

January 15, 1918

Single Copies 15 Cents

CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO

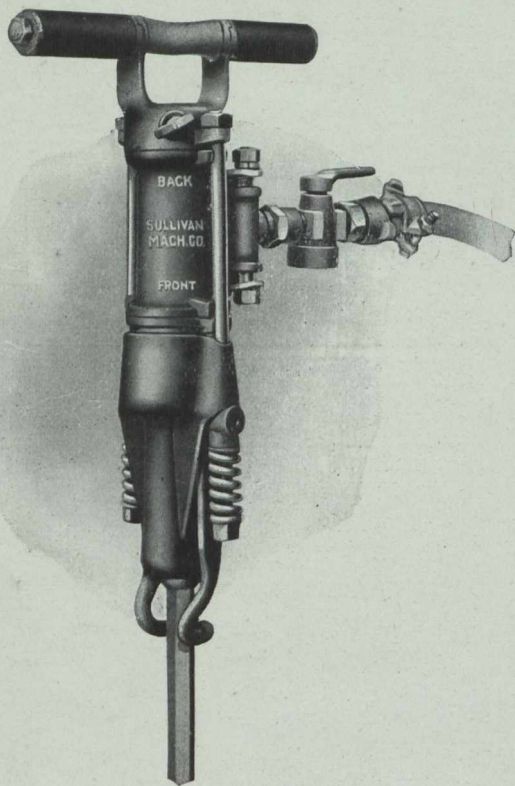
No. 2

Molybdenite From An Ontario Mine



This specimen is from the Taylor mine near Renfrew, now being operated
by A. W. Taylor, 123 Bay St., Toronto.

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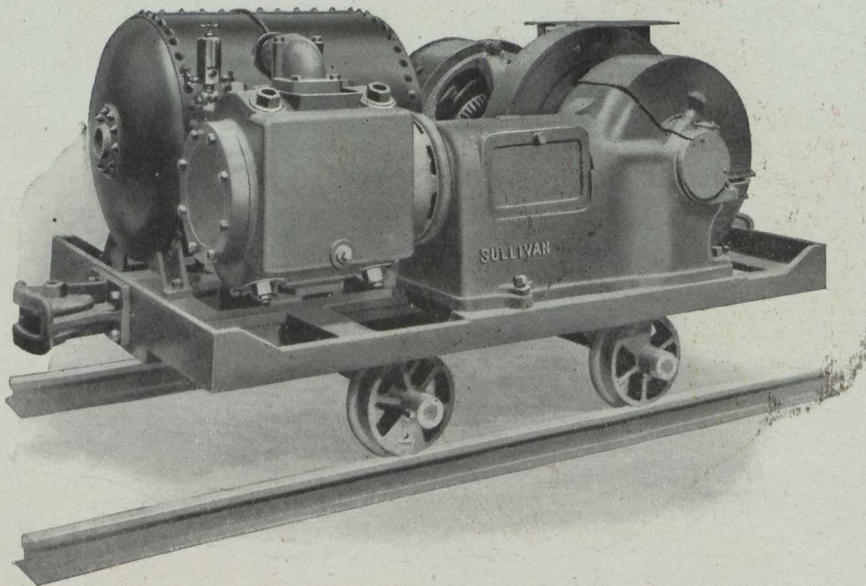


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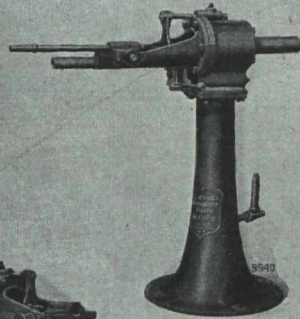


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Leyner Shank and Bit Punch
punching out a drill bit



View showing Rack and
Pinion Guard Removed

LEYNER SHANK AND BIT PUNCH

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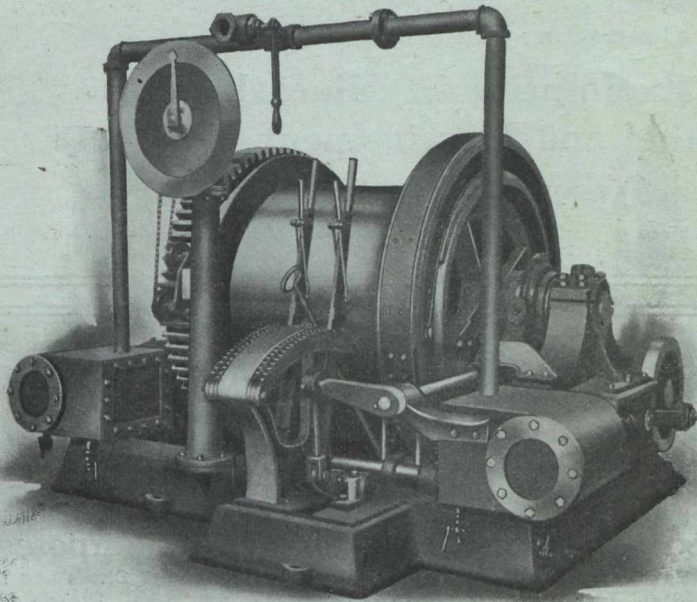
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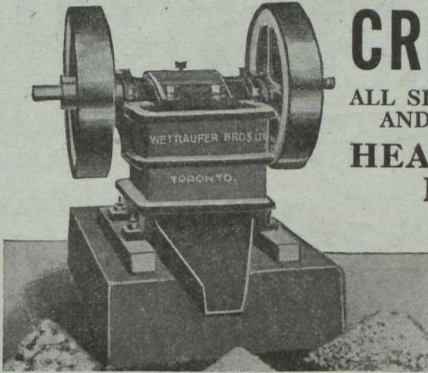
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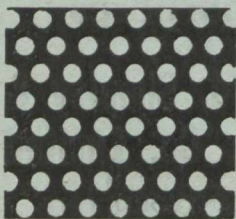
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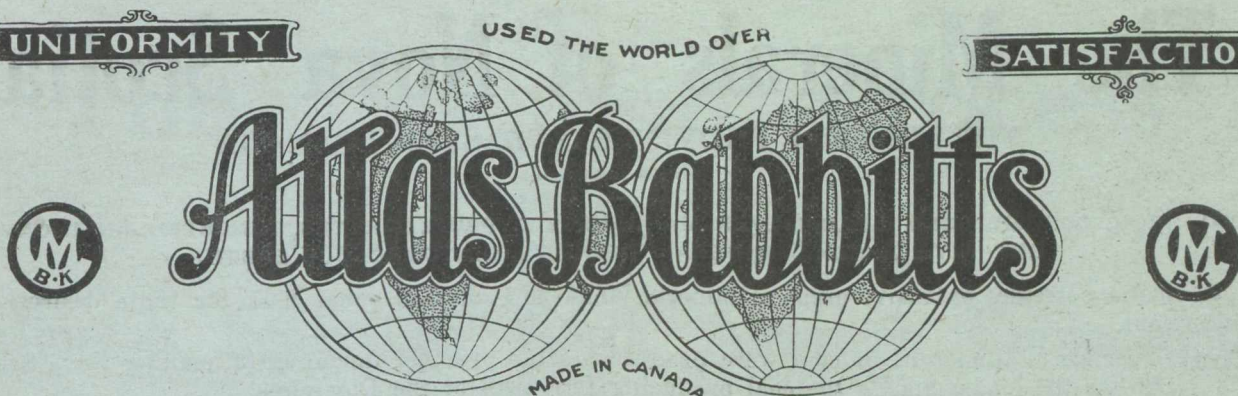
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4

The Minerals of Nova Scotia

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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and Other Literature may be had free on application to

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Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS.

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

**HONOURABLE HONORÉ MERCIER,
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The Flotation Process

All patent and other rights to this process
in North America are now controlled by

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,510; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167 603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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Aggregate Value of \$558,560,715

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462.

