted by President A. A. Cole, at the annual meeting.

"Whereas in view of the enormous importance that capital and labor should co-operate amicably, and in view of the fact that, in the opinion of this meeting, the present antagonistic relations between capital and labor are largely the result of economic misunderstanding of the true relationship of industry to the welfare of the society as a whole; Be it resolved that this Institute endorses the general position set forth in the series of papers presented by Mr. C. V. Corless as to the necessity of educational reform as a basis for the correction of this misunderstanding; And be it further resolved that

the Secretary of the Institute be instructed to forward a copy of this resolution, with copies of the papers in question to the Engineering Institute of Canada, the Society of Chemical Industry, the Canadian Manufacturers' Association, the Pulp and Paper Association, the Textile Association, and other industrial national bodies, with the request that they consider the reform advocated, so that joint action can be taken in bringing the matter to the attention of the educational authorities of the Dominion."

#### CANNEL COAL.

Cannel coal has long been a will-o'-the-wisp to coal men, and to many of them its mere mention brings up visions of wealth. The reason becomes obvious when its price on the market is compared with that of ordinary bituminous coal, for in days past cannel coal has sold in the New York market at a price about three times that of the best bituminous coal and perhaps double the price of anthracite. This high price is due to old causes—strong demand and weak supply.

As a coal for use in office and household grates, as an enricher of coal gas, and as a quick-firing coal for use in fire engines and otherwise, cannel coal has filled a unique place; and these uses coupled with its scarcity in the earth have made it an object of much search and of many disappointments, because wherever it is found there has usually proved to be very little of it.

Of late years, however, fewer grates are used in the office and the home, and water gas, enriched with oil, has replaced the old type of coal gas, so that when the European war broke out the demand for cannel coal as such had largely disappeared. Then some people remembered that many years ago, before oil was struck in the country, houses were lighted with oil obtained from cannel coal. They remembered that on distillation cannel coal yielded more oil and gas than could be obtained from ordinary bituminous coal. They realized that the sudden demand for high explosives for use in the war required the utilization of the by-products formed in the distillation of coal, and they argued that if cannel coal when distilled yielded more oil and gas than other coals it should be very rich in the by-products from which benzene, toluol, and other explosive bases are made, so a demand was made for information about cannel coal. To supply this information the United States Government, through the Geological Survey, Department of the Interior, has just issued a report on the cannel coals of the United States, describing cannel coal in detail and telling where it can be found. This report refers to every place where cannel coal has been found or where it is said to occur. It contains references to nearly a hundred and fifty such places in one State alone, Kentucky.

The fact that cannel coal does yield large quantities of oil and gas is confirmed, but it is found that this oil, though suitable for ordinary burning, distills at a temperature so low that the percentage of gasoline, benzene, and other desired substances it contains is very small, and until some way has been discovered of distilling it at a higher temperature or of cracking or otherwise converting the oils found into the oils desired the distillation of cannel coal will not furnish the large supply of gasoline, benzene, toluol, and other substances that are now so greatly needed.

#### MOLYBDENITE IN NORWAY.

Norway has been for several years an important producer of molybdenite. At pre-war prices the industry was evidently not a profitable one; but it is said that the few regular producers are now making very large profits and dozens of new companies have been formed to take advantage of the high prices which can be obtained in Norway. In view of these reports of fabulous profits we are naturally interested in the cost of producing molybdenite in Norway. Some light on this matter was given by Mr. Ernest R. Woakes at a meeting of the Institution of Mining and Metallurgy in London on Jan. 17th, 1918. Mr. Woakes recently visited most of the molybdenite mines in Norway and he says of the cost of production "no mine produces a ton of 75 per cent. concentrates at a less cost than \$2,500. with the abnormal cost of labor, materials, etc., in Norway at the present time." If the Norwegian producers had to accept the price fixed in England and forced on Canadians by the molybdenite embargo they would soon be bankrupt.

#### ELECTRICAL INSPECTION AT ONTARIO MINES.

Section 37 of The Power Commission Act, as enacted by section 10 of The Power Commission Act, 1916, is amended by adding thereto the following subsection:

This section shall not apply to any mine as defined in The Mining Act of Ontario, save only as regards any dwelling-house or other building not connected with or required for mining operations or purposes or used for the treatment of ore or mineral.

#### DOLLAR SILVER.

Washington, April 9.—Melting into bullion of not more than 250,000,000 silver dollars now in the Treasury for sale and export, to pay trade balances, and repurchase of silver at \$1 an ounce, is proposed in an Administration bill introduced to-day by Senator Pittman of Nevada as an emergency war measure. Silver certificates would be withdrawn from circulation as the dollars are taken from the Treasury, and Federal Reserve Bank notes of new \$1 and \$2 denominations substituted. If enacted, the measure virtually would fix a standard price for silver at \$1 an ounce.

#### BIG GUNS.

London, April 3.—Rear-Admiral T. B. S. Adair, of the Parkhead Steel Works, Glasgow, commenting on the "mystery" gun, says that as far back as 1909 a certain 12-inch gun of Scottish design was tested at Woolwich and some very remarkable and unprecedented ballistics were obtained. The gun could easily throw a 700-pound projectile of modern contour a distance of sixty-two miles, at an expense, however, of shortening its life to about forty rounds, but it could then be relined. The recent German spectacular effect obtained with a 24-centimeter gun can be reproduced by British gunmakers whenever required.

Charles M. Schwab says: "The German gun which has been bombarding Paris may do for killing women and children at long distance, but I doubt its military value. We could make such a gun easily. It might be made practicable for certain distances, but I still believe it to be of little military use for 60 up to 100 miles. There is under construction an American gun which shoots a 16-inch projectile 59 miles. That is the gun we are building for coast defence at Sandy Hook."



# Civil Engineers Discuss Fuel and Power Problems

A meeting of the Canadian Society of Civil Engineers was held in Toronto on March 26th and 27th, to discuss the fuel and power situation. A number of papers were presented at the sessions. Interesting discussions followed the reading of the papers. The program was as follows:—

Opening address, by Sir William Hearst, Prime Minister of Ontario. The Fuels of Canada, Mr. B. F. Haanel, Chief of Fuel Division, Department of Mines, Ottawa. Discussion, Mr. L. M. Arkley, M. Can. Soc. C. E., Assistant Professor of Mechanical Engineering, Toronto University. Transportation from the Fuel Viewpoint, Mr. W. N. Neal, General Secretary of the Canadian Railway Association for National Defence, Montreal, Que. The Rational Development of Canada's Coal Resources, Mr. W. J. Dick, A.M. Can. Soc. C.E., Mining Engineer of the Commission of Conservation, Ottawa, Ont. Utilization of Peat, Mr. John Blizard, A.M. Can. Soc. C.E., Technical Engineer, Division of Fuels and Fuel Testing, Mines Branch, Department of Mines, Ottawa, Ont. Discussion, Mr. James Milne, M. Can. Soc. C.E., Mechanical and Electrical Engineer, Department of Works, City of Toronto. The Low Temperature Carbonization and Briquetting of Bituminous Coals, Mr. E. Stanfield, Division of Fuels and Fuel Testing, Mines Branch, Department of Mines, Ottawa, Ont. An illustrated address on "The Erection of the Quebec Bridge," Mr. Geo. F. Porter, M. Can. Soc. C.E., Engineer of Construction, St. Lawrence Bridge Company, Montreal, Que. Ontario's Efforts to Relieve the Fuel Situation, Mr. Albert Grigg, Deputy Minister, Department of Lands and Forests, Ontario, Toronto, Ont. Wood as an Emergency Fuel, Mr. E. J. Zavitz, Provincial Forester, Ontario. Gas for Light, Heat and Power, Mr. Arthur Hewitt, General Manager Consumers' Gas Company, Toronto. Central Heating as a Means of Conserving Fuel, Mr. F. G. Clark, M. Can. Soc. C.E., Chief Engineer, Toronto Electric Light Company, Toronto, Ont. Oil Fuel and the Possibilities of its Use, Mr. R. W. Caldwell, Chief Mechanical Engineer, Imperial Oil, Limited, Sarnia, Ont. Canada's Water Powers and their Relation to the Fuel Situation, Mr. J. B. Challies, M. Can. Soc. C.E., Superintendent of Dominion Water Power Branch, Department of the Interior, Ottawa, Ont. Discussion, Mr. H. G. Acres, M. Can. Soc. C.E., Hydraulic Engineer, Hydro-Electric Power Commission of Ontario, Toronto, Ont. Railway Electrification, Mr. John Murphy, M. Can. Soc. C.E., Chief Electrical Engineer, Department of Railways and Canals, Ottawa, Ont. The Possibilities of the Relief of Fuel Consumption in Canadian Industry by the Increased Use of Hydro-Electric Energy, Mr. J. M. Robertson, M. Can. Soc. C.E., Director, Southern Canada Power Co., Montreal, Que. The Possibilities of Lessening Fuel Consumption in Canada by the Adoption of Electrical Heating, Mr. P. H. Mitchell, A.M. Can. Soc. C.E., Consulting Engineer, Toronto, Ont.

## Premier Hearst Addresses Engineers.

Sir William Hearst extended a hearty welcome to the engineers. Sir William said he was pleased to welcome such an eminent body of scientific men, and that added interest would attend their conference because they were to discuss the fuel question. While coal had not been discovered in Ontario, there were, however, numerous waterfalls, by which power could

be developed. The resources of peat were as yet unknown, but money had been provided by the Legislature to deal with the problem and experiments would be carried out. A co-operative scheme had been agreed upon between the Dominion and Ontario Governments on the question of peat fuel, and fuel distribution had also been discussed. While the peat resources could not be relied upon for next winter, the Government had taken up the question of wood supply, and it was hoped enough wood would be secured to meet emergencies.

