Subscription, $5.00 per year. January 8th, 1919 Single Copies, 15 cents.

CANADIAN MINING JOURNAL

VOL. XL TORONTO No. 1

Another Shaft Record for Rotators

THE SENECA SHAFT, at Mohawk, Michigan, near Calumet, claims a new record for fast sinking. During May, June, July, August and September 994 feet of four-compartment shaft was sunk. The shaft is 11 ft. 4 in. x 21 ft. 4 in. in size, and will meet the Kearsarge amygdaloid when completed. On Sept. 30, it was 1312 ft. deep.

The record progress by months was as follows:---

May,	208 ft. (27 working days)	June,	195 ft. (26 working days)
July,	202 ft. (25 " ")	August,	205 ft. (27 " ")
		Sept.	184 ft. (24 " ")

Sullivan Air Tube Rotators

performed practically all the drilling. Ten drills were used, putting in 45 holes, averaging eight feet deep per round, in from 3 to 5 hours' drilling time. Three shifts were worked per day.

Air for the rotators is furnished by two Sullivan Air Compressors. A full description of the Seneca shaft appeared in the November Mine and Quarry. Ask for your copy.

The Seneca is only one of a dozen or more big Lake Superior shafts, sunk within the past two years, in which Sullivan Rotators have done commendable work.

FOR RAPID SINKING USE ROTATORS

Bulletin 670-F

SULLIVAN MACHINERY COMPANY

122 So. Michigan Ave., Chicago :: 39 Colborne St., Toronto

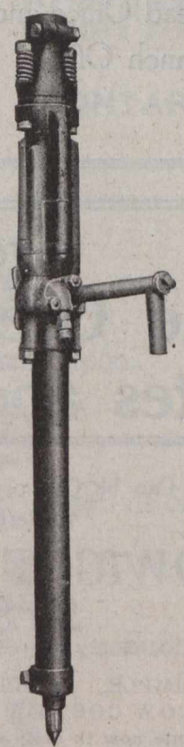
THE CIRCO PAGE

Illustrating Compressed Air Machinery, Tools and Appliances

A Letter About the Satisfactory Stoper

Dear Sir,

You will like the construction of the CC-21 Stoper. It is an all-steel drill, made up largely of drop forgings. The cylinder is a deep forging, and no bushings are used. One throttle controls the entire operation of the drill, it is arranged so that the drill can be operated under light pressure when starting the hole. The air feed is rugged and substantial; and it is carefully balanced so that the drill rotates easily.



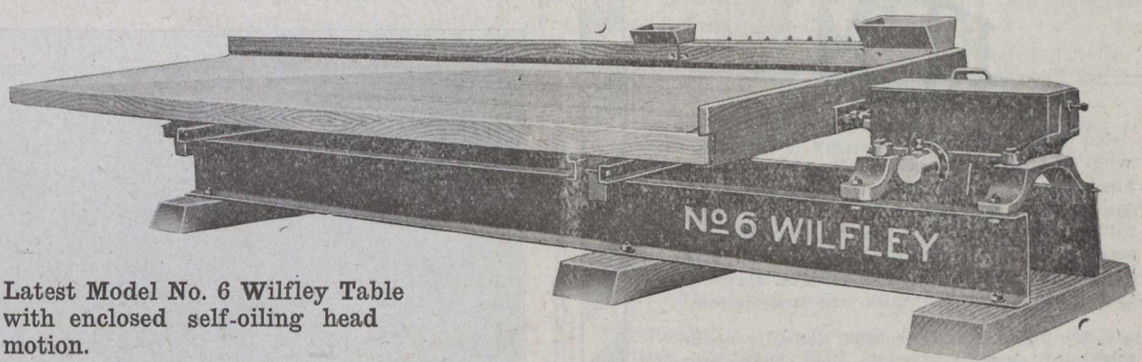
Yours very truly,

Canadian Ingersoll Rand Company, Limited

Sydney Sherbrooke Montreal Toronto Cobalt
Winnipeg Nelson Vancouver

535 WILFLEY TABLES

AT THE NEVADA CONSOLIDATED COPPER COMPANY



Latest Model No. 6 Wilfley Table with enclosed self-oiling head motion.

Wilfley Tables were used at this plant for many years, and when 84 additional double-deck tables were required for increasing capacity—there was but one choice—***Wilfley Tables.***

During the past 20 years more than 22,000 ***Wilfley Tables*** have been built, and more of them are being purchased today than ever before.

The universal popularity of ***Wilfley Tables*** is due to the following reasons;

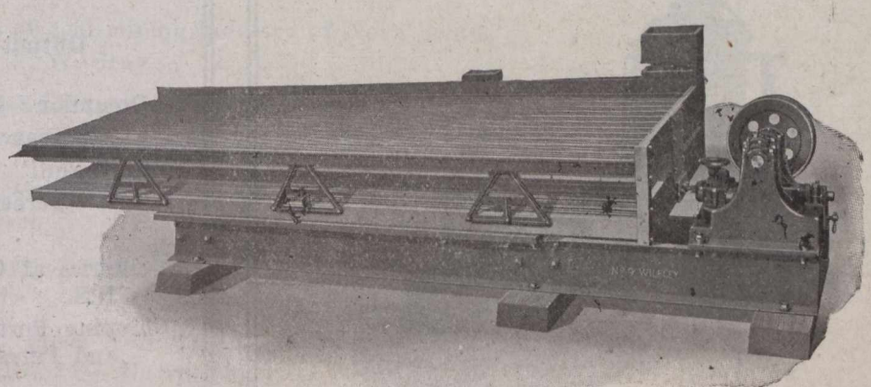
Highest efficiency in metallurgical extraction—

Great capacity—Mechanical perfection—

Extreme simplicity of construction.

The ***Wilfley*** will recover the biggest percentage of values from your ores, and do it at the lowest cost.

Write us about your concentrating problems--- our engineers will gladly cooperate in studying your requirements.



No. 9 Double-Deck Wilfley—Two Tables in the Floor Space for One.

We also manufacture the Pierce Gold Separator and Amalgamator for placer mines and dredges mills and cyanide work. Write for Bulletins.

THE MINE AND SMELTER SUPPLY COMPANY

A SERVICE STATION WITHIN REACH OF YOU

DENVER **SALT LAKE CITY** **EL PASO**

New York Office: 42 Broadway.

Canadian Mining Journal

A Weekly Journal devoted to the Science and Practice of the Mining, Metallurgical and Allied Industries, with an Up-to-date Review of Conditions maintaining therein.

Published every Wednesday by The Mines Publishing Co., Limited, at the Garden City Press, Ste. Anne de Bellevue, Que. 'Phone 165.

J. J. Harpell, President and Managing Director,

A. S. Christie, Eastern Manager,
Room B-30, Board of Trade Building, Montreal.
'Phone Main 2662.

H. W. Thompson, Western Manager,
Toronto Office, 412 C. P. R. Building,
'Phone Adelaide 3310.

Changes in advertisements should be in the Publishers' hands ten days before the date of issue.

REGINALD E. HORE, B.A., Editor,
263-5 Adelaide St. West, Toronto.

The editor cordially invites readers to submit articles of practical interest which, on publication, will be paid for.

Subscription to any address in Canada, United States and British Empire, $5.00 yearly. Other Countries Postage Extra. Single copies, 15 cents.

VOL. XL. **TORONTO, JANUARY 8th, 1919** **No. 1**

TABLE OF CONTENTS

Editorials:
- Canadian Mining Institute ... 1
- Manitoba Branch C. M. I. ... 1
- Does leasehold system keep capital out of Manitoba? ... 1
- Salt in Nova Scotia ... 2
- A monopoly to shell company? ... 2
- Freehold or leasehold? ... 3
- The metal markets ... 3

Problems of coal mining industry of Nova Scotia, by F. W. Gray ... 4

Personal and general ... 5

Meeting of Manitoba Branch of C. M. I. ... 5

Interior corrosion of wire ropes, by W. F. Robertson ... 6

A discovery of rock salt in Nova Scotia, by L. H. Cole ... 8

German methods of destruction in mining districts of France—Abstract by T. C. Denis ... 10

Special correspondence ... 11

Dividends paid by mining companies operating in Norther Ontario ... 15

EDITORIAL

CANADIAN MINING INSTITUTE.

The 21st annual meeting of the Canadian Mining Institute will be held in Montreal on March 5th, 6th and 7th, 1919. Arrangements are being made to make the occasion a memorable one. Members will have an opportunity to celebrate fittingly the successful conclusion of the war. It is hoped that many soldier members will be back home in time for the meeting.

MANITOBA BRANCH C. M. I.

A meeting of the Manitoba branch of the Canadian Mining Institute was held in Winnipeg on December 17. Dr. R. C. Wallace, Commissioner of Northern Manitoba was in the chair. There was a dinner, followed by a business meeting and a talk on the resources of Northern Manitoba, by J. A. Campbell, former Commissioner. There was a good representation from The Pas, including H. C. Carlisle, manager of the Mandy mine, and R. Neal, manager of the Rex mine.

DOES LEASEHOLD SYSTEM KEEP CAPITAL OUT OF MANITOBA?

By an Order-in-Council passed in 1917, the Dominion Government adopted the policy of granting leases in place of title to all minerals naturally occurring in quartz. The effect of this Order-in-Council has been well pointed out by Dr. R. C. Wallace, Mining Commissioner of Northern Manitoba. Dr. Wallace writes in part:

"Manitoba is more directly concerned in this change in policy than any other territory to which the federal laws are applicable. In Saskatchewan and Alberta the mining of gold and copper is as yet negligible. In the Yukon territory placer mining—to which other laws apply—is still the most important industry. In Manitoba, however, the future of the mining industry will rest with the success with which quartz claims—for copper, gold, tungsten, and other precious minerals—will be operated. It is consequently of fundamental importance that the legislative control should be of such a nature that the industry in its infant stage should be encouraged and stimulated, and that a fair field should be safeguarded for the employment of capital from outside sources. The United States of America will undoubtedly supply the greater part of the capital on which Manitoba must depend for the development of her resources for many years to come. Under the Federal laws of the United States, as we have seen, the investor in mineral properties may obtain a title, and thus feel himself secure from interference in the development of his domain. It may be, of course, that this situation will not obtain for many years longer. In 1907, a special commissioner was appointed by Congress to investigate the actual working out of the leasehold system of mineral tenure, as practised throughout Australia and New Zealand. His report was an unqualified endorsation of the leasing system. Mining engineers, promoters and capitalists in Australia and New Zealand were practically unanimously of the opinion that their system of government leasehold of minerals, involving bona-fide development, was a practical success. Their verdict was all the more striking in view of the fact that in all the earlier days of mining in Australia the policy of alienation of mineral lands was in vogue; and even to-day in New Zealand the operator has the option of purchase, an option which is very seldom exercised. In view of this report, and official opinion quoted elsewhere, there is at least some foundation for the belief that the Federal laws dealing with natural resources may yet be modified. As the situation now is, however, the American capitalist who is looking for favorable fields for investment abroad is accustomed to the freehold system at home. He finds that in the already established mineral territories of Ontario to the east, and British Columbia to the west, he may obtain possession outright of the properties in which he may desire to invest his capital; while in Manitoba, a field which has undoubtedly great promise, but where the industry has not yet reached a sound footing, he can secure only a long term lease. There is a very strong feeling among practically all classes of mining men throughout the Province that, as the situation stands, it is more difficult to attract capital into mining investments than it would be were it possible to offer the security of freehold tenure. The development of a sound mining industry in the Province is of vital importance for the industrial life of the City of Winnipeg, and for the commercial future of a community which can only in part be dependent on agricultural expansion and all who are concerned that the foundations of our economic structure be truly laid, will be well advised to give thought to the conditions which this growing industry has to face.

"We may perhaps legitimately assume that the force of democratic feeling is behind the system of leasehold tenure, whereby a certain measure of control is retained by the people at large. The logical conse-

quences of adoption of a leasing system are not so generally realized. If the people retain the ownership, they must also assume the obligation that development will be assisted by all means in their power. If we rent a house, we expect that the owner will see to it that the business of living in the house is made not merely tolerable, but reasonably pleasant. On a similar basis, the Dominion Government, by adopting a leasehold in place of a freehold system for minerals naturally occurring in quartz, has thereby tacitly assumed the responsibility of assisting mineral development to a much greater extent than heretofore; and if a similar system were to be adopted by the Western Provinces when their resources are handed over, the argument would apply with still greater force. The success which has marked the progress of the mineral industry in Australia and New Zealand under the leasehold system has been in large measure due to the fact that the various Governments have shown the greatest enterprise in providing transportation facilities into new camps, in erecting Government smelters and stamp batteries, and in assisting prospecting. In Manitoba the success of the mining industry rests first and foremost with the prospector. Nothing that will hamper his activities should be permitted to stand. Apart from the question of the system of tenure, the Dominion laws are particularly favorable to him, in comparison with certain laws that obtain in the Provinces. He would be compelled to admit that the erstwhile freehold system promoted a species of real estate gambling in mining prospects, which was not in the interests of the development of a sound mining industry. If, however, he does not receive specific assurance that under the leasehold system the Government will always stand ready to assist—within its own sphere of action—in developing all prospects that show good promise of success, he is justified in view of existing conditions in petitioning for a repeal of the leasing clause."

The experience of a year under the leasehold system has evidently convinced mining men in Manitoba that the Dominion Government does not take proper care of its tenants. They wish, therefore, to purchase title to the mining lands on which they spend money and labor.

SALT IN NOVA SCOTIA.

In a recent number we published a short item from one of our Nova Scotia correspondents, announcing that salt had been discovered near Malagash, Cumberland Co., Nova Scotia. We are fortunately able in this number to give some account of the history of this important discovery. Mr. L. H. Cole, of the Mines Branch, who has written the article, has devoted considerable attention to the salt mining industry. He is the author of the report on salt deposits and the salt industry of Canada, which was published by the Mines Branch in 1915.

There is something peculiarly appropriate in this discovery of salt in Nova Scotia. At present no salt is being produced in the Maritime Provinces, and the fishing industry has to depend on imports from across the Atlantic. We have good salt in Ontario, but the freight rate to the Atlantic is prohibitive. A large tonnage of salt is used in the fishing industry, and it now seems likely that Nova Scotia will produce it.