Production During last ten years, \$284,916,993

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

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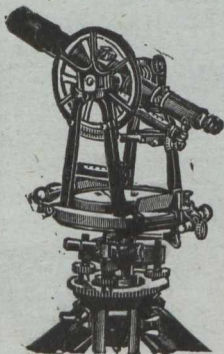
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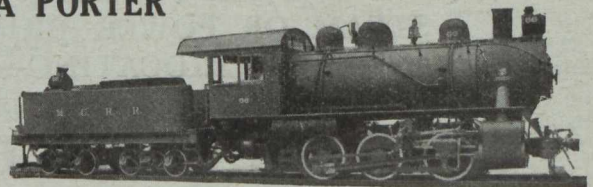
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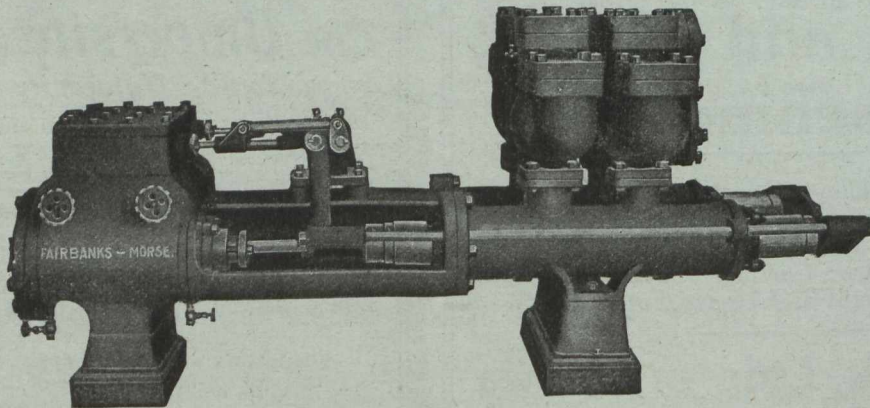
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THE CANADIAN MINING JOURNAL

VOL. XXXIX

TORONTO, January 15th, 1918.

No. 2

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada.

Published 1st and 15th of each month by the
MINES PUBLISHING CO., LIMITED

Head Office 263-5 Adelaide Street, West, Toronto
Branch Office 600 Read Bldg., Montreal

Editor: REGINALD E. HORE, B.A. (Toronto).

SUBSCRIPTIONS.

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

Single copies of current issue, 15 cents. Single copies of other than current issue, 25 cents.

The Mines Publishing Co. aims to serve the mining industry of Canada by publication of reliable news and technical articles. This company publishes the Canadian Mining Journal twice a month and the Canadian Mining Manual once a year.

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Advertising copy should reach the Toronto Office by the 3th for issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

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"Entered as second-class matter April 23rd, 1903, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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In fixing prices of metals and ores in the United States the producers and the Government have carefully considered costs and needs. In fixing the price of molybdenite in Canada, Canadian producers and would-be producers received no consideration. The price was arbitrarily fixed in England, and our Government until last week showed no disposition to free itself from outside dictation. By putting on an embargo without insisting on a fair price, it met the wishes of the British users of molybdenite and then allowed the Imperial Munitions Board to dictate prices to producers. Everyone is pleased to see the British Government obtain its supplies as cheaply as possible; but it was absurd to expect that the producers should not object to the fixing of prices without consideration of the cost.

The recent decision of the Canadian Government is to be regarded as a hopeful sign. It suggests to us that the folly of discouraging the producer of basic materials is becoming more generally recognized.

THE MOLYBDENITE EMBARGO LIFTED.

The Dominion Government is to be congratulated on its decision to remove the embargo on molybdenite. As we have repeatedly pointed out during the past few months, this embargo has seriously interfered with the development of molybdenite deposits in Canada at a time when there is an excellent opportunity to market this mineral.

Early in the war the British Government fixed the price of molybdenite in Great Britain, and appointed brokers to requisition, at a price of 105 shillings per unit, all shipments arriving in the United Kingdom. The demand for molybdenum naturally rose rapidly with the increased use of molybdenum steel, and the ruling price in the United States is about double that in England. Development of molybdenite deposits in Canada has been given a great impetus by the war; but the placing of an embargo on shipments to the United States forced Canadian producers to depend almost entirely on purchases by the Imperial Munitions Board at a price fixed by the British Government. By this stupid arrangement, which saved the British Government only a paltry sum because its needs were small, Canada was prevented from marketing molybdenite at a good price in the United States; and development of Canadian molybdenite properties has been greatly delayed.

The price paid by the Imperial Munitions Board is not sufficient to pay the cost of mining and concentrating molybdenite at many mines, if any, in Canada; and unfortunately it will now be some time before full advantage can be taken to supply the demands of United States and European manufacturers. It is to be regretted that the embargo was not lifted last spring, as mining could have been carried on more energetically if the action of the Government had not been so discouraging to producers. The few companies which are now in a position to produce molybdenite will, however, be able to take some advantage of the new conditions, and those who have been disheartened by Government interference will now resume their work of development with new courage.

In view of the fact that the prices of many metals have been fixed by Governments, it is not surprising that the price of molybdenite should be fixed. We have no objection to the fixing of a price if it is done by Canadians after careful investigation of the cost of producing the mineral at our low grade undeveloped or partially developed deposits. We do object to the fixing of a price without investigation. The demand for molybdenite before the war was small; but it has so greatly increased that development of low grade and irregular deposits is necessary. The cost of mining such material is necessarily high and should be taken into consideration. Experience in the United States has shown that not enough molybdenite is obtainable when the market price has been over \$2 per lb. With the embargo lifted and Canadian deposits worked, it is probable that a fixed price of \$2 per pound would result in enough molybdenite being mined to meet the demand. It would be an easy matter for the United States and Canadian Governments to agree on a price such as has obtained in England, but such a price makes development of most molybdenite deposits impossible.

A SHIPMENT FROM TAYLOR MOLYBDENITE MINE.

During the past summer, Mr. A. W. Taylor of Toronto has been developing a molybdenite property near Renfrew, Ontario. Recently he shipped to the Mines Branch, Ottawa 42,584 lbs. of ore which averaged 3.4 per cent. MoS₂, or 1447.88 lbs. On a basis of 92 per cent. recovery the MoS₂ content amounted to 1332.04 lbs.

The flake molybdenite, shipped to another destination, averaged over 65 per cent. MoS₂. The combined shipment contained over 4 per cent. MoS₂.

Owing to the severe weather, work at the property is temporarily discontinued. The satisfactory results obtained in the preliminary work indicate that the property will soon become an important producer.

THE EXPORT OF MOLYBDENITE.

The Canadian Government has decided to license until further notice the free export of molybdenum, tungsten, their ores, concentrates and products to approved consignees in the United States and France. It is necessary for exporter to obtain license from Commission of Customs, Ottawa, previous to shipment and from the Bureau of Imports, War Trade Board, Bond Bldg., Washington, a license to import into the United States.

USES OF MOLYBDENUM

At a meeting of the New York section of the American Institute of Mining Engineers held on Sept. 27, 1917, the following comments on molybdenum were presented in a paper prepared by S. H. Ball and published in a recent bulletin of the A. I. M. E.

Molybdenum perhaps more than any other metal has had its production increased by the war. The 1916 production was in tonnage over twenty times, and in value perhaps 100 times, that of 1902. Its use for munitions prior to the war is shown by the fact that the principal consumers prior to 1914 were Krupp and Creusot. The 3 or 4 per cent. of molybdenum used by the Germans in their heavy artillery, and even in rifle barrels, notably prolongs the life of these weapons.

The most important use of molybdenum in peace time is in steel and other alloys. Its consumption in tool steel appears to be at a standstill, but many feel that in this field the metal has not as yet had its final trial. The use of alloys containing molybdenum in automobile parts is increasing. The metal is also employed in small quantities by the electrical and scientific instrument trades. Its salts figure as chemical reagents, pottery colorants and medicines. A salt of molybdenum is used as an explosive preservative.

It is hoped that the war will prove to the steel workers the valuable properties of the metal, and by creating a demand for it, develop dependable sources and stabilize the supply. Tungsten, its chief competitor, has in the past enjoyed the advantage of a much better established production.

The position of being the chief molybdenum producer has changed with remarkable frequency recently. In 1910 Queensland accounted for 50 per cent. of the production, New South Wales and Norway each almost 25 per cent., and Sweden and the United States produced small amounts. Active prospecting, fostered by

war prices, caused the United States to take the lead in 1915, but this year Canada is apparently the most important producer. According to Mr. F. L. Hess, the world's 1915 production was equivalent to 222.6 tons of metal.

Prior to the war France and Germany produced most of the ore, but now England, Canada and America are also making both molybdenum and ferromolybdenum.

The metal 6 years ago was worth about \$1.40 per pound, but since 1914 has been from double to quadruple this figure. The price of ferromolybdenum (containing from 50 per cent. to 85 per cent. molybdenum) is practically that of its molybdenum content.

There are two molybdenum materials occurring in minable quantities, molybdenite, the sulphidates, and wulfenite, lead molybdate.

Molybdenite, the most important of these, on cursory examination resembles graphite. It is usually associated with rocks of the granite family. Tungsten deposits, and quartz-molybdenite veins, have to date yielded over three-fourths of the world's production, while pegmatites, tin and bismuth deposits and cupiferous quartz veins have added small amounts. Certain molybdenite-bearing granites might be the basis of large milling operations if the demand for the metal justified the necessary expenditure.