## B. F. Haanel Urges Development of Fuel Resources.

B. F. Haanel, Chief of the Fuel Division of the Department of Mines at Ottawa, read an address upon "The Fuels of Canada." Mr. Haanel declared that if Canada was to-day largely dependent upon coal and oil from the United States, it was due to apathy toward the development of home resources, not to the scarcity of the fuel within the Dominion. "We have been culpably neglectful of our fuels," he declared. "And some day in the future we will be faced with great suffering if we do not now render our own fuel resources available." Mr. Haanel contended that Canada had fuel resources sufficient to make her independent of the United States if they were developed. He read to the engineers statistics to show how largely Canada was depending upon the States and presented estimates of her resources of coal and peat. Canada, he said, had 37,000 square miles of peat bogs. The conversion of these bogs into good commercial fuel involved no particular research work. It had been made into excellent fuel for domestic and industrial purposes for many years in European countries. In closing, Mr. Haanel advocated concerted pressure to get vigorous development of Canada's Resources.

The big item in connection with peat, in the opinion of George W. Allen, secretary-treasurer of the Canadian Gas Association, was that peat could be used for producer gas and the by-products turned into so many uses that great efficiency and economy resulted. The fact that peat could replace bituminous coal in this regard made it almost a national crime to use coal for purposes of producing gas.

## W. N. Neal Tells What Railways Have Done.

W. N. Neal, general secretary of the Canadian Railway Association, was not able to be present to deliver in person his address upon "Transportation From the Fuel Standpoint." The address as read to the members was an instructive review of the problems the railways had faced and overcome in connection with the shortage of fuel. Mr. Neal estimated the haulage of coal as one-fifth of the total tonnage handled by the railways, and that coal, he stated, had been carried farther in Canada for less money than any other country in the world. It cost less to haul a ton of coal 60 miles than to team it a mile in the city of Toronto. The address told of the efforts made by the railways to relieve the coal scarcity by instituting radical economies. The reduction in the number of passenger trains had effected a saving of 600,000 tons of coal. The number of sleeping cars had been reduced, observation cars eliminated, and the freight loads increased. In closing, Mr. Neal said that the railways took a great deal of pride in their record in regard to the carrying of fuel.

### W. J. Dick Suggests Improved Methods of Utilizing Our Fuel Resources.

W. J. Dick, Mining Engineer of the Commission of Conservation, spoke upon the rational development of Canada's coal resources. "Canada," he said, "has 16.4 per cent. of the world's coal, Great Britain 2.4 per cent., and the United States 51.8 per cent. The coal fields of the United States and Canada have the largest proportion of the world's resources of coal and with the exhaustion of the coal fields of Europe those countries will have to look to North America.

Mr. Dick stated that production of coal in Canada had doubled every twelve years since 1874, yet had not kept pace with the increase in consumption. Mr. Dick was of the opinion that while in the east and the west Canada had large deposits of bituminous coal, she had little anthracite for domestic use. To make up that deficiency he suggested that the future would bring with it the production of artificial anthracite made from bituminous coal with gas, ammonia and tar as valuable by-products. The municipal gas plants of to-day would form the basis of a new organization.

"It is not beyond the bounds of reason," he said, "to foresee the day when the householder, in place of his \$10 ton of coal and slate, will receive a ton of smokeless artificial coal, gas for a month, enough ammonia to fertilize a small garden and enough tar to cover the road in front of his home, all for less money than he is now paying for inferior coal." Mr. Dick contended that two million tons of coke had been used in the United States for domestic purposes, and the fact that the gas companies with small plants could produce quantities of coke showed the possibilities of the coke industry.

Mr. Dick suggested that the area to be served from the Western Canada coal fields could be enlarged by special railway rates during the season when the grain was not being moved, the coal being stored at delivery points. This would ease the drain upon imported coal and would give steadier labor conditions at the mines, an important consideration in securing increased production. Mr. Dick also advocated a pooling of interests by the mines in order to secure economic development of the coal fields.

### John Blizard Discusses Utilization of Peat.

Mr. John Blizard, Technical Engineer of the Division of Fuels and Fuel Testing, of the Mines Department, in dealing with peat, expressed his opinion that it was to assume an important role in Canadian industrial life in the future. Mr. Blizard discussed at some length the methods of taking raw peat, extracting the moisture and making it commercially profitable. He gave the gathering an idea of the tremendous resources of peat that are to be found in various parts of the Dominion, particularly in Ontario. A peat bog to be a commercial proposition should be at least five feet deep. A square mile of bog, ten feet deep would contain about 800,000 tons of dry peat, or 1,100,000 tons of air dried peat with 25 per cent. moisture.

In commenting upon the possibility of peat competing in price with coal and other fuels, Mr. Blizard stated that peat, if produced in any quantity, could be made cheaply since most of the labor required was unskilled. In concluding his address, Mr. Blizard declared that the inauguration of peat fuel as an important industry in Canada could not be long delayed.

The concluding address of the Tuesday afternoon session was by E. Stanfield, of the Division of Fuels and Fuel Testing of the Mines Branch at Ottawa, on

low temperature carbonization and briquetting of bituminous coals. At the evening session, George F. Porter, Engineer of Construction for the Quebec Bridge, gave an illustrated address on the erection of the bridge.

The efforts which Ontario is making to relieve the fuel situation were dealt with by Mr. Albert Grigg, Deputy Minister of Lands, Forests and Mines. The use of wood as an emergency fuel was taken up by Mr. E. J. Zavitz, Provincial Forester, who said it was vitally necessary to educate the people in rural districts to the importance of cutting wood during the summer for winter use. Mr. Zavitz showed that fuel wood costs \$12 to \$15 a cord, and that a cord of wood in heating capacity was equal to only half a ton of coal, so that at this rate the people will be paying from \$24 to \$28 for the equivalent of a ton of coal.

### Arthur Hewitt on Uses of Gas.

The importance of manufactured gas among the economic fuels on which Canada may rely was explained at the convention by Mr. Arthur Hewitt, general manager of the Consumers' Gas Company, of Toronto.

Mr. Hewitt estimated that the percentage of efficiency obtained from coal in a gas works is between 60 and 70 per cent., while that of a ton of the same fuel burned in an open fire is less than 20 per cent. In addition to the gas, many gallons of tar, from which toluol, benzine, fuel oils, acids, and dyes can be made, is recoverable. There is also retort carbon, which is used for the manufacture of carbon electrodes for searchlights, electrical steel furnaces, and other uses. Mr. Hewitt said that if gas were used for cooking exclusively in Toronto, compared with anthracite coal, there would be a saving of \$2,000,000 a year.

### F. G. Clarke Points Out Advantages of Central Heating System.

Mr. F. G. Clarke, chief engineer of the Toronto Electric Light Co., advocated the use of central heating plants for towns and cities. Mr. Clarke's up-to-date heating system would necessitate steam mains laid in city streets. He says: "A well designed system as, for example, one covering that part of Toronto between the bay and College Street and from Sherbourne to Spadina Avenue, if supplied from a central plant, such as the Scott Street station of the Toronto Electric Light Co., would be able to furnish all of the heat required in the district at a cost to the users from 10 to 30 per cent. less than their present expense."

Mr. Clarke predicted that gas and briquettes made from powdered coal will replace the coal now used in Canadian cities. The powdered coal could be delivered in pipes just as oil is now being conveyed from the well to the seaboard in the United States. "The cost of the gas and the briquettes will be less than one-half, and possibly one-fourth, the present prices for gas and coal."

### Canada's Water Powers Should Be Used More Fully.

"Cheap power promises to be one of this country's greatest assets in the post-bellum industrial rivalry of nations for world trade," pointed out Mr. J. B. Challes, Superintendent of Dominion Water-power Branch, Department of the Interior, in dealing with the relations of Canada's water-powers and their relation to the fuel situation. The great fuel reserves of Canada, supported by the water-power resources, represent a sure source of cheap power, and should, he claimed, guarantee Canada her share in world trade, provided



the varied fuel-power resources are availed of to a maximum extent.

It is axiomatic, claimed Mr. Challies, that our heat, light and power needs must be considered as one great national problem. While the Pacific and Atlantic Provinces are self-sustaining, the Central Provinces, he said, were dependent on outside sources for coal. The "acute fuel area" is dependent for domestic requirements mainly upon Pennsylvania anthracite, and for industrial needs upon American bituminous coal, as well as upon water-power.

This "area," however, he said, could eventually be made independent of foreign fuel imports and Canada could become self-sustaining, at any rate in respect of her domestic heating requirements.

In 25 years there has been developed and put in use nearly 1,800,000 water horse-power. Only about 10 per cent. of Canada's available water-powers has been developed. If Canada is to reap full benefit from her heritage in white coal there must be a constructive liaison between the Dominion and Provincial Government administrative departments concerned in water-power matters.

#### Electrification of Railways Would Help.

In a paper on railway electrification, Mr. John Murphy, chief electrical engineer of the Department of Railways and Canals at Ottawa, said the elimination of the need for coal at a considerable distance from the mine is a greater measure of relief and of true conservation than increasing mine production, and thereby adding to the load of the already over-burdened railways. Reducing coal consumption automatically releases men and apparatus all along the route from the mine to the consumer, and also helps to prevent railway congestion.

Railway electrification will reduce coal consumption and haulage, and it will greatly improve traffic conditions. It seems, therefore, to be a solution of the problem.

"Railway electrification is, in my opinion, a very pressing, economic, financial and engineering problem—a problem worthy of the best attention of the most highly trained and experienced specialists," said Mr. John Murphy. "From 50 per cent. to 60 per cent. of the coal now used would be saved if electric locomotives were used."

In dealing with "The Possibilities of the Relief of Fuel Consumption in Canadian Industry by the Increased Use of Hydro-Electric Energy," Mr. J. M. Robertson, Director of the Southern Canada Power Company, Montreal, said that economic utilization of power and fuel resources would limit the present use of irreplaceable materials and promote the use of other materials whose use would conserve the assets of a community.

Electric heating is not a present economic possibility, due to high cost and lack of available power, according to Mr. P. H. Mitchell, consulting engineer, who read a paper on "The Possibilities of Lessening Fuel Consumption in Canada by Adoption of Electrical Heating."