Another interesting feature of the discovery is the evidence of close co-operation between the prospectors and the Mines Branch. Mr. Cole is to be congratulated on the practical assistance he has given.

While Ontario produces must salt, there is no actual mining of rock salt in Canada. The salt in Ontario is obtained by pumping brines, natural or artificially made from rock salt at depth. The Nova Scotia salt beds are, however, near the surface. Rock salt mining may soon be added to our industries,

A MONOPOLY TO SHELL COMPANY?

According to a despatch from Ottawa, the Government has under consideration a proposal to give to the Shell Transport & Trading Company, Limited, a concession to enter upon and develop all the oil-bearing lands in the Province of Alberta, north of the Athabasca River. The concession is to be in the nature of a monopoly for five years, except that the rights of leaseholders and prospectors already there are to be respected. In return the company is to pipe the oil to Vancouver or to the head of the lakes, and after receiving six per cent. on its investment is to divide the remaining profits equally with the Government.

There will be considerable difference of opinion in this matter. It is generally recognized that Canada and the British Empire produce a lamentably small proportion of the oil consumed. There will therefore be much gratification if a great effort is made to speed up exploration for oil in Western Canada. On the other hand it is inadvisable that any company be given a monopoly. If the company is not willing to take the same chances as others who explore new areas in Canada it will find few friends in this country. We believe that every assistance reasonably possible should be given to exploration companies; but we would not like to see such assistance take the form of special privileges to certain companies.

The proposal as unofficially outlined in the news from Ottawa is one that should receive attention from the orginazation which represents the mining industry, namely the Canadian Mining Institute. If the Shell Company is willing to spend a large sum of money in exploring lands that are now unproductive, it would be folly to ask the Government to turn down the proposal without giving it serious consideration. Possibly a way might be found to meet the wishes of the company without making a foolish bargain.

FREEHOLD OR LEASEHOLD?

At a recent meeting of the Manitoba branch of the Canadian Mining Institute there was an important discussion on the relative merits of the freehold and leasehold system of tenure of mining lands. The opinion of the meeting was that the development of Manitoba's mineral resources would be accomplished much more rapidly if the freehold system were adopted.

Some months ago the law governing tenure of mining lands was discussed at a convention in Port Arthur, and the result of the discussion was similar to that at Winnipeg—a resolution in favor of the freehold system being passed.

Some years ago the Canadian Mining Institute, in framing proposals for a Dominion mining law, favored the leasing system. There is evidently no unanimity in opinion on this point, however, and it would be well to have the matter reconsidered.

Manitoba's mineral lands are administered by the Dominion Government. The men who are showing most interest in developing Manitoba's mineral resources evidently do not like the leasehold system. What do those in other Provinces think about it? We would be pleased to have our readers submit their ideas for publication. Free expression of opinion should help the officers of the Canadian Mining Institute to decide whether the policy adopted some years ago is in the best interests of the industry.

THE METAL MARKETS.

The signing of the Armistice was immediately followed by a great change in conditions in the metal business. One of the first actions of most munitions makers was to cut down purchases of metals. This loss of the munitions market has since been followed by a flood of unused or partly worked metal that has been turned back on the market. Naturally there has been a slump in buying orders, and some fall in prices. While the stocks accumulated for munition manufacture remain on the market, no stability in prices need be expected. Quotations for the present are mostly nominal.

It is not to be expected that metals will fall to prewar prices again, or that the cost of production will soon be as low as it was. On the other hand, it may be anticipated that when price restrictions are removed and an open market again established, it will be shown that present prices are no longer warranted by the demand.

The removal of the price restrictions will be welcomed by most producers. There is little satisfaction in high quoted prices if buyers do not appear.

EDITORIAL NOTES.

A Commissioner for Ontario is to be appointed to succeed the late Mr. Reid. Why should we not have in London someone familiar with Canada's mining industry and the opportunities for development? A Commissioner who could give information that would lead to greater interest in England in our mining industry would be in a positon to render good service to the Province.

Now that Manitoba has begun to figure more largely as a producer of minerals, the administration of the mining lands becomes a very important matter. At present Manitoba's mining lands are administered by the Department of the Interior, Ottawa. Would not greater interest be taken in developing the resources of Manitoba if the Province had control of its mineral resources?

One of the ways in which Governments can assist in the development of our mineral resources is that of preparing maps and reports that will be used by prospectors. During the past summer the Ontario Bureau of Mines has had men in the field mapping an undeveloped area near Lake Abitibi. When prospectors go into this area next summer they will be able to take with them geological maps and reports that will enable them to spend their time to the best advantage.

If the Canadian Mining Institute were merely a scientific society, how many members would have gathered at Winnipeg on Dec. 19th to discuss matters of vital importance to the mining industry of that Province?

The Telkwa Collieries, situated on the line of the Grand Trunk Pacific Ry. Co., northern British Columbia, are finding some difficulty in keeping coal moving from the mine to provide the domestic needs of Prince Rupert city and the adjacent district. Mr. Jabe Ashman, the Superintendent, asserts that there is plenty of coal in the bunkers, but, because of bad roads and for other reasons, there has been delay in arranging for its transportation.

That the British Columbia collieries are exporting coal before fully providing for the domestic needs of the Province is a charge made by the civic authorities of New Westminster, B. C. In a recent discussion of the fuel situation in that city it was stated that the dealers did not have their normal supply of coal and, if exceptional conditions arose, a serious shortage might develop. It was decided that Mr. Nichol Thompson, Fuel Controller, be requested to see that all home demands were filled before the collieries were permitted to fill export orders. Incidentally the action of Mr. Thompson in allowing the dealers to raise their price to the consumer 65 cents a ton following an advance in miner's wages of 75 cents a day was criticized, it being pointed out that the per capita rate of coal production at the mine was 5½ tons a day. One of the aldermen, taking the viewpoint of the dealers, sarcastically observed that "it pays to increase wages."

Problems of Coal Mining Industry of Nova Scotia

Consolidation of Operating Companies is Advisable.

By F. W. GRAY.

As the year draws to a close the declining tendency of coal production is still in evidence, and indications are that the output of 1918 from the Nova Scotian coal mines will be less than the output of 1917 by between 400,000 and 500,000 tons. The reduction from the basis of 1913 has now reached 31 per cent, and no recovery is in sight.

The end of the war has turned men's thoughts to the readjustment which must take place in the change from production for war purposes and production for normal peace time consumption. So far, however, as the coal mines of Nova Scotia are concerned, there need not for a long time to come be any occasion for worry as to disposal of the product. The output of the Nova Scotian collieries in 1913 was 7,250,000 tons. In 1918 it will scarcely exceed 5,000,000 tons. These figures are sufficient in themselves to tell the tale, because in 1913, although from various causes connected with the development of the collieries themselves some recession in production was to be anticipated, no one anticipated that the peak of Nova Scotian coal production had been reached, or that the consumption of coal in Canada was a decreasing factor. It is to be presumed that the Nova Scotian operators intend to re-enter the Montreal market so soon as the rate of production and the availability of means of transportation will permit, and this market alone used to absorb 2,000,000 tons of Nova Scotia coal per year.

As the writer explained in detail in a recent article in the Canadian Mining Journal, there is some reason to expect a tendency among the non-British European nationalities now employed at the collieries to move away, and, as demobilization will necessarily be a protracted process, there is little reason to expect any large number of men to return to the collieries from the army service. It would seem advisable for the authorities in considering the problems of reconstruction to take steps to check any wholesale movement of foreign labor from the collieries, and at the same time to give preference in repatriation to skilled coal miners.

It is intimated that the Amalgamated Mine Workers of Nova Scotia intend at their Convention in Sydney shortly to join the United Mine Workers of America, and to formulate fresh demands for an increase in wages, and for working conditions based on the Pennsylvania schedules. It is not to be hoped that wise counsels will prevail and prevent the occurrence of any crisis at the year end, as it will be remembered that this particular controversy brought about the disastrous strikes of the years 1908 to 1910 in Nova Scotia.

The mine workers state they wish to receive wages equal to any other coal district in North America, but it is quite evident they cannot receive wages that will render mining an unprofitable business. The advances granted in miners' wages in Nova Scotia since 1916 run from 75 per cent to 100 per cent, and this fact, combined with the increase in the costs of materials, and the decrease in the proportion of productive workers compared with the auxiliary workers at the mines, has made the cost of mining high beyond experience or belief. As a matter of fact, if it were not that the larger companies combine the manufacture of steel with their coal-mining operations it would before this have been necessary to abandon the extraction of coal, as the selling price is lower than the cost of production. If the miners do not take these facts into consideration in formulating their demands at the end of this year, it is quite certain that they must be resisted by the coal operators.

The only possibility of reducing the cost of mining coal to reasonable figures that presents itself at this time is a restoration of the balance between producers and non-producers. This can be achieved in two ways, first, by the return of the skilled miners, or secondly, by concentrating the miners in fewer collieries, which will require the closing down of a number of the most expensive collieries, and the discharge from employment of a large number of non-productive laborers. The last-named procedure would without doubt result in larger outputs at lower costs per ton. The operators have been deterred from following this course during the war for obvious reasons, but so soon as the ordinary laws of supply and demand commence to operate, the figures on the balance sheets of the coal companies will leave them no alternative, because it is quite evident that no operator can mine coal and sell it for less than it is costing him, except for a very limited period.

There is scarcely any factor that will so speedily lead to a reduction in the cost of manufacturing and transportation, and therefore to a reduction in the cost of living, as a plentiful supply of cheap coal. A scarcity of coal, accompanied by high prices, must necessarily restrict all industry and transportation, and must bring about high prices everywhere. Coal is such a basic commodity that a disorganization of the labor occupied in coal mining exerts a much greater influence on the community at large than might at first sight be thought could be occasioned by the comparatively small number of men employed in the coal mining industry. A restoration of normal working forces at the collieries is therefore a desideratum of first class importance from the viewpoint of the whole country, and it is a matter that should receive the earnest consideration of the authorities.

It has taken the whole course of the war to educate the public and the authorities to the essential nature of coal in war operations, and it is to be hoped that now peace is here the equally essential nature of coal supply in relation to the problems of reconstruction will not be lost sight of.

There is another feature to this matter. The war must be paid for, and increased home production is one of the ways in which the money can be found. It surely is not to the advantage of Canada to have the coal output of Nova Scotia continuing at an annual reduction of 2½ millions of tons. As the writer has previously pointed out, the decrease must be filled from the outside, and it helps to pile up an adverse trade balance against Canada, altogether unnecessarily.

Further, a large part of the coal production of Nova Scotia is today coming from small collieries commenced during the war. These enterprises are, in the writer's opinion, ephermeral, and must disappear so soon as the

selling price of coal declines ever so slightly. The burden of production will once again fall upon the large and stable companies. The production of these small mines, insignificant when considered individually, amounts in the aggregate to a respectable total, and, because of the practical cessation of extensions and development work at the larger mines during the war period, the big companies will not for some time be able to work up their production to a maximum, or anything like a maximum.

What does all this lead to? Inevitably, the writer believes to consolidations of the existing coal companies. In a Bulletin prepared for the Mines Department three years ago the writer expressed the opinion that "the chief hope of settled prosperity in the Nova Scotian coal trade lies in the further development of strong corporations with adequate financial reserves." The writer further remarked: "Whatever financial stability attaches to the coal companies of Nova Scotia is a testamentary benefit conferred by the General Mining Association; a monopoly that, with all its faults, yet rendered it possible to conceive mining operations on a comprehensive basis, eliminated suicidal competition in selling prices; and enabled mine workings to be laid out with the maximum of economy, with due regard to the conservation of the vast coal reserves which sporadic individual operations have tended to endanger by unco-ordinated effort."

These remarks are more pertinent today than when they were written.

PERSONAL.

Dr. W. G. Miller, Provincial Geologist of Ontario, has returned to Toronto after being in England for several months as Canada's representative on the Committee on Mineral Resources of the Empire.

Capt. W. M. Goodwin has returned to Canada, bringing with him a young lady from Scotland.

Nova Scotia members of the Canadian Mining Institute have nominated Mr. D. H. McDougall for the presidency of the Canadian Mining Institute. Members in the Porcupine gold district have nominated Mr. J. B. Tyrrell.

Mr. B. E. Neilly, of Cobalt, has been nominated for re-election as a vice-president of the Canadian Mining Institute. Among the nominations for council are: Mr. E. T. Corkill of Copper Cliff, Mr. Geo. Gillespie of Madock, Mr. Robt. Bryce and Mr. J. P. MacGregor of Toronto.

Prof. J. S. DeLury, of the University of Manitoba, is in Toronto for the holiday Prof. Debury is secretary of the Manitoba branch of the Canadian Mining Institute.

Mr. J. W. Powell, Mine Manager at Cassidy's Colliery, Granby Consolidated Mining & Smelting Company, has resigned and has been succeeded by Mr. James Hargreaves.

Mr. Hugh Sloan, Shift-Boss at Cassidy's Colliery, Granby Consolidated Mining & Smelting Co., died recently from pneumonia following an attack of Spanish influenza.

Mr. J. A. McRae, editor of the Mining Review, Cobalt, and a regular contributor to the Canadian Mining Journal, is just recovering from a severe attack of Spanish influenza.

Mr. D. C. McArthur, who played an important part in the development of the gypsum industry in Manitoba was present at the meeting of the Manitoba Branch of the Canadian Mining Institute in Winnipeg, Dec. 18th.

MANITOBA MINING MEN WANT FREE-HOLD SYSTEM.

The Manitoba Branch of the Canadian Mining Institute held its first meeting of the winter in the St. Charles Hotel, Winnipeg, on the evening of December 19th. After an informal dinner and an interesting business meeting, the members and a number of guests listened to an interesting speech from J. A. Campbell, M.P., former Commissioner for Northern Manitoba, on "The Resources of Northern Manitoba." The talk was chiefly concerned with mineral resources, and the audience were plainly in accord with Mr. Campbell in his plea for provincial control of natural resources.