Molybdenite prices are quoted on a 90 per cent. MoS₂ product, although when stocks are short, 20 per cent. concentrates may be saleable. Copper should be below 2 per cent. or 3 per cent., and tin and bismuth less than 0.5 per cent. A number of other impurities are penalized. From 1902 to 1913 the price mounted from \$400 to \$1000 per ton, but since the war it has fluctuated between \$2000 and \$3600. All British production is commandeered at \$22.50 per unit.

Wulfenite is rather common in the oxidized zone of lead-bearing ore bodies, particularly in arid regions. Although it is a less desirable ore than molybdenite, it was practically the only molybdenum ore produced in America prior to 1915. Since the war Wulfenite containing 25 per cent. molybdic trioxide has been worth some \$300 per ton.

It is hoped that when peace arrives the steel workers will have satisfactorily proved the value of the metal, and that its production will increase. It is at least as common in the world's crust as tungsten, and I am inclined to believe that, while its high grade deposits are pockety, low-grade deposits of considerable tonnage exist which will insure a supply of the metal long after the important tungsten producing centres, now known, are exhausted.

OXY-ACETYLENE WELDING.

"Turning waste into profit" is the title of a booklet, recently issued by the Prest-O-Lite Co., Inc., Toronto, dealing with the importance of the conservation of steel and iron through oxy-acetylene welding and cutting. This booklet is profusely illustrated with half-tone engravings showing many examples of Prest-O-Lite welding repairs, which have saved money for manufacturers, railroads, mines, machine shops, engineering and industrial plants in almost every line. We have been advised by the Prest-O-Lite Company that a copy of this booklet will be mailed free of charge to anyone interested.

Bore-Hole Exploration

By C. H. Hitchcock.

The mining business may be divided into four lines of work, prospecting, exploration, mining and metallurgy. Each of these involves many of the sciences and many lines of engineering. In such a business certain branches of the work are more attractive than others and become very highly developed. Those that are less scientifically conducted cause a weakening of the whole structure.

Prospecting is a game of chance, and no matter how well it is conducted, the net result is not to eliminate the gamble but lessen it.

Exploration to-day is probably the weakest link in the mining business, and poor work along this line is yearly the cause of monumental blunders.

As soon as an area of land is chosen as having mineral possibilities scientific exploration is reasonably sure of determining the structure, quantity, and quality of such minerals as may exist. This data is fundamental and should decide how extensive a mining business, if any, can be established to ensure a maximum of profit.

In general the objects of scientific exploration are three fold; to establish ore reserves as a foundation to finance the business; to develop the structure of the orebody so that the mining can be done on the proper scale, and at a minimum expense; to prove quality of the ore so that the metallurgy will be scientifically worked out and a treatment plant built in keeping with the size of the orebody. We want nicety of adjustment of one branch of the work to every other. To get this, reliable exploration data is fundamental and absolutely necessary. Otherwise mistakes are sure to delay and lessen the total dividends. Since a thorough knowledge of ore reserves is of such vital importance, it might be expected that great care would be given exploratory work. Actually it is apt to be poorly done by the best mining companies. It is to be regretted that a mining company seldom realizes what it has missed.

Exploratory work may be done by bore-holes; by shafts, drifts and crosscuts; or a combination of the two methods. Bore-hole exploration is by far the cheapest and can generally be used in preference to the latter methods.

In order to successfully explore mineral lands, it is necessary that an engineer who knows structural geology and exploration methods be given time to thoroughly study the type of ore deposit to be explored before starting actual work. If possible, diamond drill exploration should be chosen because it is the cheapest method, proves tonnage the quickest and gives the maximum of structural information.

The rectangular system of drill holes is likely to be best. The size of the squares to govern the position of the holes depends on several factors, namely: the size of the deposit, the character of the mineralization, the depth of the holes, and the character of the rock to be drilled. A large area of ore outcrop of even mineralization and regular outline will stand large squares, while small deposits of uneven mineralization and irregular outline require smaller squares, necessitating a greater footage drilled to get reliable data. Exploration requiring deep holes demands large squares because of the deflection of the holes, otherwise the holes will cross and one will thereby

become of little value. Holes drilled in brecciated, broken material, rocks of unequal hardness and sediments, deflect greatly, and for the same reason require larger squares.

The angle of the holes should be tested at regular intervals from the surface in order to secure accuracy. E. J. Longyear Company, 710 Securities Bank Building, Minneapolis, Minn., can furnish complete apparatus for this work.

The Knight and Stone core barrel is considered the best double tube core barrel on the market and is supposed to give a maximum recovery of core in soft ground. Large rods extracting a large core will generally give a better recovery of core and may insure straighter holes.

All cores must be carefully studied and the relative ages of the formations determined. Failure to do this has caused irreparable blunders. The core requires assay of economic metals contained as well as those elements that may have a bearing on the metallurgy of the ore. The metallurgical side is too often neglected.

When the orebody is surrounded by barren holes the deposit may be considered thoroughly explored. The quantity and quality make it possible to decide intelligently regarding future financing, mine development, and the metallurgy of the ore. All work such as mine development, treatment plant, townsite, etc., can go ahead at the same time. In this way maximum production will be reached in the shortest time, at the least total expense, and give the maximum of dividends when the ore body is exhausted.

The Appeal Tribunal at Sudbury presided over by The Hon. Mr. Justice Ferguson, decided on December 28th, 1917, that exploratory work was unnecessary for the duration of the war. As a result ten skilled diamond drill runners are liable to military service. These men cannot be replaced, so that a large part of the exploratory work during 1918, if done at all, will have to be done by the very expensive and tedious method of sinking shafts, driving drifts and crosscuts, utilizing many times the number of men.

OBITUARY

Mr. Wm. Rowe, for a considerable part of the last twenty years engaged in mining in British Columbia, died suddenly in Nelson, West Kootenay, B. C., on the night of December 24, in his 54th year. He was born in Cornwall, England, and came to Canada about twenty-two years ago. He was in charge of the B. C. mine, in Boundary district in the late nineties and, too, when, in 1900, about 20,000 tons of copper ore averaging about 5 per cent. copper, was shipped to the smelter at Trail, 4,000 tons of which was the first important shipment of copper ore in the Boundary district. In later years he supervised development work on some valuable coal lands in the Blairmore-Frank district of Southwest Alberta. After that he was for several years superintendent of the Jewel gold mine, in Greenwood mining division, Boundary district. He was one of a number of thoroughly good Cornish miners who assisted appreciably in developing mines in Boundary and Kootenay districts of British Columbia.

The Development of the Ankerite Gold Mine

By Clifford E. Smith.

The following is a brief summary of the operations of the Coniagas Mines, Ltd., in the Porcupine Mining division, as contained in a report to the directors:

Operations have consisted of examination of gold prospects, exploration of properties held under option of purchase and of properties acquired by purchase and general organization for the development of gold deposits indicated by such exploratory work. Examination of Ontario gold prospects had been conducted by the directors of the company for some time previous to October, 1915, but of the prospects offered and examined prior to that time, none was deemed of sufficient promise to command the attention of the company.

During October, 1915, preliminary examination was made of a group of three mining claims known as the Ankerite property, situated in Deloro Township and about four miles south-westward from the town of South Porcupine. Results of this examination indicated the possible existence of gold deposits of more than ordinary promise and the directors of the Coniagas Mines, Ltd., decided to explore this property, subject to a satisfactory option of purchase from the owners. Negotiations for a suitable agreement were concluded successfully during the following winter, and prospecting work was begun in April, 1916, and was continuous until April, 1917, during which period of free option a systematic exploration was made of a part of one of the three claims, known as claim M.E. 61.

This work was confined to a zone in which a vein system was indicated. By an extended series of cross-sections of this zone, made by surface cross-trenching and cutting, underground cross-cutting and diamond-drilling, this vein-system was defined as continuous for a length of approximately 1,500 ft. across claim M. E. 61. Systematic sampling followed each cross-section of the several veins and assay results of each section were satisfactory, showing more than ordinary widths and continuity of commercial gold values. This plan of exploration was completed in April, 1917, permitting then a correlation of all results and reasonably safe conclusions respecting the promise of the property. The directors were then advised that they were justified in making the small preliminary payment due that month toward purchase and in undertaking a systematic development of the deposits along the lines which this exploratory work had indicated.