#### \$5,000,000 PLATE MILL FOR SYDNEY, N.S.

Ottawa, April 4.—Additional information with respect to the Federal Government's programme for the construction of steel ships to be used in meeting the

shortage of merchant vessels on the Atlantic, and the agreement between the Government and the Dominion Iron and Steel Company looking to the construction of a plant for the rolling of ship-plates in Canada was contained in the statement of Hon. C. C. Ballantyne, Minister of Marine and Fisheries, in committee of supply in the Commons to-night.

Hon. Charles Murphy asked if the shipbuilding programme of the Imperial Munitions Board and that of the Government were in any way connected. Mr. Ballantyne replied that there was absolutely no relation between them. The Minister of Marine said that one difficulty which had confronted him when he first took into consideration the question of steel shipbuilding was that Canada had no plant for the rolling of steel plates. If Canada was to be a ship-building country it was necessary that a steel mill be established in the Dominion. He, therefore, took up with the various Canadian steel companies the question of establishing a rolling mill in the Dominion. The best proposition submitted by the Government was that of the Dominion Iron and Steel Company, of Sydney, which agreed to install a rolling mill which would cost in the neighborhood of five million dollars, all of the money to be furnished by the company.

The contract which the Government had entered into with the steel company was concluded on the following basis, the Dominion Government guaranteed to take a minimum tonnage of 50,000 plates per year for five years. The price per plate for the moment was \$4.15, but this would have to be adjusted every six months on the basis of the cost of steel ingots. The mill would run for six months, turning out steel plates, and then the price to be paid by the Government would be determined. The contract provided that no higher price than \$4.25 should be charged the Government, and if the prices of ingots went down that of steel plates should be lowered accordingly. Government accountants would be placed in the office of the company to see that the prices were adjusted correctly.

The Minister of Marine said that the new mill would probably be in operation in twelve or fifteen months. All machinery which the company had to import would have to pay duty on entering Canada, but this would be refunded to the company. Until the mill was ready to supply steel plates, the shipbuilding programme would be carried on with plates supplied from the United States. The Government had been fortunate in securing 80,000 tons of steel plates at a reasonable price through the British War Mission at Washington.

#### BRITISH-AMERICAN NICKEL CO.'S REFINERY.

Ottawa, April 10.—The British-America Nickel Refining Company, which has been negotiating for property on which to erect a refining plant for some time, has decided to locate on the Hull side of the Ottawa River.

It is learned that representatives of the company have purchased the property known as the old Conroy piling grounds, at Deschenes, upon which a nickel refining plant, to cost in the neighborhood of \$1,000,000, will be erected. The company will employ at least one hundred and fifty hands.

Preparations have already been made for a start on the construction of the plant as soon as the frost leaves the ground.

### Accuracy in Coring with Diamond Drills

By Joseph S. Mitchell.\*

The increased use of diamond drills in locating ore-bodies and mineral deposits, together with the fact that mining engineers now depend largely on their use in preliminary developments, has directed attention to the various methods and devices employed for the purpose of producing the most accurate results.

While a diamond drill, even when carelessly operated, will invariably detect the presence of minerals, engineers now demand accurate and reliable data to enable them to determine with some degree of exactness the quantity and quality of the mineral sought, so that it is possible to put the property on a definite commercial basis before development is begun and equipment purchased.

In coring minerals, it is important to use the proper core barrel for the particular kind of material to be cored. For hard, solid rocks, the single tube core barrel is regularly used and no difficulty is experienced in getting full and accurate core. This barrel consists of a single tube, as its name indicates, to which the diamond bit is connected by a taper core shell. The shell is fitted with a taper split ring core lifter, which tightens on the core as the barrel is withdrawn, due to the locking effect, when it is forced into the taper of the core shell.

The water for washing out the cuttings passes directly down, over and around the core in this type and with hard, solid core will, of course, do no harm. When the cores are soft or the formation is full of natural cleavage planes, it is desirable to protect the core against washing and also to avoid the tendency of broken core, even when hard, to wedge when subjected to the pressure of moving water.

The most usual conditions, under which special barrels are used to secure core, in such material, are those found in coal formation. It is usually customary to drill with the plain or single core barrel down to within a few feet of the point at which it is expected the coal seam will be encountered. The drilling rods are then pulled up, the plain core barrel removed and the double tube core barrel substituted for it. For many years the Sullivan swivel ball bearing tube barrel has been the type in perhaps most extended use throughout the North American coal fields, for this class of drilling. It consists of an inner and outer casing, the latter being attached to the drill rods and rotating with them. This carries the diamond bit and the core lifter at the lower end. The inner casing is suspended on ball bearings inside of this tube, and remains stationary at all times, receiving the core, which passes up through the bit and core lifter, and protecting it from the friction of the rotating parts and from the washing action of the water, which is forced down between the outer and inner barrels. The return water then comes up, outside of the outer casing.

The use of this barrel is recommended for all coal prospecting, and has been the means for securing practically full cores, in nearly all cases, where it has been employed. This type of barrel is also recommended for drilling in salt, sulphur and other materials which are friable or soluble on contact with water.

\*Sullivan Machinery Co.

Simpler types of double-tube barrels are sometimes employed in hard mineral prospecting, when the formation is encountered at an angle, or is unusually broken, so that there is danger that the short pieces of core may be ground up and the record lost. In this design provision is made for returning part of the water through the inner tube, instead of letting it all pass up, outside of the barrel. A small opening at the top of the core barrel connects with the inner tube, and the water coming back through this tube is discharged into the hole, at this point. The lifting effect occasioned by the upward rush of the water aids to loosen and free the broken pieces of core, preventing clogging and consequent grinding of the pieces. The water ordinarily passes down between the two tubes.

In a still simpler form of barrel, sometimes used, the inner tube is rigidly attached to the outer casing, and prevents washing. This does not give as good results as the return water barrel, described above.

It is interesting to note in this connection that an important advantage of the diamond drill consists in the small size of the hole in which it bores, and the relatively small size of the cores removed. Experience of more than a third of a century has indicated that the diamond drilling process can, and does, remove, satisfactory and complete, accurate records of any mineral which it is desired to prospect in this way, with cores not exceeding two inches in diameter for friable formations, such as coal, and running down to 15-16th of an inch in diameter for hard, solid mineral formations. The small size of the drilling tools used enables much better progress to be made at a relatively lower operating cost than is possible with larger drilling equipment.

The core barrels described above are manufactured by the Sullivan Machinery Company, of Chicago, whose Canadian office is at 37 Colborne St., Toronto.

#### NORTHERN MANITOBA MINING NEWS.

##### Mandy Has 9,000 Tons Copper Ore Ready to Ship.

The Pas, April 1st.—The Mandy Mining Co. has now 9,000 tons of ore at the head of navigation, awaiting the opening of the lakes and the Saskatchewan River. It will be carried to the Pas by steamboat and barge, where it will be shipped by rail to Trail. It is expected that ore will come down at the rate of 900 tons a week during the summer. Three steamboats and six barges will be put at the work by the Ross Navigation Co. Twelve cars shipped this month to Trail were freighted by returning teams.

##### Diamond Drilling at Flin Flon and Cranberry Lakes.

The Flin Flon syndicate will continue drilling with three diamond drills all summer on their big property.

A Duluth concern has a diamond drill at work on some claims at Cranberry Lakes.

An option has been taken by a large eastern mining company on a group of claims at the end of Phantom Lake, south of the Flin Flon group, on which diamond drilling operations will be commenced next October.

##### Mill at Herb Lake Completed.

Herb Lake is also soon going to be in the limelight; the mill on the Rex is now completed and should be producing gold inside of thirty days.

The Northern Manitoba is making a shipment of ore to Trail and will probably resume work shortly.

Active development work is expected to start on several other promising properties with the advent of spring.



### Origin of Sudbury Nickel-Copper Deposits

In a paper presented at the recent annual meeting of the Canadian Mining Institute and the American Institute of Mining Engineers, H. M. Roberts and R. D. Longyear said in part:

The genesis of the Sudbury ores has been a subject of keen debate for a number of years. The data brought to light by this exploration, which has developed one of the large orebodies of the district, lends a new emphasis to some phases of the problem, and it will be of interest to discuss in a general way the facts concerning the deposits and the various conclusions which may be drawn from them.

The apparently conflicting theories of origin are all based upon certain facts. These facts, as distinguished from inferences, are enumerated below:

1. The ore generally occurs at or near the margin of the main norite mass. Where the ore is not near the main laccolith ("offset deposits"), norite is always found associated with the ore, or in close proximity to it.

2. The ore minerals are later than the rock-forming minerals of the norite.

3. The ores penetrate and replace the foot-wall rocks to some extent.

4. The rock associated with the ore appears to be more or less brecciated.

5. The walls of the commercial orebody are usually sharply defined, mineralogically.

6. The norite wall is always spotted with sulphides. The foot wall is sometimes spotted, and sometimes barren.

7. The mineralogical content of the "marginal deposits" is singularly uniform with a fairly constant ratio between the amount of pentlandite and pyrrhotite, although with a slightly more variable quantity of chalcopyrite. The content of the "offset deposits" is not as uniform as that of the marginal deposits.

8. The usual minerals accompanying typical hydrothermal deposits are scarce or lacking, and in many places the norite associated with the ore is unaltered.

9. The norite laccolith has been differentiated into an upper stratum of acid material and a lower stratum of basic material. Within the basic material are minor amounts of acid rocks.

On the basis of these facts, a number of hypotheses concerning the genesis of the Sudbury ores have been offered. In general, they fall into two classes: those which postulate a magmatic origin, and those which postulate that the ores are the result of a later introduction by hydrothermal solutions.