During the business meeting a resolution was presented by H. N. Baker, asking for a change from the leasehold system to the free-hold system, as applied to Quartz Mining Claims on Dominion Lands in the Province of Manitoba. On motion of T. B. A. Price, seconded by F. de Sieyes, after an interesting discussion, the meeting decided that the resolution be presented to the Canadian Mining Institute.

If the success and enthusiasm of a first meeting be taken as a gauge of the future activities of an organization, it can be safely predicted that the Manitoba Branch will have an important future, and will play an important part in the mineral development which we all know is coming in this misnamed "Prairie Province."

Among the guests present were: G. W. Allan, M.P.; R. L. Richardson, M.P.; Wm. Andrews, M.P.; and Hon. Edward Brown, of Winnipeg; Ferris Bolton, of Lisgar, and H. C. Carlisle, manager of the Mandy Mine on Schist Lake. Members from the districts of Rice Lake, Falcon Lake, Flin Flon and Herb Lake made the meeting representative of the whole Province. Among the members present from The Pas country were R. C. Wallace, President of the Local Branch; Walter Neal, manager of the Rex Gold Mine on Herb Lake, Bancroft; of the Mandy Mining Co., and Gordon, of Herb Lake. The Rice Lake District was represented by such old-timers as Hugh Smith, B. S. MacKenzie, Capt. Pelletier, and E. W. Jackson. From the Falcon Lake District came Capt. G. B. Hall, Frank Thoms, W. G. Chase (chief engineer of the Greater Winnipeg Water District), and L. Hicks. H. M. Paull, who with associates has recently made an important strike in the Knee Lake District, was also present.

Now that the influenza ban has been lifted in Manitoba, it is the intention of the Winnipeg Branch to continue their original program for monthly meetings throughout the winter.

RICH MOLYBDENITE ORE FROM TAYLOR MINE.

Returns just received by Mr. A. M. Taylor, who operates the Taylor molybdenite mine in Renfrew Co., Ont., show that the last car shipped averaged 5.3 per cent molybdenite. This car of ore was shipped some months ago to the Mines Branch laboratory at Ottawa. The ore was concentrated to 86.87 per cent MoS_2, the 68,644 lb. of ore yielding 3,852 lb. concentrates containing 3347.1 lb. MoS_2. The recovery was 92 per cent.

A car of molybdenite was shipped from the Hazelton View mine during the past winter and two tunnels are being driven, this development to continue during the next few months. The property is situated near Hazelton, B. C.

Interior Corrosion of Wire Ropes

Wm. Fleet Robertson's Report on Tests.

The inquest into the death of sixteen miners, which took place on the 10th of last September when the cable snapped in Protection Shaft, Canadian Western Fuel Company, still continues. The inquiry would have been completed had it not been for the delay entailed in sending Mr. Wm. Fleet Robertson, Provincial Mineralogist, to Montreal to make an exhaustive technical examination of the rope that broke and the postponement necessary because of the prevalence until recently of the influenza plague in Nanaimo city.

At the last sitting of the Coroner's Jury, which took place on the 16th of December, Mr. Robertson presented a report of the work he undertook at the laboratories of McGill University. He gave evidence which is of considerable general interest and of special importance to all identified, directly or indirectly, with the operation of mines in which wire ropes are in use. It is not improbable that, as a result, provision will be made for a more rigid inspection of such cables.

Dealing with the cause of the accident, as disclosed by technical researches, Mr. Robertson outlines his conclusions as follows:

"The failure of the cable was, in my opinion, entirely due to the oxidizing of the wires, chiefly internally, caused by apparent lack of any internal lubrication, leaving the wires exposed to the action of a more than normally corrosive water and a humid atmosphere.

"The internal hemp core, which under a sufficiently effective lubrication system, would serve as a reservoir of oil to keep the wires oiled and protected from corrosion, not being supplied with oil, became a reservoir of moisture and so hastened the corrosion of the wires.

"It is a well-known fact that if rust gets started in a steel structure, such rust will continue despite any surface application of anything that may exclude the atmosphere.

"Hence only a thorough soaking of the hemp core with oil before it is installed and a frequent renewal of the oil supply would be necessary to ward off corrosion.

"The fact that the tests showed the cable to be more corroded in certain parts than in others, and these not in any regular procession, may be accounted for by local conditions in the shaft of which I have no knowledge.

"The section of the cable about 4 or 5 ft. from the fracture, broke under a load of a little over 13 tons, and it stands to reason that the rope at the fracture had a lesser strength.

"The weight of the empty cage is given by the company as 4,357 pounds; the rope, 179 feet, weighed about 540 pounds; sixteen men at, an average of say 170 pounds, weigh 2,720 pounds. This makes a known dead load of 7,617 pound, or approximately 4 tons."

Mr. Robertson gives it as his understanding that the rope broke at a point which, at the time, was passing over the sheave and proceeds to say that "when a cable of this description passes over a ten-foot sheave, it is by the bending subjected to an additional 9,360 pounds or say roughly, 5 tons. This, in addition to the dead load as above, would give a strain in cable, if travelling slowly, of approximately 9 tons. This approaches so near to the breaking strain shown in Test 5 (described hereinafter) that it is scarcely necessary to assume extraordinary rough handling by the hoistman to account for the break.

As an indication that this sort of interior corrosion is not confined to the case in hand Mr. Robertson produced "a piece of 1¼ inch cable from a Sudbury mine which was tested at McGill University in my presence. It broke at 58,600 pounds, whereas the new cable had a breaking strength of about 128,000 pounds. I think you will agree with me that this cable shows but little deterioration discernible externally, whereas in the broken end, also exhibited, the internal corrosion is excessive."

Before proceeding to give details of the interesting experiments carried out at Montreal under Mr. Robertson's supervision it should be explained that he was furnished at Nanaimo with all the faulty cable which, for convenience, is divided into three parts, viz.: Exhibit 13: That part which was constantly on the hoisting drum in the engine-room. Exhibit 11: That 100 feet including the upper end of the fracture and extending upward. Exhibit 12: That 100 feet including the lower end of the fracture and extending downward to the cage. He also had the spiral springs designed to bring the safety clutches into action; a jar of water collected as it fell in Protection Shaft; and a bottle of black oil of similar character to that used in lubricating the cable. His directions were to submit these "exhibits" to "the most critical physical, chemical, and microscopic tests practicable in Montreal" with a view, of course, to establishing definitely and beyond cavil the cause of the break.

The results of the tests to which the cable was subjected are described in detail as follows:

Tests on Nanaimo Mine Rope.

Test 1: This piece of cable (that taken from the drum) showed only very slight wear and only on the outer wires, possibly caused by pressure on the drum. The individual wires were bright and free from rust. The cable was practically as good as new, and had been lubricated, grease oozing out as the strain was applied. The test piece taken was very approximately 36 inches between the grips. The load was applied in successive increments of 10,000 lbs. each, the elongation of the specimen being taken for each increment. The elongation for each 5 ton increment was 4/100 inches up to 70,000 lb. increasing gradually until at 120,000 lb. the elongation for the last increment was 8/100 in.—the total elongation under this load being 59/100 inch. At almost 130,000 lb. the elastic limit of cable seemed to be reached and the cable broke under a load of 160,000 lb., after sustaining such load for a minute or so, when 3 strands broke simultaneously a few inches below the upper grip. The pull being continued, the other three strands broke near the lower grip. The breaking strength of cable was 160,000 lb., or 80 short tons. As a check and confirmation of this test a 24" piece of cable adjoining the test piece was unwound—the individual wires somewhat straightened—and 6 of the larger wires and 3 of the smaller wires from each strand were submitted to a tensile breaking strain. These wires showed remarkable similarity in strength.

"The wires of average diameter of 0.1255 inclusive had average strength of 2540 lb.

"The wires of average diameter of 0.085 inclusive had average strength of 1165 lb.

"The aggregate strength of all the wires comprising the cable, if pulled straight, would be 179,100 lb. The strength of the cable, therefore, was about 89.35 per cent of the strength of the aggregate of the wires,

a result considered as indicating a well built cable. The tensile strength of the steel in the wires would be equivalent to about 208,000 lb. to the sq. in. This result taken with the uniformity in strength of wires indicates an excellent quality of steel in the cable.

Test 2: Sections of cable immediately above the fracture. The test piece from this was cut starting about 5 ft. above the tapered end of fractured cable. The exterior showed a certain amount of wear on the outer wires, but this was not at all serious. No broken or torn wire ends were observed on the surface in the whole length of the piece. A serious amount of rust was observable on surface wires. In opening up the end of the test piece in preparing it for the grip the small interior wires were found to be badly rusted and eaten away, so much so that several of them were found to be completely eaten through. None of the larger (0.1255 in diam.) outer wires were eaten through; but they also were badly corroded, a rough estimate being that the steel in these wires had about half the sectional area of similar wires in Exhibit 13 (the good rope). The cable and the core showed no indications of having been lubricated; both were dry and dusty. This test piece (tested similarly to the former) showed very even elongation for each successive increment in 5 tons in load, up to 60,000 lb. about which point the elastic limit seemed to be reached. Under a load of 81,900 lb. four strands of the rope broke, the break extending 12 in. below the grip. In breaking clouds of dust were given off, the doors of the building having to be opened to clear the air, indicating the interior to be very dry, with no indications of having been oiled. The two remaining strands broke under load of 21,000 lb.

Test 3: This and the following two tests are of three separate pieces of the rope from the fracture down towards the cage. The test under consideration was of a piece cut 11 feet from the end nearest to the cage. It was seemingly uninjured by its fall with the cage. It was not untwisted at all and there were no projecting or loose wires on the surface. The surface was somewhat worn and was corroted to at least half section of the externally visible wires. In the portion opened for the grip several of the small wires were found to be corroded completely through, as were a few of the larger wires. The load was applied as in previous tests. With each 10,000 lb. increment of load the elongation was practically constant up to 40,000 lbs., being about .07 in. for each increment. At about 40,000 lbs. certain of the interior wires were heard to break. At 49,400 lbs. the cable broke at about three inches below the upper grip. The centre core was absolutely dry and dusty, and large quantities of rust dust were given off on breaking.

Test 4: This test piece was cut 21 feet 6 inches below the fracture. The cable showed but slight wear but was much corroded both on surface and interior wires, but as far as could be seen few if any of the wires were actually eaten through. No evidence of lubrication was visible in the interior of the cable. This piece was tested as were the former. The elongation for each 10,000 lb. increment was constant at about 5/100 inch up to 80,000 lb. which was about the elastic limit. Under a load of 106,000 lb. some of the interior wires were heard to break. At 109,800 lb. the cable broke, two strands parting about 6 inches below the upper grip. Subsequently the remaining strands were broken by re-application of the load. The third strand broke under load of 55,000 lb.; the fourth under load of 55,400 lb. and the fifth and sixth under load of 43,700 lb. Three strands broke near each end of the test piece.

Test 5: This piece was cut at 3 ft. below the point of break. It did not appear to be damaged by the fall. The rope was still tightly twisted and but slightly bent, not enough to materially affect it. This piece was badly corroded, so much so that even on the surface a number of the wires were seen to be completely eaten through and could be picked out with the fingers, but none of the ends projected. In the interior of the cable one of the sub-strands was completely cut through by erosion. There was no indication that the rope had ever seen oil. In opening up the two ends for the grip 32 wires were found completely erroded through and loose. The condition of the test piece was evidently so bad that the load was applied in smaller increments than in other tests. At 2,600 lb. load wires were heard to break in interior. The successive loads applied were 3,000 lb., 5,000, 7,000, and 10,000 (when elastic limit was reached) 20,000 and 25,000 lb. At 19,500 a number of wires were heard to break and at 22,000 more wires broke. At 26,700 lb. load three strands parted 12 in. below grip. The there remaining strands broke at 8,800 lb.

The cable in question had been in use for three years. It is described as being originally a first-class cable in every particular, well made and of excellent material, of Lang Lay's build and apparently up to specifications.

It is in the following paragraphs that Mr. Robertson deals with the very important point of the difficulties of adequate and satisfactory inspection under such circumstances as those under review:

"The amount of rust visible on the surface was serious and showed when the cable was dry; but, if the cable as it hung in the shaft was dirty, an inspection by passing the rope through the hand or against a stick, would fail to reveal the defect in the rope, and was useless in this case.

"In a shaft where the cable was subjected to heavy and constant work, the wear on the external wires would probably be so great as to wear certain strands through, thus producing projecting ends and these would be the first indications of deterioration of such a cable. The hand test might then be of value. But in the Protection Island Shaft the mechanical wear on the cable was slight, the failure being internal, hence not discernable by the method of inspection in vogue.

The spiral springs designed to bring the safety clutches into operation were of excellent quality, capable of a safe extension of about 30 per cent of their length and having a pulling power when so extended of about 1,250 pounds. It may be observed here that tests since made at the Canadian Western Fuel Company's yards, Nanaimo, have demonstrated that such springs and clutches do not give satisfaction on a descending cage, although brought into successful operation on an ascending cage suddenly released.

The oil used in lubrication is declared to have been of a character non-injurious to the steel. Of the water Mr. Robertson says: "There was no free acid in the water that would dissolve the steel, but the water was of such composition as to rust the steel more rapidly than pure water would, and would also be apt to wash off any external lubrication of cable faster than would pure water."

No verdict has as yet been rendered the Inquest having been adjourned until January 19th, 1919.

Notes of a Discovery of Rock Salt in Nova Scotia*

By L. HEBER COLE, Mines Branch, Ottawa.

A deposit of rock salt of considerable thickness is being opened up in the neighbourhood of Malagash, Cumberland Co., N.S. This is the first known discovery of rock salt in the Maritime Provinces, and the first in Canada to be discovered at a depth sufficiently shallow to enable it to be won economically by actual mining.

Discovery and History of Deposit.

In the fall and winter of 1916-17, a number of wells were drilled for water, by Mr. Peter Murray, on his farm on the Malagash road, about 7 miles northeast of Malagash Station. In each case salt water was encountered, at depths varying from 70 to 90 feet, and a sample of this brine was forwarded by Mr. Allan McKenzie, to the writer at the Mines Branch, Ottawa. It was found to be a saturated brine, its analysis being given in the following table, together with four analyses of brines from the Western Ontario salt district for comparison.