During this first period of work it was found that the vein-system under exploration extended westward from the Ankerite property for some undefined distance across an adjoining group of two claims known as the Maidens-McDonald property. Having evidence that such extensions would prove of value as adjuncts, negotiation for purchase was begun with the owners, and on August 9th, 1917, an option of purchase was concluded, at a price considered safe and reasonable. This option has since been exercised.

Development work decided for the Ankerite was deferred pending these negotiations, so that location of the first working shaft could be determined accordingly. Upon completion of this option, work was resumed under a general plan of development and exploration combining the prospects of both groups and is being pushed as vigorously as working conditions will permit.

This second period of exploration of the Ankerite is producing further satisfactory results, prospects, both of deposits and net values, being extended considerably. Our earlier opinion has been confirmed, that at the eastern boundary of the Ankerite claims the general system of fissuring swings from a north-east strike back sharply toward the north-west, following the swinging brow of elevated country and remaining well within the Ankerite boundaries. This set of conditions appears to preserve within the Ankerite eastern boundaries, both on strike and dip, the major possibilities of Ankerite vein-systems.

On the Maidens-McDonald property, exploration is being extended westward from the Ankerite boundary. This work is following new lines and is defining important extensions and values.

A new power plant has been installed on claim M. E. 61 and is now in operation, serving power for shaft sinking and electric lighting of general buildings. This plant consists of a boiler of 150 H.P. capacity, a "6 drill" air compressor, hoisting engine with drum capacity for 800 ft. depth, engine and generator for 185 lights of 40 W. each, Leyner No. 5 drill sharpener, and general equipment complete for efficiency.

In acquiring the Maidens-McDonald property a power-plant already installed thereon was purchased. This consists of two boilers of about 40 H.P. capacity each, and a "6 drill" unit of a "12 drill" compressor, the other unit to be installed. This plant was put in order and air connections made with the new plant on M. E. 61, so both plants may be used for operations, or one as a reserve for the other.

There is abundance of wood on the properties for over one year of requirements, and this is used as fuel, the cutting serving the double purpose of supplying fuel at a relative cost of less than one-half that of coal and of clearing the ground against risk from fires.

When this fuel has become exhausted and development has exceeded the capacity of these steam plants, electrical power will have been installed suited to extended working requirements.

Camp buildings have been constructed and equipped with capacity for about 75 workmen. The shaft-sinking crew comprises about 35 men, and about 25 more workmen are now employed in operations.

A vertical shaft is now being sunk on M.E. 61, located for development and working of sections of M.E.61 and H. R. 832 (of the Maidens-McDonald group). This shaft is designed for both development and producing purposes and consists of three compartments, each 5 ft. x 5 ft. inside timbers. From this, at proper levels, stations will be cut and cross-cuts of the vein series made as sinking advances, from which development of deposits will follow.

During the coming fiscal year of your company a very considerable underground development and determination of deposits should be accomplished.

Published comment in Spokane, Washington, relative to the Slocan Co.'s affairs is that it begins to look as if a receiver's sale will be necessary, in which event it may be possible that some scheme will be worked out by the White interests whereby the property will be transferred free of debt to a new corporation in which all shareholders in the present company who shall see fit to participate will be allowed to do so.

CONSOLIDATED. M. AND S. CO.

W. D. Matthews, president of the Consolidated Mining and Smelting Company of Canada, in the report, rated December 28th, of the operation of the Company for the year ending September 30th, 1917, said:

The net profit is \$1,076,828 after writing off \$648,058 for depreciation of plant and equipment and charging Profit and Loss Account with \$380,071 in development of the properties. The balance at the credit of Profit and Loss Account now stands at \$2,360,274.

Operations at the smelter, refineries and mines have been handicapped during the year by strikes, causing a serious shortage of coal, which resulted in the discontinuance for some time of shipments of ore from the Rossland mines and a curtailment of ore shipments from other properties.

Labor conditions have been unsettled and difficult during the year and finally resulted after the close of the year in a general strike of the men employed in the smelter at Trail, and a complete cessation of the operations of the company. This strike has within the past few days been settled and the plants and properties will recommence operations immediately.

Notwithstanding all the difficulties encountered during the year, the value of the season's metal product exceeded \$13,000,000.

Producing Sixty Tons Zinc Daily.

Managing Director J. J. Warren says:

The electrolytic zinc plant was completed during the year. Various improvements were made in the process and more are under consideration. A daily production of over 60 tons of pure zinc was reached. An extraction of over 90 per cent. was made from certain classes of ore. Now that the process may be considered to be standardized, every effort is being made to reduce the cost of production. So far there has been no difficulty in disposing of the entire output. The year's production of 10,000 tons of pure zinc, of a value of \$3,000,000, marks another epoch in the metallurgical history of Canada. A concentrating mill with a capacity of 400 tons of ore per day has been erected to treat the Sullivan zinc ores prior to their being put through the zinc plant proper. It has been demonstrated that a much higher extraction can thus be made and at a moderate cost.

Produced 22,000 Tons Refined Lead.

The production of refined lead amounted to over 22,000 tons—or more than 2,000 tons in excess of the product of the previous year. About 75 per cent. of this was sold to the Imperial Munitions Board.

The metallurgical results were the best in recent years.

The production of gold was less than in the previous year because of the Rossland mines having been operated only about half the year.

The production of silver was greater than in the previous year because of the higher silver content in the lead ores received.

Sulphuric Acid Plant Doubled.

The sulphuric acid plant was doubled in capacity. After supplying the entire needs of the refineries and the zinc plant, there is a surplus product for sale commercially.

The hydrofluosilicic acid plant provides the entire requirements of the lead refinery.

Unsatisfactory Operating Conditions.

Operating conditions during the year were unsatisfactory. Supplies of all kinds increased in price. La-

bor, in addition to demanding (and receiving) a higher wage scale, showed a marked decrease in efficiency.

The production of the Rossland mines was only about one-third of normal. This reduced profits and increased operating costs. The Sullivan mine maintained its position as the largest producer.

The statement of the West Kootenay Power and Light Company shows satisfactory earnings. For the most part these represent revenue from electric energy supplied the parent company. The power company has contracted with the Northport Smelting and Refining Company to supply a maximum of 1,500 horse-power for a term of years and with the Canada Copper Corporation to supply a maximum of 5,000 horse-power for ten years. The rates obtained are satisfactory and insure substantial additions to the earnings of the company. A transmission line is being extended to the works of the Northport company. The necessary steps are being taken to extend another transmission line from Greenwood to Princeton and Copper Mountain, where the works of the Canada Copper Corporation are situated.

The value of the year's metal product—over thirteen million dollars—is the greatest, by far, in the history of the company.

Acquiring Gold Properties.

A policy of acquiring and developing gold ore properties is being pursued, to provide against the possibility of a decline in the demand for base metals after the war.

The Canadian commercial requirements for base metals having slackened very considerably during the war, the Imperial Munitions Board have absorbed the bulk of the production. The Board are very keen buyers. Recently they have required that the prices current in the United States markets be met by the company—except for a fair allowance in the matter of freight charges.

Duty on Machinery Increases Cost of Mining.

The cost of production in Canada is necessarily higher than in the United States on account of the more refractory character of the ores treated and the smaller size of the operations. Besides, all supplies used in connection with Canadian mining, smelting and refining cost about forty per cent. more than the same supplies in the United States, the Canadian price being practically the United States price plus the duty into Canada.

This operates as a hardship on the Canadian production of metals when they have to be sold at the United States prices. If the Company's sales to the Imperial Munitions Board had been made at the Canadian commercial prices of the day—instead of the United States prices of the day—the difference in the net profits would be very substantial.

It is hoped that in the future the Board will take a more favorable view of the conditions under which metals are produced in Canada.

Early in 1917 Mr. R. H. Stewart left the service of the company to engage in consulting and other engineering work in Vancouver.

On July 1st, Mr. F. N. Flynn became General Superintendent of Smelting and Refining. From that date, Mr. E. H. Hamilton devoted his entire attention to the zinc plant.

The selling organization, in charge of Mr. W. S. Rugh, west of the Province of Quebec, and of Thomas Robertson and Co., Limited, east of the Province of Ontario, gave satisfactory results.

Recent Industrial Uses of Aluminum*

By F. G. Shull.

In preparing a paper on this subject I have chosen to refer to the following materials, practically all of which have reached stages of commercial importance during quite recent years: Aluminum foil. Aluminum bottle caps and jar closures. Manufactures, involving autogenous welding. Die and pressed castings. Tubing for store service. Rolled rod for machinery purposes. Aluminum conductors, steel reinforced.