#### The Relation Between the Exploration and Theories of Origin.

A choice between the various hypotheses is a matter of great importance to the explorer who is endeavoring to conduct a rational search for ore. Such a choice of views is important not only in reference to the value of any one parcel of land along the contact but also in regard to the handling of any one drill hole. There is one condition common to all of these theories: The orebodies that have now been found do occur along the contact of norite with some other adjacent rock. This is true not only of the sill as a whole, but of the offsets as well; although in many of the offsets, sulphides occur throughout norite dikes. Thus any lands along the norite contact might be expected to carry ore. The explorer must answer this question: Which lands among

those along the norite warrant the greatest expenditure for the purpose of finding ore? Every consideration that will help in solving this difficult problem is of great importance.

When this exploration was started, the later publications by Tolman and Rogers and by Knight were not available, but a study was made of existing publications.

In the early stages of the work, drilling was carried on, simultaneously, in various townships along the nickel range. As far as the immediate local facts in the field might show, all of these localities presented about equal opportunities for finding a body of ore. It may be of interest to record briefly the results of the exploration in the various townships, touching particularly upon the factors which determined the course of the work.

In the Township of Levack, on the north limb of the basin, three holes were drilled between the Strathcona mine and the Levack mine. The relative position of these mines led to the belief that ore might be found along the norite contact between them. Only one hole was drilled to the contact. This hole is typical of many of the holes drilled and is therefore described. It started in a uniform phase of the norite and continued in this for a depth of 500 ft. the proportion of pyroxene and basic minerals increased as the hole deepened, and many anhedral pyrrhotite appeared. Between the depths of 500 and 600 ft., portions of the core were composed largely of basic minerals; other portions were plagioclase feldspar. These segregations gave to the rock the appearance of having a gneissoid structure. Within this material were found a few occurrences of pyrrhotite and chalcopyrite, each attaining perhaps to as great a volume as 1 cu. in. At 600 ft., the drill encountered the coarse-grained, flesh-colored granite of the footwall, decidedly different from any of the rock above.

Drills working in the Township of Trill in the western part of the district and in the Townships of Denison and Blezard, encountered much the same types of norite with segregation phenomena near the contact as described in connection with the drill holes in Levack. No commercial quantities of sulphides were found, which, of course, does not necessarily mean that such bodies may not be found. Meanwhile, drills were at work in the Townships of Falconbridge and MacLennan in the eastern part of the district. Typical norite was encountered there also, after penetrating the glacial drift. The norite at the contact in Falconbridge differs in no degree from the norite encountered elsewhere, except that outcrops to the north indicate that the basic portion of the intrusive sill is wider than in the other localities where drilling was done. In attacking this region, it was planned to refrain from deep, costly rock drilling until the position of the contact had been definitely determined by "scout" holes which would merely penetrate ledge for a few feet. These were put down through the drift for the purpose of marking out the position of the contact; thus the deeper holes had a definite basis for the choosing of their location. In the early stages of the work, one hole near the contact was drilled to a depth of 600 ft. in norite but did not encounter footwall rocks, thereby indicating that the norite contact had a steep dip.

At this time, lands in the Townships of Howell, Wisner and Graham were also available for exploration, but it was decided not to drill them. The drills were withdrawn from Levack, Trill, Denison and Blezard

and the exploration was concentrated upon the Townships of Falconbridge and MacLennan where the contact was largely concealed by glacial covering, but where, so far as known, the norite had the same mineralogical characteristics at the immediate base as the norite found during the course of the other explorations. In addition to the drilling, and while it was in progress, studies of many portions of the norite contact were made in the field wherever it was exposed to view.

As a result of this work and of a consideration of all the large field relationships as shown on the maps of the Sudbury District, the following general condition had been becoming apparent: The quantity of sulphides which may be expected to occur at the contact of the nickel-bearing intrusive is roughly proportional to the volume of the adjacent norite. The surface expanse of the nickel-bearing intrusive and its thickness as shown by the dip at the contact both go to show what the volume of the tributary nickel-bearing intrusive may be.

The one great expanse of nickel-bearing intrusive in the district which, so far as known, did not have a commensurate body of sulphides accompanying it, lay in the eastern part of the district in the Township of Falconbridge. The nickel-bearing intrusive in this vicinity has a much greater width than in the Townships of Wisner, Bowell and Levack on the north, or Trill on the west. The norite has a great width in the Townships of Denison and Blezard, but the accompanying orebodies had already been discovered; i.e., Crean Hill mine and Blezard mine. Hence, it was decided to concentrate on the contact in the Township of Falconbridge, even though it was covered by 150 to 200 ft. of gravel and boulders.

In this connection, it may be noted that in regions where the offsets are highly mineralized, the adjacent basic margin does not yield orebodies, i.e., in the region of the Worthington and Mond mines, the marginal contact of the main intrusive is quite generally exposed and no orebodies have been found along it. In the region of the Froid mine, which is found on an offset, the margin proper does not yield orebodies, indicating that the metallic content which was a portion of the magma in these vicinities, when found in one place does not occur in quantity in another portion of the "horizontal cross-section" or plan now exposed by the erosion surface. This relationship is, of course, rough, discernible only in broad outlines, but is sound evidence for the conduct of exploration, safer than speculation arising from more detailed features of any one hand specimen or any one orebody. General evidence of this kind is more likely to be a safe guide for the projection of work in unknown areas, since the reasoning proceeds from the nature of the intrusive process as a whole, not from any one phase which may be dominated by local conditions.

While the discovery of ore in Falconbridge Township as a result of assuming a relation between the volume of norite and the volume of sulphides may be only a coincidence, nevertheless, the outcome is a strong indication that some such close relationship actually does exist.

Another factor which has been emphasized by this exploration is the intimate association of the ore with the norite. In Falconbridge Township, it usually occurs at the immediate contact, the hanging-wall being entirely norite and the footwall entirely quartzite. Where the ore is actually within the quartzite (or

greenstone) it is never more than 20 or 25 ft from the base of the norite. Moreover, the drill core often shows that the gangue within the ore is norite, while the rock above and below may be quartzite or greenstone.

This is well illustrated in Hole 308, a cross-section of which is shown. Below the main body of ore, the drill passed through 16½ ft. of barren quartzite only to enter again a 2½ ft. stringer of rich ore containing small included particles of norite. The association of the norite with this last shoot of ore is extremely suggestive, and points strongly to the fact that they both came from the same source and were closely contemporaneous.

#### Summary.

By way of summary, a possible succession of events which produced the Sudbury ores is outlined below:

A laccolithic mass of molten rock was intruded along a plane of unconformity beneath the Animikie sediments. Through some process of differentiation, the nature of which is uncertain, this mass separated and consolidated into two distinct but intergrading types, micropegmatite and norite. The sulphides were carried downward with the norite. As the norite consolidated, these sulphides remained in solution and were concentrated in association with an acid component of the magma. This segregation or "extract" made its way to the base of the norite under the influence of complex chemical and physical forces. At the very last stage in the consolidation of the norite, the sulphides were precipitated from the "extract" along the contact, and at the same time, the acid component solidified into granite. The presence of water, sulphur, and possibly other mineralizers in the magma, gave this extract somewhat the character of a solution, enabling it to replace the wall rock to some extent. But it was still so intimately related to the magma that it was unable to carry the sulphides any great distance into the foot-wall, unless also accompanied by the molten norite.

With this point of view, it is merely a question of emphasis whether these ores are considered to be of magmatic or hydrothermal origin. The point we have tried to make clear is that the dominant factor controlling the deposition of the Sudbury ores is magmatic segregation in situ. Hot solutions may have been active, but only served to influence the local character and position of the ores.

#### THE ROSS ENGINEERING COMPANY.

The Ross Engineering Company, makers of Ross box pumps for sands and slimes, automatic drop-bar grizzly feeders and ore screening equipment and automatic dump ore car system, have opened an office at 908 Eastern Townships Bank Bldg., Montreal.

Mr. Wm. Ross, general manager of the company, is well known in many mining districts. He is a graduate of the Aberdeen Technical College, Aberdeen, Scotland. After graduating he went with Messrs. Babcock & Wilcox, Limited, where he remained for a year. He was also for a year with Messrs. Box Hall Iron Works, London, England. During the next four years he was in South Africa as chief designer of the City Deep Gold Mines, Johannesburg. From there he came to Canada five years ago. During his first year here he was mechanical engineer of mines for the Canadian Copper Co., Copper Cliff. For the next three years he was mechanical engineer for the Dome Mines, South Porcupine, and during the last year he was chief engineer for Messrs. Fraser & Chalmers.



## CORRESPONDENCE

**Bore-Hole Exploration.**

Editor Canadian Mining Journal:

Sir,—I have read with interest the article by Mr. C. H. Hitchcock, on "Bore Hole Exploration," in your issue of January 15th, and also the letter by Mr. C. J. Harrington in your issue of March 15th, in which he takes issue with Mr. Hitchcock's statement that the "Knight and Stone" core barrel is considered the best double tube core barrel on the market.

Mr. Harrington, by his statements, proves that he is not familiar with the core barrel, which he undertakes to describe, or with the results obtained by the use of the different types of double tube core barrels.

The "Stone Patent" core barrel, which is also known as the "Knight and Stone" core barrel, is provided with means for causing a portion of the circulating water to flow back or upward through the core barrel, thus exerting pressure below the core and raising the broken pieces of rock or mineral. This prevents these pieces from being ground away on the piece of core below and therefore lost. This return water principle is not confined to the rigid type of double tube core barrel; but is also used with two different styles of ball-bearing double tube core barrels; these are shown in the patent drawings and are manufactured and sold by the Diamond Drill Contracting Company of Spokane, Wash., and the E. J. Longyear Company. However, these ball-bearing styles are recommended by the patentee and manufacturers only for very soft material, for like the Sullivan Machinery Company's type, they are short lived either in hard or alternating hard and soft material. But little if any more core can be saved with the stationary inner tube ball bearing type of core barrel in soft material than by intelligent handling can be saved with the "Stone Patent" rigid type double tube core barrel.