The overlying beds penetrated by the shaft are in a nearly horizontal position. They consist of clays, soft shales and gypsiferous muds.

The underlying saline beds dip to the west of south at an angle of about 25°, and have a strike of south 70° east.

The saline beds, as encountered in the shaft, show, in the upper 12 feet, considerable impurities in the form of mud, but whiter rock salt is now being excavated at the bottom of the shaft. The indications from a drill hole located on the site of the shaft are that the salt beds have a thickness, at this point, of nearly 50 feet.

The saline beds are found associated with beds of gypsum mapped by Fletcher as of lower Carboniferous age. These gypsum beds are seen exposed on the shore to the north of the shaft. To the south of the shaft there is a small unmapped outcrop of what ap-

TABLE I.
Analysis of Canadian Brines.

1,000 parts by weight contain:

	Malagash Brine, N.S.	Western Ontario Brine			
Sodium (Na)	99.50	96.270	101.728	96.368	100.997
Potassium (K)	0.55	n.d.	n.d.	n.d.	n.d.
Iron (Fe)	0.07	n.d.	n.d.	n.d.	n.d.
Calcium (Ca)	1.37	1.552	1.630	2.496	1.531
Magnesium (Mg.)	0.22	.244	.257	.127	.118
Sulphuric Acid (SO_4)	3.11	2.631	2.634	1.698	2.803
Chlorine (Cl)	154.70	150.122	158.742	152.294	156.884
	259.52	250.819	265.001	252.983	262.333
Hypothetical Combination: Parts per thousand.					
Sodium Chloride (NaCl)	252.90	244.860	258.770	245.111	256.891
Potassium Chloride (KCl)	1.04	n.d.	n.d.	n.d.	n.d.
Magnesium Chloride ($MgCl_2$)	0.86	.966	1.017	.503	.467
Calcium Chloride ($CaCl_2$)	0.22	1.265	1.484	4.964	1.007
Calcium Sulphate ($CaSO_4$)	4.42	3.728	3.730	2.405	3.971
Ferric Oxide (Fe_2O_3)	0.10	n.d.	n.d.	n.d.	n.d.
	259.54	250.819	265.001	252.983	262.336
Sp. Gravity at 15.5° C.	1.200	1.197	1.2045	1.178	1.198

In the summer of 1917, Mr. A. R. Chambers and Mr. Geo. McKay, of New Glasgow, took an interest in the operations, and drilled a series of holes, including a diamond drill hole, with the hope of proving the presence of a bed of rock salt, and, if successful, to obtain some idea of its extent. The results of the drillings proved rather unsatisfactory, no cores having been obtained. A prospect shaft was then commenced—June, 1918. In this shaft rock salt was encountered at a depth of 85 feet from the surface, and, when visited by the writer on October 10, 1918, it had penetrated to a depth of 17½ feetin in the salt formation.

Headframe at Magalash Salt Mine

* Published by permission of the Director of the Mines Branch.

pears to be New Glasgow conglomerate. The salt beds are on the south slope of an anticline, and little is so far known as to their lateral extent. To the west, about one mile from the shaft, there is a pronounced fault shown in the shore section, and this may cut off the western extension of the beds. To the east, about the same distance, the occurrence of a marsh, caused by the sea eroding the northerly lying and protecting sandstone barrier, may determine the eastern extension of the deposit. The evidence at hand, however, indicates the presence of a salt formation of considerable extent. On the basis of data obtained from the shaft, from surface indications, and from the drill holes, it is possible that the saline formation, measured at right angles to the dip, may have a thickness of 175 feet.

A general sample of the whiter rock salt was taken for analysis, with the following results: (Analyst, Mr. T. W. Hardy).

Dried at 110° C.

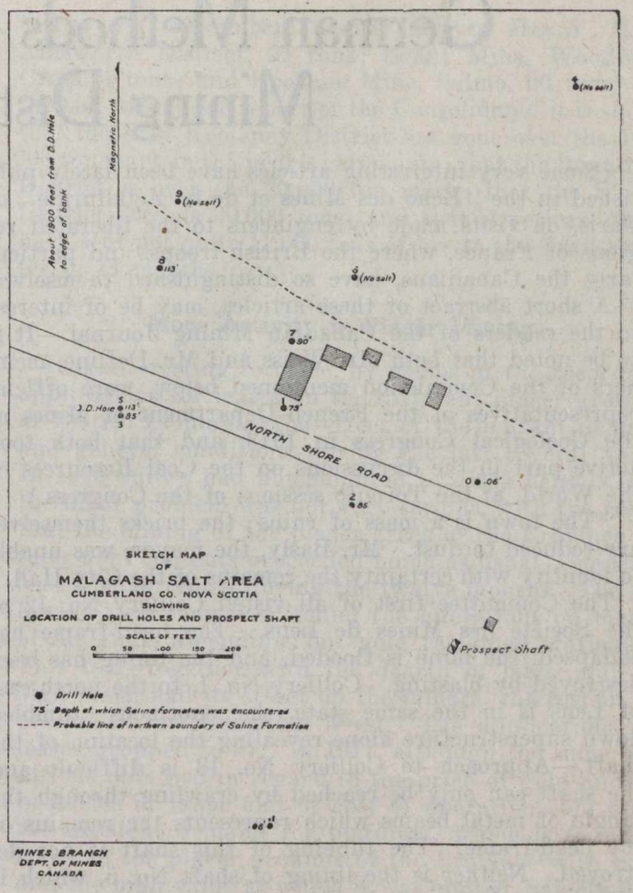
Sodium (Na)	38.45
Potassium (K)	0.20
Iron and aluminum (Fe and Al)	none
Calcium (Ca)	0.25
Magnesium (Mg)	trace
Sulphuric acid (SO_4)	0.61
Chlorine (Cl)	59.35
Insol. in water	1.05
Total	99.91

Conventional Combination.

Sodium chloride (NaCl)	97.60
Potassium chloride (KCl)	0.40
Magnesium chloride ($MgCl_2$)	trace
Calcium chloride ($CaCl_2$)	none
Calcium sulphate ($CaSO_4$)	0.86
Ferric oxide (Fe_2O_3)	none
Insol. in water	1.05
Total	99.91

Although the quantities of potash salts present in the two samples examined from this locality are small, it does not of necessity mean that they are absent in commercial quantities in this area. The drillings and prospecting so far carried out have only in the most superficial way indicated the presence of a large bed at one horizon, and the probability of encountering potash salts, interbedded with the sodium chloride at other horizons than the one penetrated by the prospect shaft and drill holes, is quite within the bounds of possibility.

First Blocks of Salt Mined at Malagash, N.S.



Malagash Salt Area

The importance of this discovery to the Maritime Provinces can readily be seen. The only salt producing district in Canada at present is the Western Ontario district. The Maritime Provinces consume about 50,000 tons of salt in the fishing industry each year. Owing to the prohibitive freight rates from western Canada, this salt has to be procured either from England, Spain or the West Indies. On the Atlantic seaboard of the United States, as well as in Newfoundland, a considerable tonnage of salt is imported for the curing of fish, etc.

It is evident, therefore, that the establishment in Nova Scotia of a modern salt manufacturing industry producing suitable grades of salt, would undoubtedly prove to be a profitable commercial enterprise.

Fire in the workings of the Princeton Colliery interfered with operations towards the end of November. It is now well under control, however, and work is proceeding.

One of the smaller powder houses of the plant of the Canadian Western Fuel Company, Nanaimo, B. C., was completely obliterated recently by an explosion, the cause of which is a mystery. Fortunately the accident happened when there were only a few men in the vicinity and no one was seriously injured. It is thought that some detonators were left in the building by mistake and that the explosion was the result of some of these falling to the cement floor.

German Methods of Destruction in the Mining Districts of France*

(Some very interesting articles have been lately published in the "Echo des Mines et de la Métallurgie" of Paris, on visits made by engineers to the liberated regions of France, where the British troops, and particularly the Canadians, have so distinguished themselves. —A short abstract of these articles, may be of interest to the readers of the Canadian Mining Journal.—It is to be noted that both Mr. Weiss and Mr. Defline, members of the Commission mentioned below, were official representatives of the French Department of Mines at the Geological Congress in 1913, and that both took active part in the discussions on the Coal Resources of the World, at the Toronto sessions of the Congress.)

"The town is a mass of ruins; the bricks themselves are reduced to dust. Mr. Basly, the mayor, was unable to identify with certainty the remains of the City Hall."

The Committee first of all visted Colliery No. 12 of the Société des Mines de Lens. The head-frame has collapsed, the mine is flooded, and the lining has been destroyed by blasting. Colliery No. 1, to the north-east of Lens is in the same state, the enormous tumbled down superstructure alone revealing the location of the shaft.—Approach to Colliery No. 13 is difficult and the shaft can only be reached by crawling through the tangle of metal beams which represents the remains of the head-frame. The tubbing of this shaft is not destroyed. Neither is the lining of shaft No. 5, which is 300 metres deep, and in this colliery there is no more water than in any mine which has not been operated for some time. Of Colliery No. 15, at Lens, of which the head-frame was known as the "Tower Bridge" among the British troops, not a vestige remains.

"Under the most favourable conditions," says the official preliminary note of the Commission, "the hoisting of coal in small quantities from the pits, may be resumed in from 8 months to two years, but normal prewar production cannot possibly be hoped for in less than five years."

At Courrières, where the "Compagnie des Mines de Houille de Courrières" had twenty shafts and 12,000 men, every single surface plant has been systematically destroyed with fiendish thoroughness. In both Lens and Courrières there is nothing that can be repaired; it is a case of clearing away the ruins and reconstructing entirely.—At Wingles, the iron and steel plant of the "Société Métallurgique de Pont-à-Vendin," comprising three blast furnaces, open-hearth steel plant, coke ovens, has been razed to the ground, the machinery having long previously been removed. These plants had just been completed at the cost of over forty million francs when war was declared, and operations were just starting.—From the testimony of liberated inhabitants most of these wanton destructions were effected at the time of evacuation of the German troops, when they were pushed back by the British army.

In the Anzin and Aniche districts the mines were working until the end of September, 1918, under German rule.—Owing to the hasty retreat there was less time available to destroy the shafts and underground workings, but all the machinery has been rendered useless, the favorite method having been to set off dynamite charges in steam chests, and cylinders, of hoisting engines, compressors, motors, and in general in all essential parts of machines and apparatus.

A few weeks ago a special commission, among the members of which were Mr. Basly, Mayor of Lens, Mr. Perrier, chairman of the Mines Committee of the French Chamber of Deputies, Mr. Weiss, Inspector -General of Mines, Mr. Defline, Director of the Service des Mines, and several mining engineers from Lens and Courrières, made a preliminary investigation of the state in which the German hordes left the French coal mines of the Lens-Courrières district on their retreat towards the Rhine.—Everywhere, scenes of desolation met their eyes. with a methodical ruthlessness the Huns, on withdrawing from this rich industrial and mining region had proceeded to systematically sack and thoroughly destroy all the plants. At Lens, of the 10,000 houses which constituted the town *not a single* one is now standing. In many of the cellars time-bombs had been placed, and during the first period of occupation of the town by the British troops, every ten minutes or so a violent detonation would take place, sending up heavy clouds of smoke and gas. The Royal Engineers, unfortunately at the cost of numerous comrades, have become experts at detecting the presence of these engines of destruction. They search for them diligently, and on discovering them, a warning signal to take cover is given, and a charge of high explosive is then set off to explode them prematurely.

"A large share of our thanks," says "L'Echo des Mines," must go to the members of the British Labor Corps, who do heroic work with characteristic imperturbability, frequently under enemy fire. After 24 hours of continuous work in Lens they had cleared the main streets sufficiently to render circulation possible."

*Abstracted from "L'Echo des Mines et de la Metallurgie," by Theo. C. Denis, Quebec.

OBITUARY.

William Lewis Phillips.

William Lewis Phillips, ex-President of District 18, U. M. W. of A., which includes the Eastern British Columbia and Alberta Coal Mining Camps, who left Fernie, B. C., with the 225th Overseas Battalion, C. E. F., has been reported killed in action on September 28th last. Thomas, a brother, was officially reported killed on September 29th, the day following. W. L. Phillips first came to Fernie from Wales seven years ago and was employed on the engineering staff at the Crowsnest Pass Collieries. After holding minor offices in the Fernie Union he was elected to the post of President of District No. 18 in 1914. After the expiration of that term he was re-elected, but resigned before the end of the year in order to take up arms with the Canadian forces. Two brothers, David E. and Richard S. are residents of Fernie.

The Voigt Claims, situated on Copper Mountain, near Princeton, B.C., are being closely inspected by representatives of the Consolidated Mining & Smelting Company of Canada, which recently acquired control of this property. Extensive development of this deposit of low grade copper is expected to commence early in the new year.

Special Correspondence

BRITISH COLUMBIA.

Loper Pardoned.

Mr. G. Weaver Loper, a mining broker who was charged with over-issuance of the stock of the Lucky Jim Zinc Mines, Ltd., and sentenced to ten years in the Washington State Penitentiary, has been granted a pardon by Governor Lister. Loper has suffered a stroke of paralysis, and his condition is said to be grave.

Labor Conditions at Anyox.

Mr. E. E. Campbell, Superintendent of the Anyox, B.C. Mine of the Granby Consolidated Mining & Smelting Co., and O. B. Smith, general superintendent of the company's mining operations, have returned to Anyox after visiting the Ketchikan district of Northern British Columbia. Mr. Campbell states that normal conditions have been attained again at Anyox after the set-back caused by the influenza. Labor now is comparatively plentiful, many loggers and other workmen, who had been employed in logging camps busy on war production, being available.

Predicts Great Future for Portland Canal District.

Mr. G. A. Clothier, British Columbia Provincial Resident Mining Engineer for the Northwestern District, recently reported to the Board of Trade of Prince Rupert that "taking everything into consideration I think the district at the head of Portland Canal is destined to become one of the most active and permanent mining areas in British Columbia." He urged that immediate steps be taken towards the construction of a dock and approach thereto.