The aluminum foil industry has grown from practically nothing to a volume of business involving many tons of aluminum annually. At the start, the product consisted principally of plain foil, not appreciably unlike plain tin foil in appearance, which was used for wrapping candies, chewing gum, teas and the like. Later on the development of the process for embossing and printing aluminum foil opened up a field among manufacturers of chocolate bars, cheese, toilet soaps, etc., so that to-day a very considerable tonnage of this foil is being used in the embossed and printed form.

Plain foil is being used to some extent in electrical condensers. A most recent use for plain foil, which has, as yet, just barely started, is for the lining of pulp board cartons for the packaging of coffee. This combination package possesses moisture resisting, and oil retaining characteristics not inferior to the tin can, as a coffee container.

Aluminum bottle caps and jar closures on the market, known as the "Goldy" seal, have, like foil, advanced from a meager beginning to a business of substantial proportions during a very few years. They are being used on practically all food products put up in glass, such as grape juice, fruits, preserves, ketchup, pickles, salad dressing and so on. While this seal possesses the non-refillable feature and requires no opener to remove, it owes its success, in a great degree, to the fact that it is aluminum, which is known to be non-rusting and strictly hygienic.

The development of a process of welding aluminum by means of the oxy-hydrogen and oxy-acetylene flame has opened an almost limitless field for the outlet of aluminum. Sheet aluminum of all gauges heavier than about one-thirty-second of an inch can be readily welded and the seam dressed off so that it is difficult to locate the joint. Consequently it is possible to build up an aluminum tank or container of almost any size and shape which, when welded together, is practically a one-piece job. This class of material finds a place in breweries, ginger-ale plants, milk depots, chemical plants, and, in fact, wherever seamless metallic non-rusting containers are wanted. The one-piece feature is of marked advantage over the riveted tank which is always liable to spring a leak.

For a long time it has been considered a difficult proposition to die-cast aluminum. At the present time, however, this problem seems to have been solved, as there are several companies that claim to be successfully die-casting this metal.

Another quite recent development is the subjecting of sand castings to very high pressures in order to render the metal more dense and to increase the

strength. Such castings have found use in the making of parts for the timing devices of shrapnel, it being found that these castings not only possess extra high strength, but that they also machine exceptionally well.

Aluminum tubing for pneumatic store service is not a new field for aluminum, strictly speaking, since it has been gradually coming into use for the past several years. It is a fact, however, that the last few years have seen the volume of aluminum consumed for this purpose reach a stage where the tonnage involved is of very great importance. The natural characteristics of the metal itself principally recommend it for this use.

One of the most interesting developments in the aluminum industry of recent years is the rolling of high alloy rods in practically all commercial sizes. In the past, commercial aluminum rod has been largely a drawn product. This method of manufacture prevented the use of aluminum alloyed with any appreciable percentage of other metal, for the reason that in the drawing operation the surface, principally, of the rod is worked. The result is that the surface becomes hard while the body of the rod is left comparatively soft. Therefore, only the smaller sizes of drawn rod are suitable for machining.

By the rolled method of manufacture not only is it possible to use highly alloyed metal, but also the process tends to work the entire mass of the rod so that the finished product is a good uniform homogeneous material which machines well throughout its entire substance. This process, therefore, makes available a good machining aluminum rod in all commercial sizes for automatic machine and turret lathe products.

One of the first uses for which this rolled rod was tried was for the machining of the fuse-timing parts for shrapnel. While it worked perfectly for this purpose, it so happened that the principal timing parts were of such a shape that in making them from rod it was necessary to cut away a great deal of the metal, resulting in high scrap loss. It was found that sand castings of the general shape of the parts to be made could be subjected to a compression process and rendered highly satisfactory for this purpose, with a minimum of scrap loss. Consequently, as a commercial proposition, the rolled rod could not compete with the compressed castings for this particular article. It will without doubt, however, find wide usage for automatic machine products.

Aluminum cable, steel reinforced, is not a very recent aluminum product, it having been in commercial use on an extensive scale for the past few years. It is, however, sufficiently little understood to seem to warrant reference being made to it under the title of this paper.

The excuse for the existence of such a product as steel reinforced aluminum cables lies in certain inherent characteristics of aluminum which needed improving in order to recommend its use for long span, high voltage work. The particular characteristic to which I refer is the coefficient of expansion of aluminum, which is approximately one-third greater than that of copper. Due to this greater expansion the aluminum line lengthens a little more with temperature rise, and shortens a little more with temperature fall, than copper. The result is that it is necessary to string aluminum wire with greater sags than copper wire, in order that its strength may not be overtaxed at low

*A paper presented at a meeting of the American Institute of Metals.

temperatures. By allowing this greater sag at ordinary temperatures, combined with the higher coefficient of expansion of the aluminum referred to, one is apt to get excessive sags at extremely high temperatures in summer.

This was a condition of comparatively little importance in the early days of low voltages and short spans, but with the advent of higher voltages and long span, steel tower construction, the characteristics of aluminum cable, as referred to above, became a serious menace to its commercial existence.

What aluminum cable lacked was high tensile strength and low coefficient of expansion. In order to impart these characteristics it was proposed to make the centre strand of a seven-strand cable, of steel, and the six outer strands, of aluminum, the steel to furnish the strength, and the aluminum the electrical conductivity. A very high grade plow steel wire was selected, which was triple galvanized to prevent corrosion, and the practical tests which followed proved that the theory was correct; that the composite cable took on characteristics different from either of the component metals, and was highly satisfactory for long span work.

It is found feasible to construct these cables with any standard number of strands, varying the proportion of steel and aluminum to meet the particular strength and sag conditions required.

Aluminum cable, steel reinforced, began to grow in favor from the start, so that to-day many of the most modern transmission lines on the American continent are built with this cable.

This, in a general way, will give a hint as to some of the more recent uses of aluminum. The automobile industry is, of course, the big factor in the aluminum business to-day, but the relative importance of some of the other fields for this metal seem to be greatly on the increase.

Mr. J. A. Macpherson, manager of the Cariboo-Chisholm Creek Mining Company, in which it is understood Toronto men are interested, has been quoted by the Cariboo Observer as having stated that the tunnel on the Company's property on Chisholm Creek, Cariboo, crosscutting the channel, is about two-thirds in gravel, with something like two feet of bedrock in the bottom. The gravel looks well; red, rusty looking stuff, and is well washed. The bedrock, unfortunately, is soft, and, the Observer remarks, although it is not known except to the management, what value it contains, not much can be expected until there shall have been a change, which may happen in a set or two, after drifting up-stream shall have been undertaken.

A Northwestern copper-mine manager has been quoted as having stated recently, in order to show what the copper-mining companies "are up against," that after careful investigation he has found that: Cost of wages at present, as compared with the average of 1915, shows an increase of 35 per cent.; cost of supplies, an increase of 45 per cent. Labor efficiency has at the same time had a tremendous diminution as shown by the fact that the average number of tons per man per shift now as compared to 1915 shows a decrease of 35 per cent. Under these circumstances the present selling price of copper can hardly be more advantageous to the copper companies than would be a price of 15 or 16 cents with pre-war costs.

THE LEAD-ORE SITUATION IN BRITISH COLUMBIA.

Following the settlement of the strike of its employees at Trail, British Columbia, the Consolidated Mining and Smelting Company of Canada, Ltd., invited the lead-ore producers of Kootenay district to meet its officials in conference relative to the present situation in regard to the disposal of lead ores. The meeting was held in Nelson on Dec. 27, and the Daily News, of that city, gave the following account of the proceedings:

The crux of the situation is that the Imperial Munitions Board is unable to place any more lead orders at the present time, though an early improvement in the situation is expected.

Most of the lead producers of the Kootenay lead district were in attendance, but the Slocan mine owners were unable to attend owing to train service being interrupted.

The Consolidated Company officials, after the lack of market had been thoroughly discussed, were asked what the company could do.

They stated that they could not receive any lead ore until Feb. 1. It will take until that time to get rid of the accumulation which resulted from the recent strike at the smelting works and refineries at Trail. Two hundred carloads of ore were unloaded by the office staff of the company after the smelter men went out. After Feb. 1, the officials stated, the smelter could take each month until further notice one-twelfth of 25 per cent. of the production of the mines for the year ending Sept. 30, 1917, and settle for it on the terms of the "pooling" circular of Nov. 5. From the same date, Feb. 1, the smelter could receive each month one-twelfth of the remaining 75 per cent. of last year's production and settle for the silver contents on the terms of the circular of Nov. 5, but the lead contents would have to be stored and settled for only after the lead now on hand had been sold and the lead contents of the 25 per cent. of new ore disposed of.