The "Sullivan" core barrel, like the "Stone" ball bearing type, is hung on ball bearings; but it is solidly plugged or closed at the upper end. If a piece of soft core such as clay or sticky shale is crushed in the lower end, or in any other part of the barrel, water must necessarily fill the balance of the barrel and when so confined and prevented from escaping by the crushed soft material it will act as effectually as a bar of iron in preventing the barrel from passing down over further core. If the drilling is continued all core will be ground away and lost.

With the "Stone" barrel, of either type, the water escapes freely from above the crushed piece of core and the water pressure from below assists in raising the core and freeing the block.

Mr. Harrington states that the "Sullivan" double tube core barrel is universally used for drilling in coal. I do not doubt that it is extensively used, as is all of the Sullivan machinery equipment which is widely advertised. He, however, fails to state that where this core barrel is used ninety-five per cent of the drilling is done with some other type of core barrel, usually the old single tube type, and the ball bearing core barrel is used only to cut through the coal. Whereas the "Stone" type of core barrel is used for the entire length of the hole and I have never heard of it having been superceded by any other type for drilling through the softer friable material.

Where the "Stone" core barrel has been introduced it has practically replaced all other makes, single and

double tube alike. Ninety per cent. of the drilling in the Western States and British Columbia from California to Alaska is done with the "Stone" return water types and largely with the rigid style. The advantage is not alone in the value of the core saved, for in saving a greater percentage of what may be useless hard rock core an increase in the footage drilled is made and a decrease in diamond breakage amounting from ten to fifty per cent is accomplished. This, in itself, when recognized, should cause the "Stone" return water core barrel to supplant all others.

One of the purchasers and users of the "Stone" core barrel, Mr. M. Ahearn, of Denver, Colorado, has a patent double tube core barrel without the return water feature, this is superior to the "Sullivan" double tube core barrel or any other of that type known to the writer in that the construction allows for the lubrication of the ball bearings, which are protected from the action of the circulating water. It also allows for the use of larger and stronger thrust balls.

Yours, etc.,

FRED STONE.

Box 947, Spokane, Wash., U.S.A.

March 30, 1918.

**\$400,000 FOR EXPERIMENTAL PLANT.**

Ottawa, April 7.—The Advisory Council for Scientific and Industrial Research has been informed by the Government that the Council's recommendation that a plant be erected in the Province of Saskatchewan for the production of a high-grade domestic fuel from the lignite of eastern Saskatchewan has been approved. The Government has provided a sum of \$400,000 for the construction and operation of this plant.

In this undertaking the Dominion Government is acting in co-operation with the Governments of the Provinces of Saskatchewan and Manitoba.

The Council has received a request from the Ontario Government asking that R. A. Ross, C.E., one of the members of the Council, be appointed to act with Arthur Cole, C.E., as a committee to take immediate steps for the development of the peat bogs of Ontario, and the production from them of a merchantable fuel. The Research Council has concurred in these appointments and the investigation will be proceeded with.

Winnipeg, April 10.—It is stated that an arrangement has been entered into between the Federal Government, the Province of Manitoba, and the Province of Saskatchewan, whereby a plant for the manufacture of anthracite briquettes from prairie lignite coal will be established in the Estevan district in Saskatchewan.

The plant will cost \$400,000, the Federal Government putting up \$200,000 and the Provinces \$100,000 each. The plant will become the property of the two Provinces on its completion. The Federal Government has charge of the erection of the plant, and it is expected that it will be in operation by next winter.

At Victoria, B.C., the Central Iron Committee has proposed that the initial objective of the British Columbia steel delegation, when it shall meet the Federal authorities in Ottawa, shall be, first and foremost, the establishment of a pig-iron plant. The construction and operation of such a plant, it is contended, may be the thin end of the wedge that will eventually shape itself into the establishment of an important iron and steel industry on the coast of British Columbia.

## “The Whitley Scheme”\*

By C. V. Corless.

In the creation of democratic organization for unifying the aims of Capital and Labor, Great Britain is once more the pioneer. We instinctively turn to her for industrial experience, as a child turns to a wise parent. Her experience in industry is many centuries older than ours. Her labor is much more highly unionized. Her Trade Unions have passed through two centuries of struggle. Her differences between Labor and Capital are more clearly defined. Her class distinctions, for other (historical) reasons, are more marked—a fact that has added to the bitterness between Capital and Labor. These had brought the industrial dispute in Great Britain to such a stage that, by 1914, many felt that such general strikes were imminent, as would amount almost to, if they did not end in, a revolution. The war suddenly diverted attention from the quarrel. Though some domestic bickering has continued, all parties loyally joined hands in the superhuman effort against the common enemy. The war has, at least for the present, removed from Capital all self-complacency, which was a large factor in the domestic strife. The nation is already face to face with an inconceivable debt which is mounting at an appalling rate. The food supply is threatened. The nation is about to put forth its extreme exertion. There is no room now for old quarrels. Dust and cobwebs have been cleared away. England is never at her best until her back is to the wall. It required three years of war to brush away the last cobweb of self-complacency. She is now not only thoroughly aroused to fighting mood, but has had her creative energy quickened by the crisis.

In the awful throes and agony of the past year of war, Britain brought forth an industrial idea which, if broadly and wisely backed up in future by educational preparation, seems calculated to effect such a revolution in industrial relationships as will remove the malign social results of the pernicious economic policy followed since the industrial revolution of a century ago. In the blackest year of the war, just past, the British Government appointed a Commission whose principal work was to inquire into the causes of industrial unrest and to make suggestions for removing the causes of discontent. The work was quickly and thoroughly done. The whole country was divided into eight industrial areas to each of which was detailed a small Commission of three, consisting of one representative of employers, one of labor, and an impartial chairman. Their reports will prove of great economic value. While these industrial commissions were at work, a short preliminary report was sent to each by a sub-committee of the recently created Reconstruction Department, which at that time had merely the status of a committee appointed to consider the whole problem of industrial relations from the standpoint of post-war reconstruction.

The chairman of this sub-committee was Mr. Whitley, whose name, for brevity, has been attached to the committee, to the report and to the general scheme embodied in the report. The broad recommendation of the Whitley Committee was the establishment in every organized trade of an Industrial Council, repre-

senting both employers and workpeople, and having as its object “the regular consideration of matters affecting the progress and well-being of the trade from the point of view of all engaged in it, so far as is consistent with the general interest of the community.” This recommendation, modestly called an “Interim Report on Joint Standing Industrial Councils,” was, in June of last year, sent to each of the eight small Industrial Commissions, who quickly secured for it a consideration by more than one hundred Employers’ Associations and Trade Unions all over the country. The greatest interest in the proposal was manifested both by the industrial bodies concerned and by the press. There appeared to be at once a general feeling of relief that a possible solution had been found for what had come to be regarded as practically a deadlock. Nothing could indicate better than this feeling of relief the essential soundness at heart of both employers and employed. By October the replies had been received and correlated. The answers of nearly all of the Trade Unions and of most of the Employers’ Associations were “overwhelmingly in favor of the adoption” of the general principle of the Whitley Report. Backed thus, the Minister of Labor, on October 20th, informed the Employers’ Associations and the Trade Unions of the decision of the Government to adopt the Whitley Report. The document announcing this decision by the Government made it clear:

- (1) that Joint Standing Industrial Councils should be established in all the well-organized industries with as little delay as possible.
- (2) that these Councils would be considered by the Government as “official standing Consultative Committees on all future questions affecting the industries which they represent” and would be the “normal channel through which the opinion and experience of an industry will be sought on all questions with which the industry is concerned,” and
- (3) that the Councils are to be “independent bodies electing their own officers and free to determine their own functions and procedure with reference to the peculiar needs of each trade.” These autonomous councils will thus “make possible a larger degree of self-government in industry than exists to-day.”

These Joint Standing Industrial Councils, of national scope for each well-organized trade, will be supplemented by District Councils and these again by Shop Committees, on both of which masters and men will find equal representation.

The scheme has met with the approval of the Council of the Federation of British Industries, the most representative organization of employers in Great Britain, and of the Trades Union Congress, and to all appearances is in a fair way to success.

Mr. Wilson Harris is responsible for the statement that the idea of Joint Councils of masters and men originated with Mr. Malcolm Sparkes, of London, an employer in the building and allied trades. He had “laid before the men’s unions in these trades a memorandum on industrial co-operation. The Painters and

\*Extracts from a paper presented at the Annual Meeting of the Canadian Mining Institute, Montreal, 1918.



Decorators took the memorandum and applied it." Their experience with the Industrial Councils already extends over about a year, and has proven their practicability. The original purpose of these Joint Councils was, to use their official statement, "to promote the continuous progressive improvement of the industry, to realize its organic unity as a great national service, and to advance the well-being and status of all connected with it." This, as a spontaneous expression of idealism by a workmen's organization, is of deep significance. The District Councils in this trade have met regularly now for about a year under the masters' chairman and the men's chairman alternately and have successfully carried out some important constructive work at various centres in the country besides averting some disputes. The Whitley Committee is said to have received the original suggestion from this memorandum by Mr. Sparkes and elaborated it. It may later prove to be true, as in many other great movements, that when the time is ripe the same idea springs up in many minds at about the same time.

On considering the question of representation a little more closely, it seems probable that the labor representatives on the District and National Councils under the Whitley Scheme will all be trade union leaders while the representatives of the Employers will all be professional managers. The workmen at the bench or lathe or loom or in the mine or elsewhere is generally not in close sympathy or close touch with either. If he is to feel a real co-operation between those who direct and those who perform the work, it will be through the Shop Committees. Success of the scheme will largely depend on perfectly frank, human intercourse between the representatives of both Councils and Committees, but above all, of the Shop Committees. If, as is hoped, "such an atmosphere will be created that trade disputes will never be carried to the breaking point," there will have to be, of necessity, the greatest sympathy, frankness and cordiality between the representatives of the workmen and of the management on these Shop Committees.