Alaska Gatineau Now Working Two Shifts.

More men being available since the signing of the Armistice, the Thane mill of the Alaska Gatineau company has another shift at work, and shortly will have a third shift, running night and day. Both Manager George T. Jackson, of the Alaska Gatineau, and P. R. Bradley, of the Treadwell Properties, states that difficulty is being experienced in obtaining practical miners.

300,000 Tons and Concentrates Shipped to Trail Smelter.

Conditions relative to the operation of the Trail Smeltery of the Consolidated Mining and Smelting Co. of Canada, Trail, B.C., which were serious during November and for about a week in December, owing to the Spanish influenza epidemic, are improving. When the plague was at its heighth it was impossible to get ore cars unloaded, a large part of this work being done by contract. The immediate result was that for a time the company placed an embargo on ore shipments, having some 150 unloaded cars in the yards. The cost on demurrage alone was $500 a day, and it is estimated that the epidemic cost the smelter from $50,000 to $75,000.

Up to and including the first week in December over 300,000 tons of ore and concentrates have been shipped to the smelter of the Canadian Consolidated Co. at Trail, B.C. Three new shippers have appeared on the list this month (December) namely: Silver Hoard Mine. Ainsworth District, 21 tons; Grant Mine, Woodbury Creek, 4 tons; and Spokane Mine, Salmo, 20 tons. In the last weekly ore report of the Consolidated it is shown that the East Kootenay District has gone over the 100,000 ton mark in the year's shipments; that the Boundary District is over the 20,000 ton mark; that the Slocan District exceeds 30,000 tons; and that American mines have sent not quite 11,000 tons of ore to the Trail Smelter in 11 months.

More Activity in Placer Mining.

It is interesting to trace, by means of the records of applications for leases on the different placer grounds of British Columbia, the effect of the market demand and general conditions during the last several years. In 1915 values had not mounted to dizzy heights, and the labor problem was not very serious, with the result that the mining of the placer areas of the Province for their gold contents proceeded much as usual, about 160 leases being issued during the twelve months. The following year, however, found the quotations on metals of all kinds ascending, but gold remained stationary. This fact, together with the dearth of labor and the high costs, had its effect on the miners' interest in the placers of the Canadian West. The applications for leases dropped to 87. In 1917, although the same conditions obtained in regard to the price of gold and the problems of labor and of cost of operation continued, the insistent demand for platinum, which is found in many of the placer grounds of the Province with gold, and the high value at which it was quoted, namely $105 an ounce, once more fired the enthusiasm of prospectors and of operators. This is conclusively indicated by the issuance by the Provincial Department of Mines of 139 leases. The total for 1918, although the year is not quite at an end at the time of writing, will show that the interest was maintained as it will reach approximately 137 leases. Of the latter 35 bench leases and 9 dredging leases were granted during the months of October and November, which would seem to indicate that the predicted revival of gold production following the declaration of peace is being anticipated.

Ward-Hopp Litigation.

The latest phase of the long-drawn-out Ward-Hopp litigation was the Sheriff's sale in November at Prince George, B.C., of Mining Leases Nos. 1488 and 1494 under order of a writ of the Supreme Court of British Columbia. The said leases were those staked by John Hopp in 1913 and comprise the hydraulic mine at Bullion, B.C., formerly operated under the management of the late John B. Hobson.

The original company expended a large sum of money in development and working and washed out $1,300,000, which was a long way under the expenditure. The property was then sold to the Guggenheims, who began an elaborate development scheme, which came to an abrupt end in the panic of 1907. In May, 1913, Hopp staked the ground, which was granted to him finally under Leases 1488 to 1494. In October, 1913, R. T. Ward bought the Guggenheim rights, his contention being that the terms of the special act of the British Columbia legislature granted to the original company and acquired by the Guggenheims made the acquiring of a Free Miner's Certificate in order to hold the ground necessary.

In the resultant legislation Hopp was sustained by the Supreme Court of British Columbia but Ward, appealing to the Supreme Court, won. Hopp since has appealed to the Privy Council, where the case rests.

The purpose of the sale in question was to force court costs on Hopp and resulted in the bidding in of the leases to Mr. John A. Whittier, of Vancouver, for $325.

South Eastern Mines Co.

A. S. Holmes, manager of the South Eastern Mines Co., of Skidegate, Queen Charlotte Islands, B.C., states that preparations are being made for the further development of this gold bearing property and that it is expected that work will have made sufficient progress to make possible regular shipments at an early date. The ore carries free gold and some silver, lead and copper values. A shaft has been sunk to a depth of 100 ft., and about 600 ft., of drifting and cross-cutting has been marked by encouraging developments. It is proposed to instal a cyanide mill to treat the mine product.

B. C. Fluorspar Deposits Will be Developed.

Although it is not many months since the Canadian Consolidated Mining & Smelting Co. acquired a promising British Columbia fluorspar property, it has made such progress in development, and has made practical tests in the manufacture of hydrofluosilicic acid with such satisfactory results. that it is proceeding to open up the mine on an extensive scale. By the beginning of January the company, which already has forwarded several carloads to New York and Philadelphia, hopes to be able to begin regular shipments at the rate of from 1,200 to 2,000 tons a month. To facilitate this, an aerial tramway is being constructed for a distance of several miles from the mine to the railway. Thus the local requirements, which before had to be provided for by shipments from Kentucky, will be cared for, and there will be sufficient surplus to permit the export of considerable quantities.

Was Poor Coal Supplied Str. War Charger?

A short time ago the ss. "War Charger," after taking on coal in British Columbia for a voyage to the Orient, had to put back to port for the reason, according to statements given publicity, that she was unable to proceed on this fuel. On returning she loaded with Welsh coal. This reflection on the steaming quality of British Columbia coal is resented, it being maintained that it has been subjected to every test, practical and otherwise, with the best results and that it is so satisfactory that one of the Vancouver Island Collieries was able to enter into a contract to supply the Pacific Fleet of the United States Naval Forces. If the Str. "War Charger" was in trouble of the kind, which there is no disposition to deny, it is asserted that she must have been given an exceedingly poor quality of fuel and that the responsibility should be placed where it belongs and should be generally understood in the interests of the industry. The Board of Trade of Vancouver City has taken the matter up, its members pointing out that absence of a full explanation of the Charger's return is likely to leave the impression in England and elsewhere that a boat cannot be coaled in British Columbia to the satisfaction of the naval authorities. Some declare that the matter is of sufficient importance to warrant the fullest possible investigation by a civic commission.

The Greenwood Smelter May Be Operated By City.

That the Phoenix mines should be prospected by diamond drill with a view to demonstrating ore values in order to obtain the necessary supplies for the operation of the now idle Greenwood (B.C.) Smelter is a suggestion made by residents of the district. It is said that the Provincial Government is to be asked to extend financial aid to permit the starting of this work. Hon. J. D. MacLean, Provincial Secretary and the member for Greenwood, and Mr. J. E. Thompson, Member of Parliament for Grand Forks, B.C., are said to be in sympathy with the proposal and to be ready to render their support to any representations made along this line. Through Mr. Oscar Lachmund, former general manager of the Canada Copper Company, commercial interests of Greenwood City, determined that the smelter shall not remain inactive, have asked the last named company to lease the plant for $10,000 a year in order that the citizens' company may operate it. The Canada Copper Company directors at New York City are said to have these and other suggestions under consideration.

Ore Shipped From Blue Grouse Mine.

Two carloads of ore have been shipped from the Blue Grouse Mines, Cowichan District, Vancouver Island, to the Trail Smelter, and it is stated that shipments will be made regularly from now on. During the last few months considerable exploratory work, including drilling, has been in progress with satisfactory results, according to report.

Prince Rupert Wants a Smelter.

With the recrudescence of mining activity in the Portland Canal District, the City of Prince Rupert has commenced an agitation for the establishment of a smelter at that point. Commenting on this a mining man of Northern British Columbia says: "The one thing needed just now is a smelter near enough to the mines to enable the owners to ship at a profit. It is the one thing that will stimulate the mining industry. There are plenty of mines that could ship if it were not so expensive. Take as an instance, the American Boy mine. It was unable to ship on account of the cost, but when the Silver Standard put in a concentrating mill it was able to handle 25 tons a day from the American Boy, and the property at once changed from an idle prospect to a producing mine, which is paying well. Many other mine owners wanted to ship to the mill, but there was not sufficient capacity to enable it to take any custom work except from the one mine. There is no doubt about the desirability of establishing a smelter in the neighborhood, and Prince Rupert certainly is the logical point to enable shippers to avoid double handling. If it is built on tidewater and on the railway the mines from the interior can ship direct to it and the mines up and down the coast will have the benefit of cheap transportation. At Stewart, B.C., there will be important developments in the Spring. It is possible that Sir Donald Mann will build a smelter to handle the ore from his mines as well as that from others in the district."

Important development is in progress on the Galena Farm Mine near Silverton, B.C., an ore body 11 feet wide, having been reported to have been struck which contains two feet of galena.

Granby Finds More Good Ore.

A large deposit of a good grade of copper is reported to have been struck by the Granby Consolidated Mining & Smelting Company during the past season on the Ecstall River, which is a tributary of the Skeena River, into which it flows at the town of Port Essington, Northern British Columbia. Diamond drilling operations were carried out on the property which is an immense body of iron pyrites. It has been held for some twenty years by Victoria, B. C., interests and during that period some development was carried out, several tons of the pyrites being shipped to Victoria for the manufacture of sulphuric acid by the chemical works. The deposit consists of a mass of pyrite lying in schist formation, the belt being about a mile wide. The old work consisted of a crosscut tunnel a hundred feet in length and drifts twenty feet from it each way on the ore. While local officials of the company do not deny or confirm the report it is accepted by mining men as accurate and it is stated that the prospects are that the Ecstall Property may prove to be as big a thing as the Hidden Creek Mine which supplies the smelter at Anyox, B. C.

Grand Forks Smelter Again in Operation.

The Granby Consolidated Mining & Smelting Company's smelter at Grand Forks, B. C., which was closed down for a period because of lack of ore and coke, the result of the illness of many of the miners while the Spanish influenza epidemic was at its heighth in the West, has resumed operations. Three furnaces now are in blast and it is expected that there will be no further interruption, supplies being assured.

Developing Portland Canal Properties.

Following the report that the Big Missouri Claims, Portland Canal, B. C., have been acquired by Sir Donald Mann, who proposes their extensive and systematic development, comes information of other promising prospects in the same locality.

The Georgia Mining Co., the property of which is 18 miles from Stewart, B. C., has been worked all summer with good results. It is a free gold proposition and a mill is necessary to get the best results. It is near the coast and transportation facilities are provided by a good trail. Mr. C. H. Dickie, of Duncan, B. C., is the owner.

A new shoot of ore is reported to have been opened up at the Brown-Alaska Mine, also in the same district. Several thousand tons of ore were shipped from here some years ago. Work has been underway during the past few months and the new showing is said to consist of a couple of hundred feet of log grade copper. The possibility of installing a concentrator is being discussed. Mr. Martin Woldson, of Spokane, Wn., is the owner and Andrew Solstad has been in charge of development. The mine has closed for the winter but work is expected to be resumed early in the spring. Limestone has been obtained at Swamp Point, near Stewart, this summer by the Granby Consolidated Smelting Company for fluxing use at its Anyox Smelter.

Larger Output From Rossland Mines Expected.

Rossland (B. C.), one of the chief mining centres of the Province, which has been hard hit by the practical closing down of its larger mines controlled by the Consolidated Mining & Smelting Co. of Canada, is looking forward to better times. It is stated that the purely development work, which has been in progress during the past year, will lead to more than has been generally anticipated. Experiments are reported to have disclosed a new method of successfully treating, at a lower cost, the low grade ores of the camp at the Trail smelter. The output of the Rossland Mines is expected, as a result, to be increased from several hundred tons a day to between 1,000 and 1,500 tons per day.

B. C. Coal Output for November.

The coal output for British Columbia for November, 1918, shows a material decrease in comparison with the previous month, the difference being approximately 49,476 tons. This is explained by the fact that the Vancouver Island Collieries, in almost every instance, failed to do as well owing to the time lost by their employees, many of whom were off for periods of varying length owing to the epidemic of Spanish influenza. The production is placed at about 168,006 tons while that for October was 217,482.

Following are the detailed figures for the Vancouver Island Collieries:

	November.	October.
Western Fuel Co.	$ 49,121	$ 59,219
Canadian Collieries (D) Ltd. (Comox)	27,065	47,604
Canadian Collieries (D) Ltd. (Wellington-Extension)	17,216	26,762
Pacific Coast Coal Mines	2,914	5,773
B. C. Coal Mng. Co. (Jingle Pot)	3,257	3,025
Nanoose Collieries	1,112	1,990
Granby Consolidated Mng. & Smelting Co. (Cassidy's)	2,010	2,560
Totals	$102,695	$146,933

Nicola Valley.

	November.	October.
Middlesboro Collieries	$ 6,000	$ 8,202
Fleming Coal Mng. Co.	2,695	3,280
Coalmont Collieries	616	490
Princeton Collieries (Estimated	2,000	3,327
Totals	$11,311	$15,299

Crow's Nest Pass Field.
(Estimated.)

November, 54,000 tons; October, 55,250 tons.

The total output for the year 1918 up to the end of November, therefore, is about 2,372,161 tons, or an increase over 1917 of 222,186 tons.

Diamond drilling of coal property situated near the Sable River, Vancouver Island, is to be undertaken at an early date. A road now is being constructed up the river to permit the shipment of machinery to the prospect.

The annual convention of the Northwest Mining Association will be held in Spokane, Wn., from February 10th to the 16th, 1919. Special interest will attach to the discussions because of the return to peace conditions, and it is expected that, because of the importance of the problems, the Convention will attract a large and representative attendance of mining men from both the United States and Canada.

Drilling For Oil in Burnaby District.