It was intimated that probably arrangements could be made with the banks to advance against the lead stored sufficient to enable the properties to continue operations. The company stated that it would do everything possible to facilitate such an arrangement with the banks.

The company agreed to continue to limit shipments from its own mines in the same proportion as the shipments from the independent producers were limited.

As to zinc, the smelter company expects to be able to receive normal quantities of ore during February. After that month receipts will depend upon further orders being received from the Imperial Munitions Board.

The question of the receipt of shipments of ore from the Electric Point Mine in the neighboring State of Washington, was mentioned and the officials of the company explained that the ore was necessary for fluxing purposes and was accepted only in sufficient proportion to flux the ores from the properties on this side. The company could refuse to accept ore from this mine but the effect would be to increase the cost of smelting the British Columbia ores. The British Columbia mines, if this were done, would thus be burdened with the extra cost.

Officials of the company present at the conference were: Messrs. J. J. Warren, managing director; S. G. Blaylock, assistant manager, and T. W. Bingay, comptroller.

War Minerals*.

By A. G. White.

From the standpoint of essential use and importance, the two great basic materials necessary for the production of modern high-power explosives are nitrate, chiefly in the form of nitric acid, and concentrated sulphuric acid produced from pyrite, sulphur or smelter fumes. In the manufacture of this acid, platinum is essential for the contact process of producing sulphuric acid and for a possible similar use in the oxidation of ammonia to nitric acid. Mercury is essential as the material used for explosives and war munitions, for detonating practically all high-power explosives.

As a second group of minerals for military purposes, come the minerals for munitions and military equipment. Of these the chief group is formed of the steel alloys, which are small amounts of the rarer metals added to our iron and steel products to give them absolutely essential qualities particularly required in munitions, ordnance, battleships, machine tools, aeroplanes and automobiles. Of these the most important are manganese, tungsten, chromium, nickel, cobalt, molybdenum, vanadium and uranium. The major metals, iron, copper, lead and zinc, represent materials of which we have produced a very large percentage of the world's supply. The problems in those minerals are quite large, involving transportation and labor supply, but not requiring new research work or the stimulation of small and unknown deposits. In this second general group come aluminum, which is largely used for automobile and aeroplane parts; antimony, which is used as an alloy for hardening lead bullets; and magnesium, which is used in shells for smoke and light purposes, to detect the point at which they burst.

Another group of minerals essential to industry includes particularly agricultural fertilizers. Potash and phosphates, which are used chiefly for fertilizers, are in this group. Then comes a group of miscellaneous minerals: tin, which is used in food containers; flake graphite, which is used for crucibles for steel, brass, bronze, etc., and is essential in metallurgy; mica, which is used as an insulating material for electrical apparatus and particularly as a transparent material in the construction of gas masks and in the automobile service; asbestos, which is used for fireproofing, ship construction, etc.; magnesite, which is used in the construction of refractory brick in many metallurgical furnaces.

The final group represents the large fuel group, coal, coke, petroleum and natural gas, and those again fall into the large group of materials which represent specific problems of transportation, labor supply, etc.

Mr. A. L. Smith, of Alberni, Vancouver Island, B. C., has informed the Daily Colonist of Victoria, that he has discovered nickel-bearing pyrrhotite on some mineral claims on Barkly Sound, V. I. He states that a sample assayed at the Provincial Government assay office, Victoria, gave a return of 1.5 per cent. nickel (metallic), and two samples assayed by the Canada Department of Mines, Ottawa, gave, respectively, 2.32 and 2.48 per cent. nickel (metallic). Mr. Smith added that "the contact vein is the oldest of rock formations and can be traced on the surface 1,900 feet through the claims. The nickel-bearing pyrrhotite is easily distinguished from the pyrrhotite which does not contain nickel."

*Extract from an address before the St. Louis Meeting of the American Institute of Mining Engineers.

NEW PLANT AT TRAIL, B. C.

Mr. E. H. Hamilton, Metallurgical Manager of Consolidated Mining and Smelting Company of Canada, summarizes additions made to the plant during the first six months of 1917 as follows:

Lead Plant.

The new ore bedding system was completed and put into operation, affording two large beds for mixing and storing unroasted ore.

Lead Mill—Improved facilities were provided for crushing ore.

Dwight-Lloyd Roasting Plant—A new unit was started on June 24th with a view to ultimately adopting double sintering.

Silver Refinery.

A flue gas scrubber was installed to recover values previously lost in smoke.

A smelting retort was installed in place of the old type reverberatory furnace for treatment of refined silver.

The new Bluestone Plant was put into operation.

Electrolytic Copper Refinery.

The capacity of the Copper Refinery was doubled. New air lifts were installed for circulating electrolyte. New slime launders installed.

Copper Melting and Casting Department—Furnace and casting facilities were rebuilt and remodelled to double last year's casting capacity.

Sulphuric Acid Plant.

During the year 2872.7 tons of 100 per cent. Sulphuric Acid were produced.

The capacity of the plant was doubled, and is now capable of producing 30 tons of chamber acid per day.

Hydrofluosilicic Acid Plant.

During the year 196 tons of 100 per cent. Hydrofluosilicic Acid were produced.

The installation of two new retorts is well under way. This will double the capacity of the plant.

Zinc Plant.

The following additions were made to the plant during the year:

Grinding Department—One ore drying rotary kiln has been installed, also other improvements.

A new tube mill has been added to the equipment.

Roasting Department—Four new Wedge-Roasters have been completed, making 13 in all.

Two roasters have been altered and equipped for use as preliminary roasters for the flotation concentrator.

Two Concrete Storage Bins with a capacity of 1,000 tons of Calcine have been built, also screw conveyors, a pumping station, pump, etc., to handle the calcine from these bins.

A link belt steel cased elevator was built and used for calcine.

Leaching Department—During the year the improved counter current system was completely installed and put into operation.

The following additions were made to the plant: 5 new Agitating Pachucas, 3 new Precipitating Pachucas, 10 40-ft. Dorr Thickeners, 4 large Kelley Filter presses bought, installed and operating; 1 large spare Kelley press bought.

Air Lifts—A shaft 75 ft. deep and lagged has been completed, into which 15 air lifts have been installed for handling the acid and other solutions, and thus eliminating pumps. The results have been very satisfactory.

Pumps—Two large bronze Gould Triplex plunger pumps for handling electrolyte have been bought and are operating.

Four Dorr Classifiers have been moved to Pachuca floor.

Two Dorr Classifiers placed over neutral thickeners.

A Diaphragm Pump has been developed and many installed. It is both simple and efficient and without it the counter current system on this class of ore would be impossible.

Two Electrolyte Storage Tanks with capacity of 1,000 tons each were built and put into operation.

Two Lead Lined Acid Electrolyte Storages with capacity of 1,000 tons each were built and put into operation. Lead Linings were put in 8 of the previously installed 16 ft. acid storage tanks. Two 20 ft. storage tanks, one of which is lead-lined, were installed with trestles 40 ft. high.

Elevators—3 elevators for calcine were erected. A Leaching Plant for Customs Ore was built. It consists of 3 Pachuca Tanks; 1 20-ft. Dorr Thickener; 1 Oliver Filter; 3 Concrete Bins; Conveyors and Elevators.

A slimes Filtering Plant with a capacity of 100 tons was built.

Electrolytic Department—Building and Room No. 2 was completed and operated. The whole circulating system of the two tank rooms, including 832 tanks, was reconstructed and greatly improved.

Melting and Casting Department—A new melting furnace was constructed to meet the increased output to 60 tons zinc per day.

Fine Atomizing Apparatus—A small oil fired furnace with oil and air piping, etc., was installed; also an electric furnace for atomizing zinc, also chamber for collecting the zinc and an electrically driven screening system.

A new wash house with shower baths, lockers and room for lunch was built.

Compressor Room—During the year facilities for compressing air were much increased by installing gear drives on the large compressor.

A new high pressure cylinder was added to the Ingersoll-Rand Compressor.

A new high pressure air compressor was bought and installed.

A small air compressor was installed for atomizing zinc.

Generator Room—Seven more motor generator sets were installed, making 13 in all.

A Machine Shop with shafting, lathe, shaper, forge and other tools was installed for quick repairs.

The monthly output of pure zinc has risen during the last six months from 830 tons to 1,322 tons.

The plant is producing, on a commercial scale, Bluestone, Sulphuric Acid, Hydrofluosilicic Acid, Gold, Silver, Copper, Lead and Zinc.