#### UNIONS WANT RECOGNITION.

Sydney, N.S., Apr. 3.—Upwards of 100 delegates from all the Amalgamated Mine Workers' locals in Cape Breton assembled in convention here this morning. This conference is being held to map out a plan of campaign for the labor men, who are demanding that the corporations recognize the various unions here. Representatives of the American Federation of Labor at Sydney Mines and the Amalgamated Association of Iron, Steel, and Tin Workers of Sydney, were also in attendance at the meeting. These two unions are demanding recognition from the Nova Scotia Steel and Coal Company and the Dominion Steel Corporation. To date neither corporation will recognize the Steel Workers' organizations.

#### STRIKE AT LETHBRIDGE.

Lethbridge, April 9.—The discharge of an alien enemy to-day at the Federal Coal Mines has resulted in a tie-up of the mines by the union. Peras, an Austrian, is the man involved. He has been an agitator of the men. The manager refused to reinstate him in response to an ultimatum from the miners. He says he will allow no alien enemy to dictate to him. The operators have violated no clause of their agreement, the manager claims.

### PERSONAL

Mr. J. B. Tyrrell is at Tulsa, Oklahoma.

Mr. G. C. Bateman, manager of LaRose Mine, Cobalt, was in Toronto last week.

Mr. C. V. Corless, manager of the Mond Nickel Co., addressed the Royal Canadian Institute in Toronto on Saturday, April 6th, on "Educational Reform."

At a meeting of the Toronto Branch of the Canadian Mining Institute on Saturday, R. E. Hore was appointed as representative of the branch on the Joint Committee of Technical Organizations.

Mr. G. W. Bowen, general manager for the Western Fuel Company, operating large coal mines in Nanaimo district, Vancouver Island, B.C., went last month to San Francisco, California, on a business visit. Control of the company is held in that city.

Mr. R. R. Bruce, manager of the Paradise silver-lead mine in Windermere division of East Kootenay district, returned to British Columbia last month, after having spent part of the winter at Honolulu, Hawaiian islands.

Mr. T. W. Bingay, of Trail, B.C., comptroller for the Consolidated Mining and Smelting Company of Canada, Limited, who recently returned from a vacation trip in the United States, was in Victoria toward the end of March.

Mr. W. R. Will, a well-known owner of mining property situated near New Denver, Slovan district of British Columbia, has returned to that province after having spent the winter in Ontario.

Mr. E. P. Mathewson and Dr. A. Stansfield have been nominated as representatives of the Canadian Mining Institute on a Canadian Engineering Standards Committee.

Messrs. A. A. Cole, Wm. McInnis, D. B. Dowling, A. W. G. Wilson, Herman Donkin, T. C. Denis, W. G. Miller, J. S. DeLury, J. T. Stirling and W. Fleet Robertson, have been appointed an Advisory Board to assist the Canadian Munition Resources Commission in a survey of mineral resources.

#### OBITUARY.

##### Bernard P. McEnaney.

Toronto, April 3.—Mr. Bernard P. McEnaney, owner of the McEnaney Gold Mines, Limited, Timmins, Ont., was found dead yesterday evening in his apartments at 125½ Sherbourne Street. He was last seen alive on Sunday afternoon, and it is presumed that he died some time during that night. Mr. McEnaney had suffered about three years ago from acute bronchial trouble, and he was then warned by his doctor of the danger of a bronchial hemorrhage. It is believed that Mr. McEnaney sustained a hemorrhage Sunday night, and that this was responsible for his death.

"Barney" McEnaney, as he was familiarly known, was an outstanding figure in the north country. Born in Mount Forest in 1857, early in life he went to Michigan and remained there for several years, engaged in copper mining. Hearing of the mineral wealth of Northern Ontario he returned to Ontario about eight years ago, but arrived too late to share in the early stakings of Cobalt. He was, however, one of the pioneers in both the Porcupine and the Lorraine mining camps, and had valuable holdings in both. His sale of the Porcupine Crown mine to the Crown Reserve was one of the features in Porcupine's early history.

### The Ross Automatic Drop-Bar Grizzly Feeders

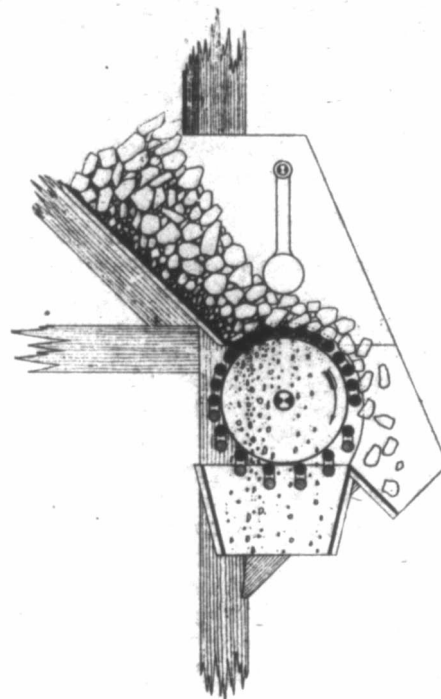
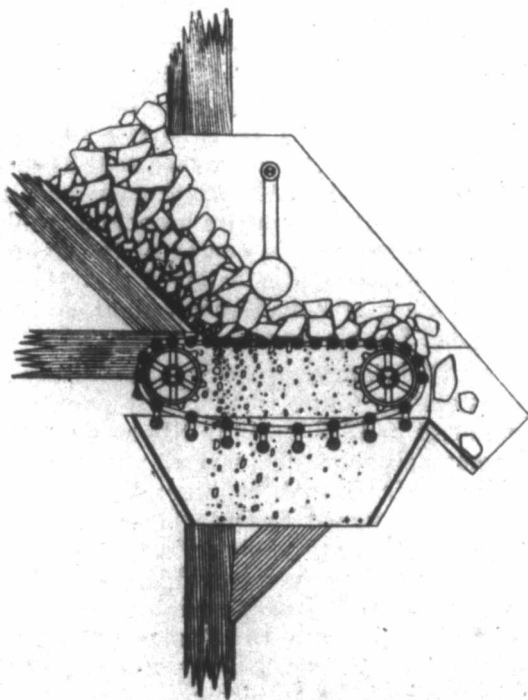
By Wm. Ross.

Ore feeders, grizzlies and screens are extremely important links in the chain of milling operations. It is on these that the crushers and other grinding machines depend for a steady flow of ore of the right size. Hitherto the close analysis granted to other milling equipment has been withheld from these machines, with the result that the mill operator is saddled with various types of faulty apparatus which are a source of continual trouble to him. Most of us are familiar with plugged grizzly, choked crusher, sledge hammer and repair gang episodes.

Many years practical study and experiment by the writer with various apparatus has resulted in the development of a machine for which is claimed the ability to **automatically feed and screen run-of-mine and crushed ore at an even rate for twenty-four hours a day without attention.**

The accompanying diagram, taken from the maker's catalogue, show the features of the rotary and travelling types of the Ross Automatic Drop-Bar Grizzly-Feeders. These diagrams show clearly the means by which the spacing of the grizzly bars is automatically increased at the underside of the apparatus.

The machines consist essentially of an apron of equally spaced grizzly bars which are fed forward under the lip of the bin opening. Every second bar, instead of being socketed at its ends, is linked to the main bar ahead of it. On reaching the discharge point these secondary grizzly bars drop down, remaining clear during the return half of the cycle, at the end of which they again automatically come into position ready for the screening and feeding operation. On the return journey to the starting point the bars do not obstruct the free passage of the fines. It should be noted here that the links carrying the secondary bars are pivoted excentrically to the main bars in such a way that the space between the adjacent bars is



automatically increased when the secondary bar drops over at the discharge point. This provides for the release of any piece of ore which might otherwise be trapped in this space. No troublesome internal fines chutes are necessary with these machines, and consequently the headroom required is very small; the discharge end of the travelling type can be elevated, thus necessitating no height allowance between the bin opening and the crusher. No other machine combines the functions of feeding, screening and elevating in such a manner.

The simplicity of construction of the Ross Grizzly-Feeders will make a strong appeal to the mill man. The rotary machine consists of two heavy cheek plates in which the main bars are journaled. The drop bars are supported by wide turned shoulders on the cheek plates. The cheek plates are keyed to heavy steel shaft which is carried by two bearings of ample size. The machine can be driven by ratchet, chain or belt. In the Travelling-bar machine the cheek flanges of the rotary type are replaced by heavy steel chains with hardened pins on which the main bars are journaled. The drop-bars are linked to the main bars, and are provided with half sockets at each end, which match the pins of each alternate chain link.

In any screening apparatus the greatest wear is caused by the abrasive action of large ore sliding over the screen bars or plates. Thus, in a revolving trommel screen ten feet long by five feet diameter, the coarse ore will slide over about one hundred feet of plate, and a piece may have tried two or three hundred holes before being discharged. The result is rapid wear of the screen and particularly the edges of the screen around the holes. Also, at the receiving end, the ore is impinged with considerable force onto the plate in a direction different to that of the plate. The Ross machine draws its own feed, which must therefore correspond in speed and direction to that of the bars. The coarse ore is carried to the discharge point without slip and consequently without wear. In most installations a speed of about twenty feet per minute is all that is necessary, and the wear caused by fines slipping through the slowly moving bars is negligible.



With regard to the self-feeding feature of the machine, it is acknowledged that the efficiency of a plant is seriously impaired if an even flow of ore from the storage bin is not maintained. A simple slide gate is not satisfactory unless constantly attended. If it is raised high enough to allow a large lump to pass, there usually results a rush of fines which flood the machine before the gate can be closed. A hanging gate, such as is shown in the accompanying cuts, works very successfully. When a large piece comes along, the gate will swing outwards temporarily to allow it to pass, returning afterwards to its normal position. In conjunction with the hanging gate, a forward motion of the feeder bars will automatically maintain a uniform flow of ore.