A depth of 625 feet has been reached by the drill which is being sunk for oil in the Burnaby District near Vancouver, B. C., by the Spartan Oil company. The indications are said to be very promising and oil is expected to be struck at 1,000 feet. If the company is not successful in this instance it is the intenton to sink several more holes. The engineers advising the company remain confident that oil in commercial quantities exists in this section and, development having been undertaken, it is intended to carry it through until the belief of those who are interested in the enterprise is shown to be justified or demonstrated clearly to be without foundation.

Canada Copper.

After an inspection of the Copper Mountain plant of the Canada Copper company, George O. Bradley, of Messrs. Bradley, Bruff & Lebarthe, construction engineers of San Francisco, Cal., has returned to California. He reports that satisfactory progress is being made in the installation of the plant which will have a capacity of 2,000 tons and that the 100 miles power line of the West Kootenay Pawer & Light Company probably will be completed to the camp sometime in the summer.

Le Roi No. 2.

Mr. Ernest Levy, general manager of the Le Roi No. 2 Limited (Josie), Rossland, B. C., states that that mine produced, in the fiscal year ending September 30th last, 19,000 tons of ore. "Ore has been found in the old No. 1 Mine after many years of exploration," Mr. Levy said. "The body is 200 ft. long, two and a half to three feet wide, and has been followed up for 50 ft. The grade is of the average in gold, but below the average in copper. We are breaking and shipping ore from this body.

"Sinking has been resumed in a 200 ft. winze from the 1,650 ft. level. Ore extracted below the collar of the winze compares favorably with that extracted elsewhere in the mine, especially in copper, but in both copper and gold. Conditions in the winze are encouraging.

"Operations were resumed recently after an interruption of two weeks because of influenza and are proceeding with two shifts. As health conditions improve the force will be increased and development and production engaged in continuously.

"Considerable hardship has attended mining in the last year or so. It resulted from sickness, labor troubles, and high price of materials among other things. Powder is 100 per cent higher and steel 60 per cent. We use much powder and of a high grade, as the ground is hard. Steel has been hard to get."

Trail Smelter.

During the last week of November and the early part of December operations at the Consolidated Mining & Smelting Co's Smelter, Trail, B.C., were handicapped by scarcity of labor, many of the regular employees being laid up with influenza. Because of the epidemic the management asked shippers to cut down shipments of ore as far as possible temporarily.

New Hazelton Gold Cobalt Co.

Dalby B. Morkill, mine superintendent of the New Hazelton Gold Cobalt Company, a Vancouver corporation owning a group of claims on the Rocher de Boule Mountain, near Hazelton, B.C., expresses himself as satisfied with the results of development up to the present. Two tunnels are being driven and these will be continued. One of these is on the Victoria gold-cobalt molybdenum lead at a point 1,100 vertically below the apex of the vein, and 350 ft. below the main tunnel. This lower tunnel has now been driven 240 ft., 75 ft. being a crosscut to tap the vein and the remainder a drift along the vein. In this drift a shoot of ore 100 ft. long has been passed through, varying from two to three inches in width, which assayed, at the widest part, $109 in gold and 7 per cent cobalt. The face of the drift is now into a second shoot of ore. It was from the upper tunnel on the same lead, 750 ft. below the apex, that three carloads of ore were taken and shipped to Ottawa for treatment, the ore containing gold, cobalt and molybdenite. A 30-ton carload of ore from the same workings is now being loaded for shipment to the Granby company's smelter at Anyox. The purpose of the lower tunnel is to develop and block out the shoots of ore shown in the upper workings and to provide a lower and permanent entry to the mine. Driving on the vein will be continued during the winter and definite plans of operation made in the spring in accordance with the results of development. The other tunnel upon which work is being carried out is on one of the copper veins on the company's Moose claim, adjoining the Rocher de Boule mine. The vein is the extension, it is claimed, of that property's upper or main vein. The surface outcrop is not favorably situated for drifting upon, so a tunnel was started below the showing. It has been driven in loose ground a distance of 140 ft. and has just reached the solid formation

DIVIDENDS PAID BY NORTHERN ONTARIO SILVER AND GOLD MINES.

(The following tabulation is contributed by the "Northern Miner")

Dividends paid by gold and silver mining companies operating in the District of Temiskaming, Ont., in 1918, to December 31st, are as follows:

Cobalt	$3,623,513
Porcupine	1,771,544
Kirkland Lake	100,000
Total	$5,495,058

Total dividends paid from beginning of operations to December 31, 1918:

Cobalt	$76,398,171
Porcupine	12,819,089
Kirkland Lake	491,125
	$89,708,385

Dividends declared in 1918, payable in 1919:

Cobalt	$717,430

This will bring the total for Cobalt silver mining companies to $77,115,602, and the total for the District of Temiskaming to $90,425,816.

In comparison the dividend record in 1917 was:

Cobalt	$5,454,694
Porcupine	1,759,544
Kirkland Lake	65,187
	$8,279,426

Dividends Paid by Cobalt Silver Mining Companies to December 1, 1918.

Mining Company.	P.c. paid 1918.	Amount paid, 1918.	T'l P.c. Dec. 31, 1918.	Total Amount to Dec. 31, 1918.
Alladin-Cobalt			2	$50,000
Beaver			32.5	650,000
Buffalo			282	2,787,000
Caribou-Cobalt (Drummond)			22.5	225,000
Casey-Cobalt			25	203,249
City of Cobalt			23	139,321
Cobalt Central			4¾	192,845
Cobalt Lake			15.5	465,000
Cobalt Siver Queen			21	315,000
Cobalt Townsite			97.5	966,726
Coniagas	12.5	$500,000	231	9,240,000
Crown Reserve			350	6,190,840
Kerr Lake	20	600,000	262	7,860,000
Foster			5	45,774
La Rose	2	30,000	84.5	7,221,433
McKinley-Darragh	12	269,723	241	5,415,920
Mining Corp.	81¼c	1,348,790	..	4,253,886
Nipissing	30	1,800,000	309	18,940,000
Hudson Bay			25000	1,940,250
Peterson Lake			19.25	462,350
Right of Way			14.5	244,492
Seneca-Superior			330	1,579,817
Temiskaming	3	75,000	83	2,059,156
Wettlaufer			45	637,465
Private Corporations				3,825,000
		4,623,513		76,398,171

Dividends declared by Cobalt mining companies in 1918 to be paid in 1919 follow:

Nipissing	5	$300,000
Bonus	5	300,000
McKinley-Darragh	3	67,430
Trethewey	5	50,000
Total to end of 1918		76,398,171
		$77,115,602

Dividends Paid by Porcupine Gold Mining Companies to December 31, 1918.

	P.c. paid 1918.	Amount paid, 1918.	T'l P.c. Dec. 31, 1918.	Total Amount to Dec. 31, 1918.
Dome Mines			37.5	1,500,000
Hollinger Con.	5	1,230,000	..	9,424,000
McIntyre-Porcupine	15	541,544	30	1,083,089
Porcupine Crown			42	840,000
Rea Mines			6	12,000
		$1,771,544		$12,819,189

Dividends Paid by Kirkland Lake Gold Mining Companies to December 31, 1918.

	P.c. paid 1918.	Amount paid, 1918.	T'l P.c. Dec. 31, 1918.	Total Amount to Dec. 31, 1918.
Tough Oakes			15	391,125
Lake Shore	5	100,000	5	100,000
		$100,000		$491,125

That an embargo will be put on lead ore and concentrates shipments to the Trail Smeltery is the effect of a report now in circulation. The explanation given is that there must be a hiatus until settled peace conditions are established. It is suggested that such embargo likely will remain in effect all winter.

Ore Receipts at Trail Smelter.

There is now no doubt that the receipts of ore at the smelter of the Consolidated Mining & Smelting Co., at Trail, B.C., will be less than for either of the two previous years. For the first ten months of 1916 a total of 456,692 tons of ore was received. In 1917 the total was 327,639 tons and in 1918 it amounts to 292,454 tons. For the last six months or more of 1918 the gross ore receipts at the smelter have been around 20,000 tons per month, which is about half of what they were in the month of March, 1918.

The following table of gross ore receipts at the Trail Smelter for the first ten months of the three past years is interesting for comparative purposes:

	1916.	1917.	1918.
February	37,863	40,967	33,989
March	43,810	42,949	41,735
April	41,771	25,909	37,039
May	43,031	15,969	21,162
June	42,252	17,129	17,965
July	40,268	20,744	20,871
August	46,814	38,134	23,465
September	42,863	39,293	21,765
October	40,350	49,975	26,042
November	40,709	(strike)	21,027
Totals	456,692	327,639	292,454

PROVINCE OF ONTARIO

DEPARTMENT OF LANDS FORESTS & MINES

BUREAU OF MINES

Ontario's Mining Lands

Ontario, with its 407,262 square miles of area contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other useful minerals, both metallic and non-metallic, are found in Ontario:— actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and talc.

Building materials, such as marble, limestone, sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured in quantity within the Province.

Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth $72,093,832, of which the metallic production was $56,831,857.

Dividends and bonuses paid to the end of 1917 amounted to $11,486,167.45 for gold mining companies, and $70,821,829.34 for silver mining companies, or a total of $82,307,996.79.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. A miner's license costs $5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of $2.50 or $3.00 per acre, depending on location in surveyed or unsurveyed territory.

For list of publications, illustrated reports, geological maps and mining laws, apply to

G. H. FERGUSON,

MINISTER OF LANDS, FORESTS AND MINES,

Toronto, Canada

No. 13084

Judicial Sale of Mining Property

PURSUANT to the Judgment and Final order for Sale made in a certain action No. 13084 by the Master in Chambers in the Supreme Court of Alberta, Judicial District of Calgary, there will be offered for sale with the approbation of the Court by Henry McCallum at the Court House at the City of Calgary in the Province of Alberta, at the hour of ten o'clock in the forenoon, on Saturday, the 25th day of January, 1919, the following lands and premises, namely:

All minerals, other than gold or silver, within, upon or under the West half of Section 9, Township 6, Range 3, West of the Fifth Meridian:

All mines and minerals, other than gold or silver, within, upon or under the West half of Section 4, Township 6, Range 3, West of the Fifth Meridian;

All minerals, other than gold or silver, within, upon or under the East half of Section 9, Township 6, Range 3, West of the Fifth Meridian;

subject to accrued taxes, and to the exceptions, reservations and conditions contained in the original grant from the Crown, and to the exceptions, reservations and conditions in the Certificates of Title covering said lands.

The sale will be subject to a reserve bid fixed by the Court.

TERMS: 15 per cent of the purchase price must be paid in cash at the time of sale to the Plaintiff's Solicitor, and the balance in Court as follows: 10 per cent in sixty days without interest, 25 per cent in six months from the date of sale with interest at seven per cent per annum, and the balance in two years from date of sale with interest at seven per cent per annum, or at the option of the purchaser the whole may be paid within sixty (60) days from the date of sale without interest.

In all other respects and terms the conditions of sale will be the standing conditions of sale approved by the Court. Further particulars will be made known at the time and place of sale, or can be obtained from the Solicitor for the Vendor, JOHN W. HUGILL, Department of Natural Resources, of The Canadian Pacific Railway Company, Calgary, Alberta.

Dated at the City of Calgary, in the Province of Alberta, this 7th day of December, 1918.

Approved:
L. F. CLARRY, M.C.

LAWRENCE J. CLARKE,
Clerk of the Court.

CANADA
DEPARTMENT OF MINES

HON. MARTIN BURRELL, *Ministea* R. G. McCONNELL, *Deputy Minister*

MINES BRANCH

Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1916.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

GEOLOGICAL SURVEY

Recent Publications

Summary Report, 1917, Part D. Reports on field work in Manitoba.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke

Memoir. 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.

: PROFESSIONAL DIRECTORY :

ENGINEERS, METALLURGISTS AND GEOLOGISTS

SMITH & TRAVERS COMPANY
LIMITED

Contract Diamond Drilling.
Foundational Work a Specialty.
Direction of Exploratory Work.
Detailed Geological Mapping.
Sampling and Valuation of Mines.
Mines Explored for an Interest.

SUDBURY - ONT.

Alfred R. Whitman
Mining Geologist
Exchange Place, New York

DOMINION ENGINEERING & INSPECTION CO.
Testing Engineers & Chemists
HEAD OFFICE & LABORATORIES
320 Lagauchetiere St. W., Montreal.
BRANCH OFFICES:
Toronto and Winnipeg
MILL, SHOP AND FIELD INSPECTION OF STEEL STRUCTURES,
TESTS AND INSPECTION OF IRON AND STEEL PIPE, ETC.
LOCOMOTIVES, CARS, NEW AND SECOND-HAND EQUIPMENT
TESTING OF METALS, CEMENT, Etc.
INDUSTRIAL CHEMISTRY,
METALLURGY A SPECIALTY

THE DORR COMPANY
Metallurgical and Industrial Engineers

DENVER 1009 17th St. | NEW YORK 101 Park Ave. | LONDON E.C. 16 South St.

FERRIER, W. F.
Consulting Mining Engineer and Geologist
204 LUMSDEN BLDG., TORONTO, ONT.

ROGERS, JOHN C.
Mining Engineer
Examination and Exploration of Mining Properties with a View to Purchase.
COPPER CLIFF - ONTARIO

ROBERT H. STEWART
Mining & Metallurgical Engineer
VANCOUVER BLOCK
VANCOUVER, B.C.

JAMES McEVOY
Mining Engineer
and Geologist
(Specialty Coal Mining)
210 POPLAR PLAINS ROAD, TORONTO, ONTARIO
Phone Hillcrest 1461

MILTON HERSEY CO., LTD.
Chemists and Mining Engineers
Assays of Ores — Tests of all Materials
DR. MILTON L. HERSEY, President
(Consulting Chemist to Quebec Government)
JAMES G. ROSS
Consulting Mining Engineer
HEAD OFFICE: 84 St. Antoine St., MONTREAL

TYRRELL, J. B.
Mining Engineer,
584 Confederation Life Building,
TORONTO, - - CANADA.