Mr. F. S. Norcross, Jr., for some time superintendent of mines for the British Columbia Copper Co. and the Canada Copper Corporation, was the recipient of a valuable presentation, subscribed for by employees on Christmas Eve at the latter company's big camp at Copper Mountain, Similkameen, the occasion being his enlistment in the Engineering Corps of the United States Army and his consequent intended early departure for the training camp at Petersburg, Virginia. Mr. P. E. Crane, who has been superintendent at the company's Mother Lode mine, near Greenwood, Boundary district, has been transferred to Copper Mountain, to there assume duty in succession to Mr. Norcross.

PERSONAL

Mr. Samuel W. Cohen, General Manager of Crown Reserve Mining Company Limited, has returned to Montreal after a six weeks trip of examination in California and Colorado.

Mr. W. E. Segsworth is in Ottawa.

Mr. George Guess, professor of Metallurgy at the University of Toronto, is perfecting a simple and cheap process of refining nickel.

Mr. C. W. Knight visited the Missouri-Cobalt properties at Frederickton, Missouri, during the holidays. Prof. S. F. Kirkpatrick of Kingston is directing the erection of a plant there for the treatment of ores containing lead, copper, nickel and cobalt.

Prof. J. C. Gwillim has returned to Kingston from Atlantic City and New York.

Prof. S. F. Kirkpatrick has returned to Kingston from Frederickton, Missouri.

Representatives from many of the iron and steel companies were in Ottawa last week.

Mr. F. N. Flynn, who was some years ago at Cobalt, has been appointed general superintendent of the smelting works at Trail of the Consolidated Mining and Smelting Co of Canada.

Mr. Fred T. Greene, Mining Engineer, of Butte, Mont. was killed on Christmas day when a train ran into his auto. He was distributing Christmas presents at the time. Mr. Greene was a graduate of the University of Toronto and of the Michigan College of Mines.

Captain J. J. Johns, shift boss at Murray mine, has been compelled by ill health to resign and go to the southern States.

G. G. S. Lindsey, W. G. Miller, E. P. Mathewson and R. E. Hore of Toronto were in Montreal on Saturday, January 12, to attend a meeting of the Council of the Canadian Mining Institute.

D. B. Dowling and Geo. Mackenzie of Ottawa were in Montreal, Saturday, January 12, attending a meeting of the Council of the Canadian Mining Institute.

A. A. Cole of Cobalt, president of the Canadian Mining Institute, was in Montreal on Saturday for a meeting of the Council.

D. B. Dowling of Ottawa and J. B. Tyrrell of Toronto, have been nominated for the presidency of the Canadian Mining Institute.

J. A. Dresser, H. E. T. Haultain and B. Neilly are nominated as vice-presidents for the Canadian Mining Institute. There are two vacancies owing to the retirement of Chas. Fergie of Montreal and T. W. Gibson of Toronto.

There will be no election for councillors of the Canadian Mining Institute this year.

Mr. W. Lancaster, for a number of years overman at the No. 2 mine of the Crow's Nest Pass Coal Co.'s Coal Creek colliery, was last month presented with a handsome watch, suitably engraved, he having resigned from the company's service on being appointed a district inspector of mines for the British Columbia Department of Mines. Colliery officials with some of whom Mr. Lancaster has been associated about twelve years, arranged for the presentation as an evidence of their esteem.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Kirkland Lake Gold.

Operations at the Kirkland Lake Gold mine at Kirkland Lake have been curtailed for the time being and a greater portion of the working force have found employment at other mines in the camp. The outcome of the Temiskaming Mining Company's meeting, to be held on the 22nd day of January, will have an important bearing on the future operations of this mine. Should the Culver interests control the meeting, the proposal to take a one-half interest in the Kirkland Lake Gold might receive favorable consideration, and it is anticipated that an immediate resumption of work would result. Other rumors are to the effect that the curtailment of operations will continue for the duration of the war.

Elliott-Kirkland.

The additions to the mining plant of the Elliott-Kirkland have been completed and the work of sinking to deeper levels was recently commenced. The shaft, which previously had attained a depth of 300 ft., will be continued to the 500 ft. level and lateral work will be done at this depth. The westward continuation of the main vein of the Kirkland Lake Gold was encountered in a cross-cut at the 300 ft. level and determined to be approximately eleven feet in width and contained average values of around twelve dollars to the ton. The Elliott-Kirkland represents an honest mining endeavor which has every appearance of being crowned with ultimate success.

Machinery Installed at Wright-Hargreaves.

The installation of the new machinery at the Wright-Hargreaves mine at Kirkland Lake has been completed. A 200 h.p. motor together with a 12-drill compressor now ready for use, will serve to drive operations at greater speed than heretofore. The No. 2 main shaft of the Wright-Hargreaves has reached a depth of 300 ft., and the No. 3 shaft, some 850 ft. west, has been driven to a depth of over 100 ft., and will be continued to a depth of 300 ft., at which depth it is proposed to connect these two workings. After this work is completed a crosscut will be driven to tap the No. 1 vein, which in the early days of the Kirkland Lake camp was opened up on the surface and found to contain excellent gold values.

Canadian-Kirkland.

Along the south and newer zone, of the Kirkland Lake camp, is to be found the Canadian-Kirkland, the Hunton-Kirkland and the Ontario-Kirkland. Active development is being vigorously prosecuted on the Canadian-Kirkland and the property is standing up well under the test. Between this property and the Kirkland Lake Gold, lies the Honer property, on which the Temiskaming Mining Company are commencing operations, and this portion of the camp is receiving merited attention. A pleasing feature of operations throughout the Kirkland Lake camp has been the absence of stock jobbing except apparently in one or two instances. Considering the substantial production of the camp the reputation it now enjoys is indeed very enviable.

Kirkland-Porphry.

The cross-cut at the 170 ft. level of the Kirkland-Porphry mine at Kirkland Lake has been driven about forty feet south from the shaft and is said to

be in ore all the way. The orebody is cut with the mud-seam, which is characteristic of practically every mine in the Kirkland Lake camp, the only difference being that two such seams intersect the orebody of the Kirkland-Porphry. These two mud-seams are about eleven feet apart at the 170 ft. level and the ore between them is said to run high even for the rich deposits of the Kirkland Lake camp. The remainder of the vein carried very substantial average values, and the latter grade of ore is still in evidence in the crosscut. The shaft is being continued to the 300 ft. level. So far the developments at this property have proven even more successful than the most optimistic had expected.

Coniagas.

At the annual meeting of the Coniagas Mines, Limited, held at St. Catharines, it was announced that half a million dollars has been paid in dividends during the past year, making a total distribution of dividends by the company to shareholders to date of \$8,740,000. The price of the product of the company was considerably higher than in former years which worked to the monetary advantage of the company. During the year about \$150,000 has been spent in prospecting work. So far President Leonard said, they have been unable to discover another silver property worthy of development. Much is expected however, from the Ankerite property in South Porcupine, known to be carrying gold values. In speaking of the development of the Coniagas mine, Mr. Leonard said the output of silver this year was 1,344,267 ounces as compared with about one and three-quarter millions the previous year. The total shipments of silver from the mine to date were over twenty-five and a quarter million ounces. The silver ore this year was mined and concentrated at a net cost of 21.36 cents per ounce. R. W. Leonard, St. Catharines, was again elected president.

McKinley-Darragh.

It is understood the method of regrinding the tailings for treatment in the new oil flotation plant at the McKinley-Darragh has not been found altogether satisfactory and a number of alterations will be made during the present cold weather. These alterations will not cause any additional delay, owing to the fact that it has been found more economical to wait until the present cold weather moderates. With the arrival of warm weather in the spring the new plant will be operated at full capacity. During the past year the McKinley-Darragh has yielded in the neighborhood of one million ounces of silver, which placed it in sixth place as a producer in the Cobalt camp. Underground operations at the mine are said to be of an exceedingly favorable nature, and a considerable quantity of the ore now being hoisted, is comparatively high grade. The annual statement of the company is expected to be of a very favorable nature.

Adanac.

During the month of December development work at the Adanac was pushed forward with excellent results. A little over 100 ft. of underground work was accomplished, the vein in the drift maintaining a uniform width. A small amount of high-grade ore is being encountered from time to time and gradually the drift is being continued north to the zone in which geologists have recommended the carrying on of development work. It would not be surprising if the next few weeks work was attended with important developments at this property.

Ore Shipments in December.

During the month of December eleven Cobalt mines shipped an aggregate of thirty-one carloads of ore, containing 2,377,708 pounds. The following is a summary of these shipments:

Mine.	Cars.	Pounds.
Dominion Reduction	8	655,000
McKinley-Darragh.	4	338,204
Coniagas	4	330,295
Buffalo	4	329,958
Nipissing	3	175,077
La Rose	2	167,317
Kerr Lake	2	120,396
Aladdin	1	87,000
National	1	67,179
Penn-Canadian	1	65,761
Trethewey	1	41,521

19,600,000 Ounces Silver in 1917.