When the ore reaches the grizzly, the object is to, as quickly as possible, provide an escape for the fines. This is accomplished in the Ross machines—as will be clearly understood from the cuts—by applying a continuous feed of clear grizzly bars under the oncoming ore. Having passed the top screening bars, there is no possibility of the fines being trapped in the interior of the machine, because the spacing of the bars on the returning side has been doubled, and the distance between the bars has been increased three or four times. The coarse discharge from these machines will be uniform over the width of the apron, a special advantage where rolls, jaw crushers, etc., are being fed.

Over a dozen machines are already installed with screen spaces of from one-half inch to three inches, and negotiations are at present being completed for the installation of heavier machines, notably one with eight-inch screen spaces. This machine will handle very large run-of-mine ore at the rate of 350 tons per hour when the bars are moving at a speed of thirty feet per minute. The bars are three and one-half inch diameter, and the calculations show that twenty-five feet of grizzly surface will be presented to each ton of ore.

The mining world has responded promptly to the unique advantages offered by these machines, and manufacturing facilities are in full working order to meet the demand for quick shipment.

#### CROW'S NEST PASS COAL CO.

Toronto, April 13.—Through the combined influence of a five months' strike and the shortage of labor, 1917 was anything but a satisfactory year for the Crow's Nest Pass Coal Company, the report submitted to the annual meeting at the head office in Toronto yesterday showing the quantity of coal mined to be 504,768 tons, against 910,839 for 1916. The coke produced was 146,533 tons, compared with 268,980. In spite, however, of the marked decrease in production, the company was able to carry forward to the credit of profit and loss account the sum of \$381,103, compared with \$322,480 at the close of 1916. During the year the company spent on improvements and developments \$125,102, which included payment for the Coal Creek branch railway purchased from the Canadian Pacific Railway.

A press despatch from Whitehorse, Southern Yukon, follows: Recently fire destroyed the plant of the Copper King Company, while in operation in Whitehorse copper camp. The power-house, boiler-room, with power plant and compressor, were ruined. The Copper King property is being worked by Mr. J. P. Whitney and associates. The mine has been shipping ore steadily. Rebuilding will be commenced at once, and new equipment be obtained as soon as can be.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

#### Decrease in Nova Scotia Coal Output.

The coal output of the Nova Scotian mines for the first quarter of the year is probably the lowest for a decade. The outputs of the Dominion Coal Company show a decline below last year to the end of March of 130,000 tons. The Allan Shaft mine of the Acadia Coal Co. is still idle, not having resumed operations since the explosion in January. The Nova Scotia Steel and Coal Co. have had interruptions to production through weather and labor troubles, as have the Inverness mines also. Generally speaking, production is at the lowest point since the early part of the war period. The best that can be hoped for during the remainder of the year is that production may be maintained. No possibility of increasing production is in sight; but there are a good many reasons to expect still further declines in outputs.

#### A New Coal Mines Act for Nova Scotia.

A new Coal Mines Regulation Act is before the House of Assembly. It contains a good deal of new matter, principally in relation to the use of explosives and the duties of examiners and shotfirers, no doubt suggested by the recent colliery explosions. All who work under the C. M. R. A. will welcome a consolidation and a more logical arrangement of its provisions, as from year to year amendments have been introduced, and repealed, and re-introduced, until the Act has become rather mixed up.

Some of the legislation introduced into the Nova Scotia House bears evidence of hurried and superficial preparation. A striking example was the Nova Scotia Stationary Engineers Act, recently brought down, and given what is vulgarly termed the "three months' hoist." As drafted, this Act was full of grammatical and typographical errors, and the textual contents were full of indefiniteness. The principle of the Act was praiseworthy, as similar legislation—but more carefully thought out—has been in existence in other provinces for many years.

Before legislators introduce bills, why should they not consult those men who have spent their lives in practical experience of the conditions which the draft legislation is intended to regulate? A process of consideration and re-drafting, of consultation of those interested, of comparison with similar legislation in other countries, of enquiry as to the success or non-success of similar legislation abroad, may very well, and very profitably consume two or three years, but after such a process, there would emerge legislation that would stand criticism and the test of actual application. A classical example is the Coal Mines Regulation Act of Great Britain. Passed in 1870, it was not consolidated and revised until a few years ago. Before it was issued in the new form, most exhaustive enquiries were instituted through the medium of technical societies, trades unions, coal-owners' associations, etc. The preliminary process was most exhaustive and possibly just as tiresome, but while the resulting Act probably did not please the extremists on either side, it is a workable, coherent, comprehensive piece of legislation, thoroughly well understood by all who assisted in compiling it. In its final form such an enactment represents not the opinion of legislators—which in technical matters must necessarily be faulty—but the unified embodiment of men

actively engaged and thoroughly familiar with the industrial operations the enactment in question is designed to govern.

#### **Nova Scotia Coal Miners' Wages Increased.**

The earlier part of the year witnessed rather protracted negotiations in the Sydney District over wage adjustments. The question has been satisfactorily settled at the mines of the Dominion Coal Company both in Cape Breton and at Springhill, and also at the collieries of the Acadia Coal Co., in Pictou Co., and the Inverness Mine in Cape Breton Island. An agreement was understood to have been reached between the workmen of the Nova Scotia Steel and Coal Co., and the Company, similar in scope to that on which the Dominion Coal Company settled with its workmen, but some hitch has arisen as to whether the increase offered will be cumulative upon a number of rather unusual concessions which the Scotia Company has granted within recent years, in lieu of specified adjustments on a percentage basis. It seems unlikely that any trouble will supervene of a serious nature, but at the time of writing the matter is not settled.

The increase given by the Dominion Coal Company was retroactive to the 1st of January, so that the workmen received two months' increase in a special pay envelope at one time. The increase which is under negotiation with the Scotia Company is likewise retroactive, and should the matter be happily settled, the cumulative increase for over three months will amount to a very considerable sum.

#### **Mining Society of Nova Scotia will Resume Meetings.**

The annual meeting of the Nova Scotia Mining Society is arranged for the 1st and 2nd of May. Since the very successful meeting held by the Society in April, 1914, the annual meetings have not been held in customary form, because the Society felt some impropriety in doing this under the strain of war conditions. In 1917 the annual meeting occupied only one day, and some extremely interesting and pertinent papers were read; but owing to the short session, they were not adequately discussed. A number of these papers are selected for discussion at the forthcoming annual meeting, and as advance copies have been distributed to the members, it is thought a profitable and mature discussion of the problems they present will take place. Some new papers are expected, and it is anticipated that the resumption of annual meetings of a normal character will show that the Society has not lost any prestige by its voluntary policy of retrenchment during the first few years of the war. This policy has placed the Society's finances in a much more favorable condition than they were in some years ago. The Annual Dinner will be held, but its features will be modified to conform with war times. As the meeting extends over two days, and as the visiting members must dine in any case, it has been considered advisable not to any longer deprive the members and the Society of the advantages which accompany the social features of the annual meeting. During the past three years the sum of \$100 has been annually donated to some patriotic fund as representing the saving to the Society from dispensing with the usual features of the Annual Dinner, which is probably the best justification of the action of the Executive in its policy of abstention and retrenchment.

It is anticipated that the question of affiliation between the Mining Society of Nova Scotia and the Canadian Mining Institute will receive final consideration from the Mining Society's members at the forthcoming meeting.

## **BRITISH COLUMBIA.**

### **To Investigate Smelter Charges.**

Continuing the agitation against the methods of the Consolidated Mining and Smelting Company in regard to charges and terms of settlement in connection with the smelting of silver-lead ores, Mr. Chas. F. Caldwell, of Kaslo, who is largely interested in mining properties in Ainsworth mining division, recently appeared before the mining committee of the Provincial Legislature, and asked, on behalf of the Independent Mine-Owners' Association, that an investigation be made into the existing situation. He claimed that the charges now made by the smelting company are unfair, and that they have been steadily increased until now they have reached a point where the smelting company absorbs all the profits.

The Victoria Daily Colonist has published the following information on this matter:

"Denial of Mr. Caldwell's statement was made by Mr. J. J. Warren, Managing Director of the Consolidated Company, who contended that the new rates, which became effective on February 1, last, would not yield to the company more than a reasonable profit.

"Mr. Warren stated the company had made an offer to allow a committee from the miners to examine its books and go into the whole matter, but this offer had not been accepted. He could not see his way to agree to a Government commission. It would cost \$30,000 to \$40,000 and would accomplish nothing. No commission could force the company to do the work at less than cost plus a reasonable profit, and this was the situation now.

"A resolution was offered by Mr. J. H. Hawthornthwaite that a commission be appointed to go into the whole matter, the commission to consist of one representative of the smelting interests, one from the miners and one from the Government. No action was taken on the motion. It will be taken up at a future meeting of the committee."

**Investigation agreed upon.**—Meanwhile, action by the Provincial Government seems to have been rendered unnecessary by the attitude of the Dominion Government, as reported by The Trail News, as under:

"Advices from Ottawa state that the Dominion Government has agreed to the appointment of the committee nominated by the Associated Boards of Trade to make an investigation into smelting rates of the Consolidated Company and will provide the necessary funds. It will also pay for the employment of an expert accountant and an expert metallurgist to assist the committee in making the inquiry.

"Information to this effect has been received by Mr. Fred A. Starkey, of Nelson, president of the Associated Boards of Trade of Eastern British Columbia, from Messrs. Lorne A. Campbell and W. A. Anstie, who were delegated to go to Ottawa and place the matter before the government with the request that the committee be given the powers necessary."

### **WEST KOOTENAY.**

**Ainsworth.**—On March 21 the Kootenaian, published at Kaslo, included the following in its week's mining news: "After spending about \$130,000 in development on the United, Crow Fledgling, and Skyline properties, in Ainsworth camp, the A. W. McCune interests have quit that field. The reason given for the move is said to have been some friction with the unions. All of the camp materials and outfit used at the various pro-



erties is being brought down the hill and disposed of at a sacrifice."