GEO. R. ROGERS
MINING ENGINEER
905 TRADERS BANK BUILDING
TORONTO
Examinations, Sampling and Reporting on Mines and Prospects
Telephone M. 2625

A. A. HASSAN
Mining Geologist
and
Consulting Engineer
SUITE 203-204 RIGGS BLDG.,
WASHINGTON, D.C.

JOHN A. DRESSER
MINING GEOLOGIST
701 Eastern Townships Bank Bldg.
MONTREAL - Canada

Sudbury Diamond Drilling Company, Limited

We contract for all classes of Diamond Drill work.
Saving a large percentage of Core is our specialty.
We solicit enquiries.
Sudbury, Ont. - Box 958.

ASSAYERS, CHEMISTS AND ORE TESTERS.

Phone Main 4427
The Toronto Testing Laboratory, Ltd
160 Bay Street, Toronto
ASSAYERS & CHEMISTS
"PROMPT AND ACCURATE SERVICE GUARANTEED."

Phone M. 1889 — Cable address "Heys"
Established 1873.
HEYS, THOS. & SON,
Technical Chemists and Assayers,
Rooms M and N, Toronto Arcade
Yonge Street, Toronto, Ont.
Sampling Ore Deposits a Specialty.

JOHNSON, MATTHEY & CO. LTD.
Buyers, Smelters, Refiners & Assayers of Gold, Silver, Platinum, Ores, Sweeps, Concentrates, Bullion, &c.
Offices—Hatton Garden, London, E.C.
Works—Patricroft, Manchester, England

Canadian Laboratories, Ltd.
ASSAYERS AND CHEMISTS
24 Adelaide St. West
"WE ANALYSE ANYTHING" TORONTO
SPECIAL RATES
SEND FOR PRICES PHONE MAIN 5088

LEDOUX & CO.
ASSAYERS AND SAMPLERS
Office and Laboratory,
99 John St., New York.
Weigh and Sample Shipments at Buyers' Works, representing the Interests of Sellers in all Transactions.
We are not Dealers or Refiners.

CAMPBELL & DEYELL, Limited
Ore Samplers, Assayers
Head Office & Works
Cobalt, Ontario
L. M. CAMPBELL,
General Manager.
Mechanical selection of samples from shipments of any size and quality

LAWYERS

Cable Address: "Linsey" — Codes: Broomhalls, Western Union
G. G. S. Lindsey, K.C.
BARRISTER, SOLICITOR, Etc.
Bank of Toronto Building - - TORONTO
Special attention given to Mining Law
Phone Adelaide 1032

Telephone Main 3813 — Cable Address: "Chadwick" Toronto, Western Union Code
E. M. Chadwick, K.C.
David Fasken, K.C.
M. K. Cowan, K.C.
Harper Armstrong
Alexander Fasken
Hugh E. Rose, K.C.
Geo. H. Sedgewick.
James Aitchison
Fasken, Robertson, Chadwick & Sedgewick
Barristers, Solicitors, Notaries
Offices: Bank of Toronto, Cor. Wellington & Church Sts.
58 Wellington St. East
Toronto

BUYERS AND SELLERS OF METALS

The Canadian Miners' Buying Directory.

Air Hoists—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.

Amalgamators—
Northern Canada Supply Co.

Antimony—
Canada Metal Co., Ltd.

Assayers and Chemists—
Milton L. Hersey Co., Ltd.
Campbell & Deyell, Cobalt.
Ledoux & Co., 99 John St., New York.
Thos. Heys & Son.
C. L. Constant Co.

Assayers' and Chemists' Supplies—
C. L. Berger & Sons, 37 William St., Boston, Mass.
Lymans, Ltd., Montreal, Que.
Stanley, W. F. & Co., Ltd.
Mine & Smelter Supply Co.

Brakeshoes—
Can. Brakeshoe Co., Ltd.

Babbit Metals—
Canada Metal Co., Ltd.
Hoyt Metal Co.

Balances—Heusser—
Mine & Smelter Supply Co.

Ball Mills—
Mine & Smelter Supply Co.

Belting—Leather, Rubber and Cotton—
Northern Canada Supply Co.
Jones & Glassco.

Blasting Batteries and Supplies—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Northern Canada Supply Co.
Canadian Explosives, Ltd.

Blowers—
Northern Canada Supply Co.

Boilers—
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Marsh Engineering Works.

Boxes, Cable Junction—
Standard Underground Cable Co. of Canada, Ltd.

Buckets—
Hendrick Mfg. Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.
Northern Canada Supply Co.

Cable — Aerial and Underground—
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.

Cableways—
M. Beatty & Sons, Ltd.

Cages—
Northern Canada Supply Co.

Cables—Wire—
Standard Underground Cable Co. of Canada, Ltd.

Car Dumps—
Sullivan Machinery Co.

Cars—
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works.
Mine & Smelter Supply Co.

Car Wheels and Axles—
Marsh Engineering Works, Ltd.

Cement Machinery—
Northern Canada Supply Co.
Hadfields Ltd.

Chains—
Jones & Glassco.
Northern Canada Supply Co.

Chemical Apparatus—
Mine & Smelter Supply Co.

Chemists—
Canadian Laboratories.
Campbell & Deyell.
Thos. Heys & Sons.
Milton Hersey Co.
Ledoux & Co.

Classifiers—
Mine & Smelter Supply Co.

Coal—
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters—
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.

Coal Mining Explosives—
Canadian Explosives, Ltd.

Coal Mining Machinery—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Sullivan Machinery Co.
Marsh Engineering Works.
Hadfields Ltd.

Coal Pick Machines—
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.

Compressors—Air—
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Northern Canada Supply Co.

Concrete Mixers—
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.

Condensers—
Smart-Turner Machine Co.
Northern Canada Supply Co.

Concentrating Tables—
Mine & Smelter Supply Co.

Converters—
Northern Canada Supply Co.

Conveyer—Trough—Belt—
Hendrick Mfg. Co.

Cranes—
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.

Crane Ropes—
Allan, Whyte & Co.

Crucibles—
Mine & Smelter Supply Co.

Crushers—
Lymans, Ltd.
Mussens, Limited.
Mine & Smelter Supply Co.
Hadfields Ltd.

Derricks—
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.

Diamond Drill Contractors—
Diamond Drill Contracting Co.
Smith & Travers.
Sullivan Machinery Co.

Dredger Pins—
Hadfields Ltd.

Dredging Machinery—
M. Beatty & Sons.
Hadfields Ltd.

Dredging Ropes—
Allan, Whyte & Co.

Drills, Air and Hammer—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Sullivan Machinery Co.
Northern Canada Supply Co.
Canadian Rock Drill Co.

Drills—Core—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Drills—Diamond—
Sullivan Machinery Co.
Northern Canada Supply Co.

Drill Steel—Mining—
Hadfields Ltd.

Drill Steel Sharpeners—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Northern Canada Supply Co.
Sullivan Machinery Co.
Canadian Rock Drill Co.

Drills—Electric—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Sullivan Machinery Co.

Drills—High Speed and Carbon—
Hadfields Ltd.

Dynamite—
Canadian Explosives.
Northern Canada Supply Co.

Ejectors—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Northern Canada Supply Co.

Elevators—
M. Beatty & Sons.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields Ltd.

Engineering Instruments—
C. L. Berger & Sons.

Engines—Automatic—
Smart-Turner Machine Co.

Engines—Gas and Gasoline—
Alex. Fleck.
Sullivan Machinery Co.
Smart-Turner Machine Co.
Gould, Shapley & Muir Co., Ltd.

Engines—Haulage—
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Marsh Engineering Works.

Engines—Marine—
Smart-Turner Machine Co.

Engines—Steam—
Smart-Turner Machine Co.
M. Beatty & Sons.

Forges—
Northern Canada Supply Co., Ltd.

Forging—
M. Beatty & Sons.
Smart Turner Machine Co.
Hadfields Ltd.

Furnaces—Assay—
Lymans, Ltd.
Mine & Smelter Supply Co.

Fuse—
Canadian Explosives.
Northern Canada Supply Co.

Gears—
Smart-Turner Machine Co.
Northern Canada Supply Co.

Hammer Rock Drills—
Mussens, Limited.

Hangers—Cable—
Standard Underground Cable Co. of Canada, Ltd.

High Speed Steel—
Hadfields Ltd.

High Speed Steel Twist Drills
Northern Canada Supply Co.

Hoists—Air, Electric and Steam—
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
Jones & Glassco.
M. Beatty & Sons.
Marsh Engineering Works.
Northern Canada Supply Co.

Hoisting Engines—
Mussens, Limited.
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
M. Beatty & Sons.
Marsh Engineering Works

Hose—
Northern Canada Supply Co.

Hydraulic Machinery—
Hadfields Ltd.

Ingot Copper—
Canada Metal Co., Ltd.
Hoyt Metal Co.

Insulating Compounds—
Standard Underground Cable Co. of Canada, Ltd.

Jacks—
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.

Laboratory Machinery—
Mine & Smelter Supply Co.

Locomotives (Steam, Compressed Air and Storage Steam)—
H. K. Porter Company.

Link Belt—
Northern Canada Supply Co.
Jones & Glassco.

Manganese Steel—
Hadfields Ltd.

Metal Merchants—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.
Consolidated Mining and Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.

Mining Requisites—
Hadfields Ltd.

Monel Metal—
International Nickel Co.

Nickel—
International Nickel Co.

Ore Sacks—
Northern Canada Supply Co.

Ore Testing Works—
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.
Hoyt Metal Co.

Ores and Metals—Buyers and Sellers of—
C. L. Constant Co.
Geo. G. Blackwell.
Consolidated Mining and Smelting Co. of Canada.
Orford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.

Perforated Metals—
Northern Canada Supply Co.
Hendrick Mfg. Co.

Pig Tin—
Canada Metal Co., Ltd.
Hoyt Metal Co.

Pig Lead—
Canada Metal Co., Ltd.
Hoyt Metal Co.

Canadian Miners' Buying Directory.—(Continued from page 29.)

Pipes—
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
Smart-Turner Machine Co.

Pipe—Wood Stave—
Pacific Coast Pipe Co., Ltd.

Piston Rock Drills—
Mussens, Limited.

Pneumatic Tools—
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.

Prospecting Mills and Machinery—
Standard Diamond Drill Co.
Mine & Smelter Supply Co.

Pulleys, Shafting and Hangings—
Northern Canada Supply Co.

Pulverizers—Laboratory—
Mine & Smelter Supply Co.

Pumps—Boiler Feed—
Smart-Turner Machine Co.
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.

Pumps—Centrifugal—
Mussens, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
Can. Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.

Pumps—Electric—
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.

Pumps—Sand and Slime—
Mine & Smelter Supply Co.

Pumps—Pneumatic—
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.

Pumps—Steam—
Can. Ingersoll-Rand Co., Ltd.
Mussens, Limited.
Northern Canada Supply Co.
Smart-Turner Machine Co.

Pumps—Turbine—
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.

Pumps—Vacuum—
Smart-Turner Machine Co.

Quarrying Machinery—
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
Hadfields Ltd.

Rails—
Hadfields Ltd.

Roofing—
Northern Canada Supply Co.

Rope—Manilla and Jute—
Jones & Glassco.
Northern Canada Supply Co.
Allan, Whyte & Co.

Rope—Wire—
Allan, Whyte & Co.
Northern Canada Supply Co.

Rolls—Crushing—
Hadfields Ltd.

Samplers—
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heys & Son.
Mine & Smelter Supply Co.

Screens—
Northern Canada Supply Co.
Hendrick Mfg. Co.
Hadfields Ltd.

Screens—Cross Patent Flanged Lip—
Hendrick Mfg. Co.

Separators—
Smart-Turner Machine Co.

Sheet Lead—
Canada Metal Co., Ltd.

Sheets — Genuine Manganese Bronze—
Hendrick Mfg. Co.

Shovels—Steam—
M. Beatty & Sons.

Smoke Stacks—
Hendrick Mfg. Co.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works.

Steel Barrels—
Smart-Turner Machine Co.

Steel Castings—
Can. Brakeshoe Co., Ltd.
Hadfields Ltd.

Steel Drills—
Sullivan Machinery Co.
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.

Steel Drums—
Smart-Turner Machine Co.

Steel—Tool—
N. S. Steel & Coal Co.
Hadfields Ltd.

Stone Breakers—
Hadfields Ltd.

Surveying Instruments—
C. L. Berger.

Tables—Concentrating—
Mine & Smelter Supply Co.

Tanks (Wooden)—
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.

Tanks—Steel—
Marsh Engineering Works.
MacKinnon Steel Co.

Tanks—Cyanide, Etc.—
Hendrick Mfg. Co.
Pacific Coast Pipe Co., Ltd.
MacKinnon Steel Co.

Tanks (water) and Steel Towers—
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.

Tramway Points and Crossings—
Hadfields Ltd.

Transits—
C. L. Berger & Sons.

Tubs—
Hadfields Ltd.

Welding Rod and Flux—
Imperial Brass Mfg. Co.

Welding and Cutting, Oxy-Acetylene—
Imperial Brass Mfg. Co.

Wheels and Axles—
Hadfields Ltd.

Winding Engines—Steam and Electric—
Can. Ingersoll-Rand Co., Ltd.
Marsh Engineering Works.

Wire Cloth—
Northern Canada Supply Co.
B. Greening Wire Co., Ltd.

Wire (Bare and Insulated)—
Standard Underground Cable Co., of Canada, Ltd.

Zinc Spelter—
Canada Metal Co., Ltd.
Hoyt Metal Co.

ALPHABETICAL INDEX TO ADVERTISERS

A

Allan, Whyte & Co. 23
American Zinc Lead & Smelting Co. 5

B

Bath, Henry & Son 27
Balbach Smelting & Refining Co... 27
Beatty, Blackstock, Fasken, Cowan & Chadwick 25
Beatty, M. & Sons 12
Berger, C. L. & Sons 5
Blackwell, Geo. G., Sons & Co. .. 27
British Columbia, Province of 10
Burns & Roberts 16

C

Callow, J. M. .. ..
Campbell & Deyell, Ltd. 25
Canadian Explosives, Ltd. 28
Canadian H. K. Porter, Ltd. 26
Canadian Ingersoll-Rand Co., Ltd. Montreal, Que. 1
Canadian Laboratories, Ltd. 25
iCanada Metal Co. 24
Canadian Milk Products, Ltd. 12
Canadian Northern Railway 7
Canadian Rock Drill Co., Ltd. .. .. Inside Back Cover
Canadian Steel Foundries, Ltd. 10
Capper Pass & Son, Ltd. 27
Consolidated Mining & Smelting Co. 27
Coniagas Reduction Co., Ltd. 27
Constant, C. L. & Co. 27
Cleveland Pneumatic Tool Co. of Canada, Ltd. 3
Canadian General Electric Co. 7
Canadian Brakeshoe Co. 20
Canadian Fairbanks-Morse Co., Ltd.

D

—
Conical Mill Co. .. ..
Deloro Smelting & Refining Co. .. 2
Denver Rock Drill Mfg. Co. .. .. Inside Back Cover
Department of Mines, Canada 22
Dewar Mfg. Co. 7
Diamond Drill Contracting Co. 5
Dominion Coal Co., Ltd. 12
Dominion Engineering & Inspection Co. 25
Dorr Co. 25
Dominion Iron & Wrecking Co. 24
Dominion Steel Foundry, Ltd.. 3
Dresser, Jno. A. 25
Dwight & Lloyd Sintering Co., Inc. 2

E

Everitt & Co. 4

F

Ferrier, W. F. 25
Fleck, Alex. 3

G

Gartshore, John J. 26
General Engineering Co. 26
Goldsmith Bros. Smelting & Refining Co., Ltd. 5
Goold, Shaply & Muir Co., Ltd. 5
Greening, B. Wire Co. .. ..
Goodyear Tire & Rubber Co. of Canada Ltd. 21

H

Hadfields, Ltd. .... Outside Back Cover
Hall, G. C. & Co. .. ..
Hamilton Gear & Machine Co. .. ..
Harding, E. .. ..
Hassan, A. A. 25
Hendrick Mfg. Co. 6
Hersey, Milton Co., Ltd. 25
Heys, Thomas & Son 25
Hull Iron & Steel Foundries Ltd. .. 13
Hoyt Metal Co. .... Outside Back Cover

I

Imperial Bank of Canada 6
Imperial Brass Mfg. Co. .. ..
International Business Machines .. .. Outside Front Cover
International Nickel Co. 6

J

Johnson, Matthey & Co. 25
Jones & Glassco 23

L

Laurie & Lamb .. ..
Ledoux & Co. 25
Lindsey, G. G. S. 25
Longyear, E. J. Co. 4
Lymans, Ltd. 6

M

MacGovern & Co., Inc. .. ..
MacKinnon Steel Co. Ltd. .. ..
Marsh Engineering Works, Ltd. ... 14
McEvoy, Jas. 25
Mine & Smelter Supply Co. 11
Minerals Separation North American Corporation 8-9
Mond Nickel Co. 4
Mussens, Limited 12

N

Northern Canada Supply Co., Ltd. .. .
Northern Electric Co., Ltd. 19
Nova Scotia Steel & Coal Co. 4
Nova Scotia Government 26
Nordberg Mfg. Co. 15

O

Ontario, Province of 7
Ontario Mining Products Co. 5

P

Pacific Coast Pipe Co., Ltd. .. .. ..
Prest-O-Lite Co., Inc. .. ..

Q

Quebec, Province of 20

R

Ridout & Maybee 26
Rogers, John C. 25
Rogers, Geo. R. 25
Reddaway, F. & Co. 16

S

Salisbury Electric Co., Ltd. .. .. ..
Smart-Turner Machine Co. 5
Smith & Travers Company 25
Standard Underground Cable Co. of Canada, Ltd. 5
Stewart, Robert H. 25
Sudbury Diamond Drilling Co., Ltd. 25
Sullivan Machinery Co. .. .. Inside Front Cover
Scully, A. A. .. ..

T

Toronto Testing Laboratory, Ltd. .. 25
Tyrrell, J. B. 25

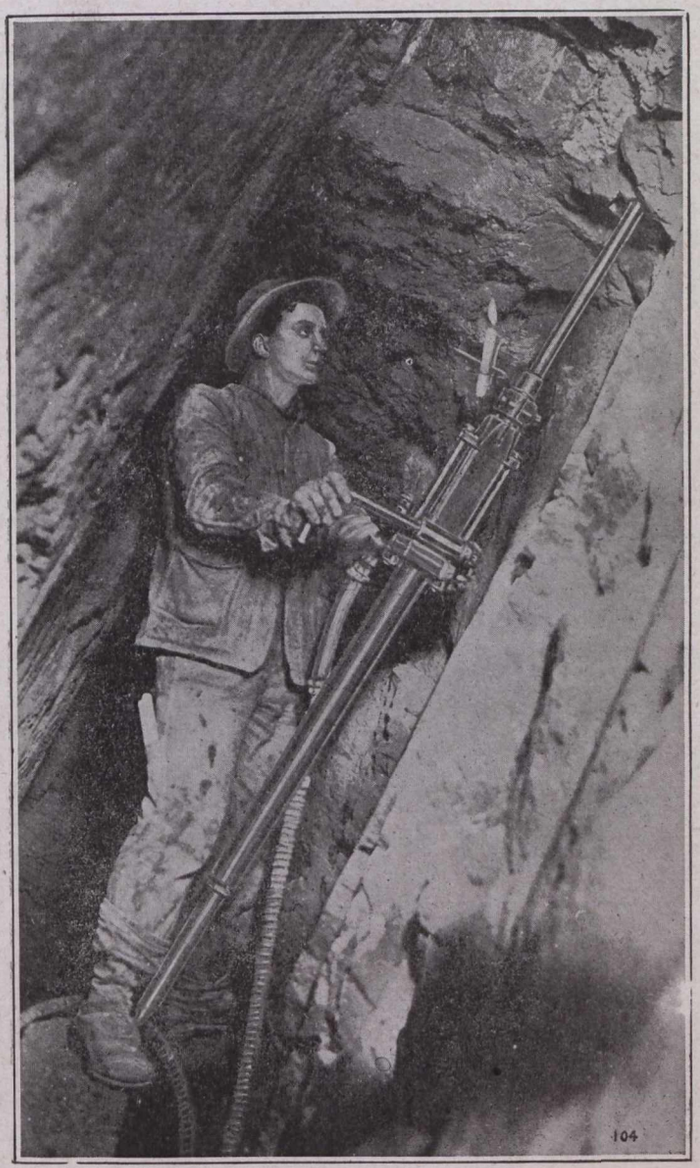
U

University of Toronto 27

W

Wabie Iron Works, The 20
Whitman, Alfred R. 25
Zenith Coal & Steel Products, Ltd. 3

Be Sure That It's a "WAUGH"



When you buy an Air Feed Stoper

No matter what your ground or pressure is, the best drill for your work will prove to be a "Waugh".

WHY?

Because the "Waugh" designs cover greatly varying conditions, and there is sure to be one suited to your requirements.

The first successful air feed stoper was a "Waugh", and experienced mining men acknowledge **the superiority** of the "Waugh" productions.

The men prefer them because they are properly balanced and easy to rotate.

Can you do better than to refer your problems to experts representing a concern that specializes in the manufacture of rock drills?

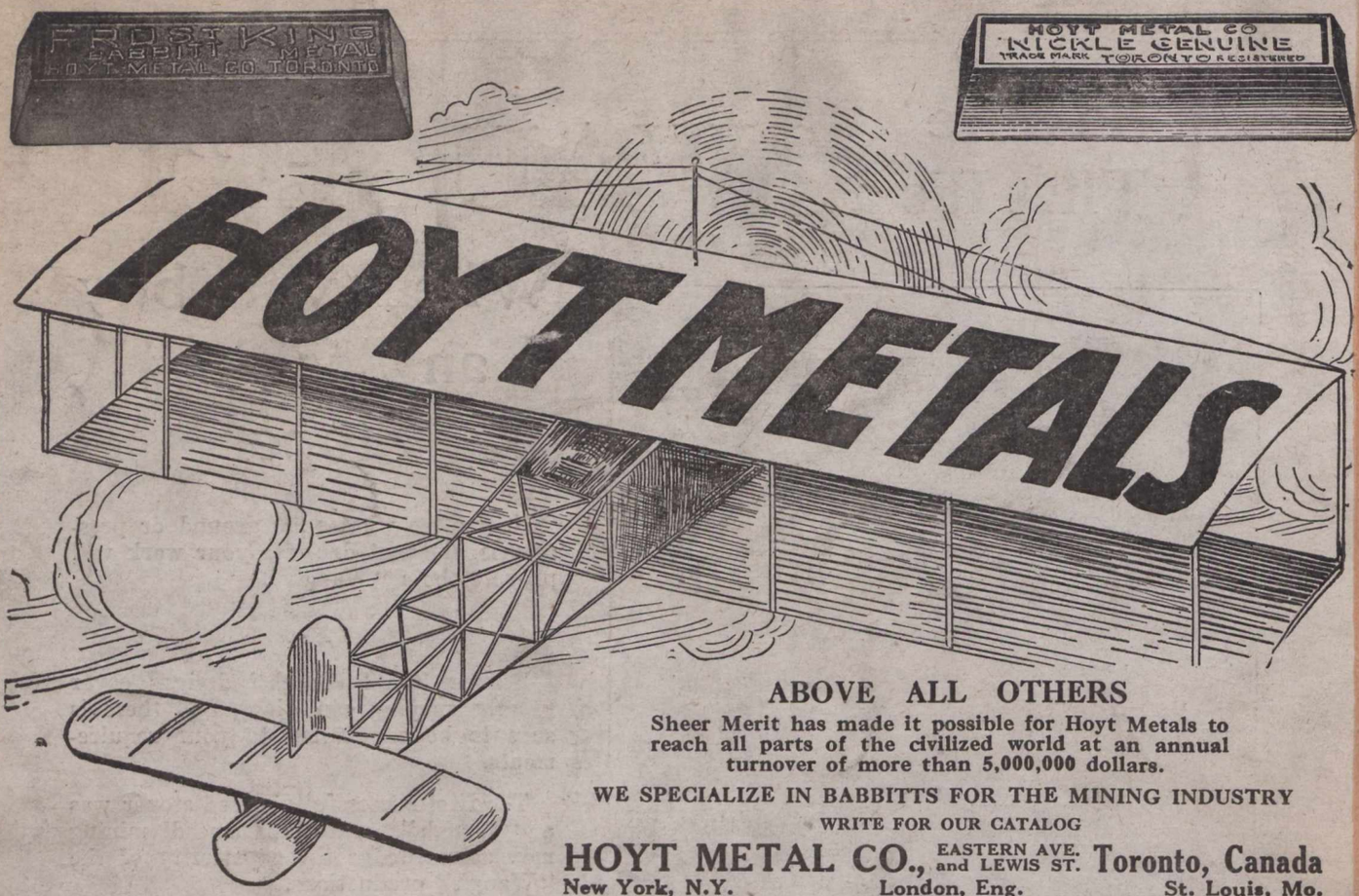
By doing so you will be sure to get a drill that will give the greatest footage on the least air upkeep. One that will neither burn the steel nor break it, and will help to keep down the cost of your production.

ROCK WAUGH DRILLS

Canadian Rock Drill Company, Limited

42 Scott St., Toronto, Ont. — **Cobalt, Ont.**
614 Baker St., Nelson, B.C. — **812 Vancouver Block, Vancouver, B.C.**

H8 *Sole Agents in Canada for* **The Denver Rock Drill Manufacturing Co.** Denver, Colorado



ABOVE ALL OTHERS

Sheer Merit has made it possible for Hoyt Metals to reach all parts of the civilized world at an annual turnover of more than 5,000,000 dollars.

WE SPECIALIZE IN BABBITTS FOR THE MINING INDUSTRY

WRITE FOR OUR CATALOG

HOYT METAL CO., EASTERN AVE. and LEWIS ST. **Toronto, Canada**

New York, N.Y. London, Eng. St. Louis, Mo.

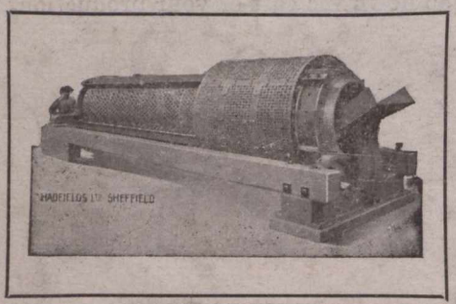
HADFIELDS L.TD.

Workmen employed over 15,000

Hecla and East Hecla Works, Sheffield, England

Works area over 200 acres

Sole Agents : Peacock Brothers, 285 Beaver Hall Hill, Montreal.



REVOLVING SCREEN

MINING REQUISITES

of all kinds

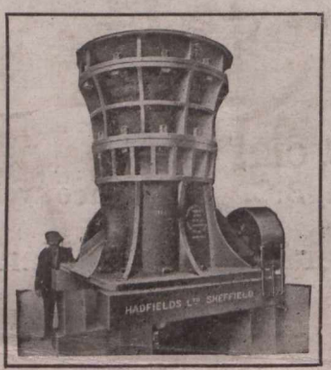
Forged Steel Balls, all sizes, for Ball Mills and Tube Mills. Grizzley Bars, Shoes and Dies. Steel Wheels and Axles, etc.

HIGH SPEED AND OTHER TOOL STEELS

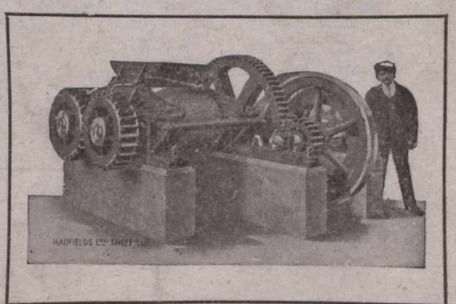
of the finest quality

MAKERS OF ALL KINDS OF

Stone Breaking & Ore Crushing Machinery



'HECLON' ROCK & ORE BR[illegible]KER



ROLL CRUSHER OF SOLID STEEL CONSTRUCTION

Steel Castings & Forgings

of every description.

Sole Makers of HADFIELD'S PATENT

"ERA"

Manganese Steel

The Supreme Material for the Wearing Parts of Stone Breaking and Ore C[illegible] Machinery