Mr. F. R. Wolfe, of Spokane, Washington, president of the Florence Silver Mining Company, operating a mine and concentrating plant in Ainsworth camp, has been quoted in print as having said lately: "In the lowest level of the company mine near Ainsworth the best ore yet found in the mine has been uncovered. There is a full face of ore which is estimated to contain 30 per cent. lead. All ore previously mined here contained half an ounce of silver to the unit of lead, so it is believed the silver content of this newly opened ore shoot will be found to average 15 oz. of silver to the ton. Ore of this grade has occurred along the last 100 ft. of the drift on the No. 3 level, which is at a depth of about 700 ft. from the surface. For 200 ft. previously driven the ore was of a good milling grade, but not equal in value to that in the last 100 ft." Several weeks ago 209 tons of mill product was shipped to Trail by the Florence Company.

**Slocan.**—The Echo mine, situated above the Standard, in Silverton camp, last month shipped 46 tons of silver-lead ore to Trail. The Ivanhoe, near Sandon, was another small shipper. The Lucky Jim has this year shipped, also to Trail, 1,016 tons, chiefly of zinc ore. The Lucky Thought, operated by the Consolidated Mining and Smelting Company under option of purchase, has shipped 85 tons lately. The Rambler-Cariboo's total this year is only 114 tons. The Surprise total is 1,142 tons. Small shippers include the Best, Freddie Lee, No. 1, and Richmond-Eureka. Shipments from Slocan City division have been very light. All the quantities just given are of ore received at Trail from the beginning of the year to March 21, inclusive. The Standard Silver-Lead Mining Co., operating near Silverton, Slocan Lake, is stated to have been lately shipping about 1,000 tons of zinc concentrate monthly to smelting works in the United States. The Galena Farm also near Silverton, is expected to shortly resume shipment of both silver-lead and zinc concentrates, operations having been resumed last month after suspension during the winter. There is ore in quantity at several other mines, but this is being held awaiting improvement in marketing conditions.

**Nelson.**—Five properties in Nelson mining division are on the Trail list of shippers for this year. The Molly Gibson, at the head of Kokanee Creek, in the north-eastern part of the division, one of the Consolidated Co.'s mines, has shipped 251 tons of silver-lead ore; the Emerald, near Salmo, 199 tons of lead ore; the Beasley-Monarch, about nine miles west of Nelson, 84 tons of copper ore. Small lots of ore have been received also from two or three properties in the southern part of the division.

**Rossland.**—Out of a total of 88,694 tons of ore received at Trail since the end of 1917, 51,636 tons was from mines in Rossland camp in the following proportions: Le Roi, 23,560 tons; Centre Star group, 22,333 tons; Le Roi No. 2 Co.'s Josie group, 4,607 tons; and White Bear, 1,136 tons. The Josie is the only one of the producing mines in Rossland camp not owned by Consolidated Company. The Le Roi No. 2, Ltd., also shipped ore to other smelting works for a while.

#### GENERAL NOTES.

Last month it was stated in Vancouver that a shipment of some 200 tons of gold and silver ore from Mexico to Ladysmith, Vancouver Island, was reshipped

south, owing to there not being any smelting works operating in the lower coast district of British Columbia at the time. The ore was brought to British Columbia owing to the shippers not being aware that the Ladysmith Smelting Corporation had suspended smelting following exhaustion of the then available supply of ore for its works. The Mexican ore was taken from Ladysmith to Vancouver, where arrangements were undertaken to reship it to San Francisco.

#### Hedley Reincorporated as a B.C. Company.

Announcement was made in Victoria last month to the effect that the Hedley Gold Mining Company, incorporated under the laws of the State of Delaware, is to be re-incorporated as a British Columbia company, with registered office in Victoria. This action followed a decision of the directors which was put into effect during a recent visit to Victoria of Mr. I. L. Merrill, of Los Angeles, California, president, and Mr. G. P. Jones, of Hedley, Similkameen district of British Columbia, general superintendent for the company. The Hedley Gold Mining Company has been operating for a number of years the Nickel Plate group of gold mines and a 40-stamp mill in Camp Hedley. The value of the company's output has averaged nearly \$800,000 a year, and dividends have been paid at the rate of 25 per cent. per annum for most years and 30 per cent. during two or three years.

#### Gold Mining on Princess Royal Island.

The following information relative to the gold mine on Princess Royal Island, which has been considerably developed in recent years by the Belmont-Canadian Mines, Ltd., understood to be an offshoot of the Tonopah-Belmont company operating in Nevada, was made public in Victoria last month: "The company has been developing this property with conspicuous success for some time past. Last month the net profit was \$30,000. The value of the production this month is expected to be between \$90,000 and \$100,000, with a net profit of about \$40,000. Lately a new tube mill has been installed, by means of which the quantity of ore milled will be increased. Mining and milling costs are \$5.30 a ton and the recovery is about 92.5 per cent or \$10 a ton. Extraction will be increased 1.5 per cent." In his last-published official report the district inspector of mines stated that "the mine proper is situated seven miles inland from the head of Surf Inlet, at an altitude of 1,000 ft. So far three distinct ore-lenses have been opened and developed to a depth of 1,000 ft. vertically from the outcrop, and more than 13,000 ft. of drifting done . . . The hydro-electric station is being built near tidewater; the structure will be composed of concrete throughout, and the plant will be capable of generating 1,500 horse-power, with a water-head of slightly more than 50 ft. A mill and concentrator with a capacity of from 250 to 500 tons is being installed at the mine; also, machine-shops, power-house, etc., which will be operated entirely by electricity transmitted from the hydro station at tidewater. Considerable clearing has been done at the mine, and a townsite laid out on which the company will erect up-to-date cottages for its employees, also stores, recreation rooms, etc. When in full operation this mine will give employment to 300 men." Since that report was made, additional development has been carried out underground, the mill and concentrator completed and operated, and shipment of mill product to smelting works in the United States is now being made. The brief comment included in the official "Preliminary Review" published in Victoria early in the current year was as follows: "The

first production from the Surf Inlet mine since its acquisition by the present owning company is interesting, and important, a considerable output being expected, the result of four months' operation. The property is equipped with a 250-ton mill which commenced milling in August. A considerable gold production in the future from this property seems assured."

The Emma mine, in Boundary district, owned and operated by the Consolidated Mining and Smelting Company, continues to ship copper ore to Trail. Its total for the current year, as at March 21, was 8,216 tons. The Iron Mask, in Kamloops mining division has made an output of 643 tons.

#### COAST COPPER CO., VANCOUVER ISLAND, B.C.

The Trail News, published in Trail, B.C., last month printed the following account of a recent deal in connection with the only copper-mining property on Vancouver Island, British Columbia, on which a large amount of development work has been done in quite recent years:

A mining transaction of great interest to Vancouver Island has just been consummated by the taking over of a seventh interest in the holdings of the Coast Copper Company in Quatsino mining division, by Mr. George E. Snyder, of Spokane, Wash. The consideration is understood to be about \$150,000, the shares having been transferred from Messrs. M. W. Bacon and W. E. Cullen, who are still interested in the company. The controlling interest is held by the Consolidated Mining and Smelting Company of Canada. The Coast Copper Company was organized last August.

Mr. Snyder closed the deal, which has been pending for several weeks, after conferring with Mr. J. J. Warren, managing director, and Mr. W. M. Archibald, manager of mines for the Consolidated Company, in Trail, on March 8 and 9. Speaking of the Quatsino property, in which he has great faith, Mr. Snyder said:

"I was assured by Mr. Archibald that development of the Coast Copper Co.'s property had reached a point which justified construction of a railway. He also told me a survey for the railway had been completed from Quatsino Sound to the property and that the holdings of the company had been enlarged recently.

#### Railway and Smelter Projected.

"Development has proceeded steadily. Mr. Archibald said the result obtained on the lower level strengthened the belief that the property would become a large and profitable producer.

"To finance the development and equipment a bond issue of \$750,000 was authorized. This sum was ample, it was calculated, to complete development, build a 12-mile railway and erect smelting works to have an

initial capacity of at least 500 tons a day. The entire bond issue was underwritten by the Consolidated Company. Only a little more than \$100,000 worth of these bonds have been issued. Approximately \$350,000 has been spent on the development and equipment.

#### 2,940,000 Tons in Sight.

"In a report dated March 1, Mr. Bacon estimates to me that the ore in sight above the 700-foot level is 2,940,000 tons, containing more than 2 per cent. copper and \$1.25 a ton in gold and silver. As the ore has a magnetite base and is consequently self-fluxing, Mr. Bacon estimates the net profit, as soon as the property shall be adequately equipped, at \$2.60 a ton. This is on a basis of 18 cents a pound for copper. These figures show an estimated net ore reserve of \$7,644,000 above the 700-foot level on March 1, or a trifle more than \$38 a share.

"Mr. Bacon says development has been confined to the main vein and proceeded on only half its length within the property. He says there has been no diminution of ore bodies or value with increased depth, so there is basis for an expectation of an ultimate return much in excess of the foregoing estimate."

#### STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange, April 9, 1918:

Gold.		Bid.	Asked.
Apex	.04½	.04½	.04½
Boston Creek	.12	..	..
Dome Extension	.10	.11	.11
Dome Lake	..	.22	.22
Dome Mines	8.40	8.50	8.50
Imperial	.01	.01½	.01½
Melntyre	1.34	1.35	1.35
Hollinger	5.10	5.15	5.15
New Ray	.19½	.20	.20
Porcupine Crown	.14	.15	.15
Vipond	.18	.21	.21
Preston East Dome	.03	.03½	.03½
Teck-Hughes	.51	.55	.55
West Dome	.13¼	.14	.14
Silver.		Bid.	Asked.
Adanac	.08	.10	.10
Bailey	.03	.04½	.04½
Beaver	.27	.27½	.27½
Ferland	.09½	.12	.12
Coniagas	3.10	3.20	3.20
Crown Reserve	.18	.21	.21
Gifford	.02¼	.02¾	.02¾
Great Northern	.03	.04	.04
Hargraves	.07	.07¾	.07¾

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