The total production of the Cobalt camp for the year 1917 will approximate 19,600,000 ounces of silver. The average price of the white metal for this period has been about 81 1-3 cents per ounce. Thus the value of the output will fall not far short of \$16,000,000. There are approximately 3,000 miners employed in the mines of Cobalt and the pay roll for the year is estimated to aggregate about \$4,320,000. The cost of supplies is said to have been about \$3,000,000, thus making a total operating expenditure of \$7,320,000. This would leave a net profit of approximately \$8,680,000. Of this latter amount over \$5,250,000 has been distributed in dividends and the balance employed in an endeavor to secure other mining properties further north. The year has been one of much prosperity, in which the companies and their employees have each shared. With the close of the year the harmony existing between the men and the operators is highly satisfactory. The men are receiving the highest wages in the history of the camp and in return the efficiency of this large working force is quite satisfactory.

Bullion Shipments.

The production of bullion from the Cobalt silver mines continues large and heavier shipments are due to be made at an early date. The high grade mills are working at maximum speed, and more than ever in the history of the camp, the product of the mines is being shipped in the form of bullion. This form of shipping greatly reduces the cost of transportation. The total bullion shipped by the Mining Corporation of Canada alone during the current year amounted to well over four million ounces. The Nipissing is establishing a record second only to that of the Mining Corporation. The enormous output of these two huge silver mines is a big factor in the world's silver production.

Kerr Lake.

Kerr Lake holds third place in the production of silver in Canada during the past year, being exceeded only by the Mining Corporation of Canada and the Nipissing Mining Company. The November yield amounted to 205,552 ounces, which is at the annual rate of 2,466,264 ounces. The dividend payments for the year amounted to \$690,000, which is equivalent to \$1.15 per share, a Red Cross dividend of 15 cents per share having been paid on August 10th. To date the company has distributed dividends amounting to \$12.45 per share, which is close to 250 per cent. on the par value of the stock. The report of the company for the fiscal year recently ended estimated that the positive ore reserves in the mine contain 3,120,400

ounces of silver. This is a net value of \$3.07 per share. At the present rate of production the reserves would be sufficient for about a year and a half's operations. The silver produced during the fiscal year was 2,551,000 ounces or a monthly average of 212,612 ounces. Production costs during this period amounted to 26 3-4 cents per ounce, which is one and a half cents higher than in the previous fiscal year, due to higher costs of material and labor.

The stock holdings of the Kerr Lake Mining Company include 150,000 shares of Wettlaufer-Lorrain, carried on the books at 15 cents per share, and 837,000 shares of Caribou-Cobalt carried on the books at the dated December 28th, of the operation of the Company also developing under an option of lease and bond, a gold property in the Boston Creek area in Northern Ontario, known as the Mondeau claims located in Me-Elroy township, east of the Gold Leaf property. Reports from this property indicate that satisfactory results are being obtained, and this week it was reported that another claim had been added to the company's holdings in this township.

Bailey-Cobalt.

The dismissal of the appeal of Edwin Benson, of Chicago, former president of the Bailey-Cobalt Silver Mines in an endeavor to collect some \$89,000, which he claimed was due him, leads to the belief that an effort will now be made to reopen this old Cobalt property.

Nipissing.

During the month of November the Nipissing Mining company maintained production at the rate of a little over 10,000 ounces per day, and for the third time during the past year, exceeded three hundred thousand ounces for a thirty day period. During the month the company mined ore of an estimated net value of \$305,572 and shipped products from Nipissing and customs ore of an estimated net value of \$331,196. Underground operations for this month continued to be favorable and a number of new crosscuts were started at various places, most of them heading for new areas, several small veins have already been found and they will be drifted upon in the near future. Stopping operations on all veins continued to produce satisfactory results. A new intermediate level was started from the workings on vein 490. There is a favorable area between that vein at the fifth level and vein 98 at the fourth level, which cannot be explored to best advantage from any present level. About 200 ft. more of vein 490 at the sixth level was put in condition to receive stope timbers. Shaft 81, which was developing the Cobalt Lake fault vein was closed during the month. With the exception of a small amount of ore encountered in one of the drifts, results were disappointing. For the eleven months ended November 30th, the Nipissing Mining company produced \$3,018,280 worth of silver. Heretofore the greatest record attained by Nipissing was in 1913 when a net value of \$2,922,714.26 was received. Thus it will be noted that the value of the first eleven months' production of the past year exceeds that of any twelve months in the company's history by \$95,566 and by the end of December it is estimated the production will have reached upwards of \$400,000 more than in any previous year of the company's existence. The company have declared a five per cent. dividend, together with a five per cent. bonus, payable Jan. 21st next, to shareholders on record Dec. 31st. This disbursement calls for the distribution of \$600,000. When it is remembered that during 1917 the Nipissing has paid 30

per cent. in dividends, amounting to \$1,800,000, and with the distribution of the January bonus and dividend will have disbursed to the shareholders a total of \$17,740,000, the magnitude of this precious metal mine may be imagined. With the current price of silver well above the average price paid during the past year it would not be surprising if the present year would prove the most prosperous in the history of the company.

Temiskaming.

The affairs of the Temiskaming mining company are anything but happy these days, and the President Mr. F. L. Culver in a circular letter under date of Dec. 31st, asks for the support of the shareholders to block the efforts of Messrs Hamilton B. Wills and Max Morgenstern to gain control of the company. A special general meeting of the company has been called for the 22nd of the present month, and the result of this important meeting is being awaited with more than usual interest.

Schumacher.

With the increase in its milling facilities the Schumacher mine is gradually working into a position to be classed as among Porcupine's big mines. This property lies adjacent to the Hollinger and McIntyre and would appear to be in line for important developments. The main workings have reached a depth of 600 ft. With 160 acres situated on the south contact of the porphyry intrusion, which has made its two neighbors famous, this property possesses enormous possibilities. Before long the work of driving the main shaft to a depth of 1,000 ft. will be under way, following the lead of the other important mines. The orebodies on this property have shown a remarkable consistency, and in spite of the shortage of labor the management has kept the enlarged mill operating at capacity, and the cost of operating this property is said to compare favorably with that of the best mines in the camp. It is understood that the ore reserves have increased considerably at the Schumacher since the last annual statement was issued, and the mine is now in better condition than ever before in its history.

Porcupine, V. N. T.

At the 600 ft. level of the Porcupine V. N. T. a comparatively large amount of ore is being opened up. The mill is running to capacity and the value of the production is sufficient to pay all operating costs, inclusive of development work, and a net profit is resulting. Preliminary plans have been made for the installation of a new mill, when conditions become more normal, and the operation of the old mill will serve to finance the new installation. The new mill addition appears to be undoubtedly warranted by the results encountered in development.

McIntyre.

The shaft on the Jupiter portion of the McIntyre property will have reached the 1,000 ft. level before the end of the present week. New pumping equipment has been installed and will meet all requirements. The main drift of the McIntyre, which is headed for this point, is already 600 ft. over the Jupiter line. From the McIntyre shaft to the Jupiter shaft is almost one-third of a mile. The big new hoist installed at the Jupiter will permit of carrying operations to a depth of 2,000 ft. The main or No. 5 shaft is also being equipped with a hoist of similar capacity. The work on this property is being centralized in such a way as to allow of ore from the sixth, seventh, eighth and ninth levels to drop through ore passes to the tenth level, where it is passed from chutes directly into the

ore cars, trammed to the foot of the shaft and hoisted to the surface. Net profits at this property are now greater than at any previous time in the history of the mine, owing to the efficiency of operations.

Groch Machine for a Molybdenite Property.

A contract has been received for the installation of a Groch Centrifugal oil flotation plant of 30 tons capacity, on a molybdenite property about twenty miles from the St. Maurice Mines, near Amos, on the Trans-continental Railway. This system for the treatment of ore has proven successful in the treatment of molybdenite, graphite and the recovery of copper from sulphide for which it is eminently suited; but its application has now been extended to practically every known metal and in the recovery of silver it has proven highly successful. One of these machines has also been in operation at the Miller Independence Gold Mines at Boston Creek, where for the first time in Canada flotation had been successfully applied in the extraction of gold. Arrangements have also been made for the installation of a Groch machine at the McIntyre-Porcupine mines where the machine will be used in experimental work. The construction of this machine differs very materially from that of the Minerals Separation company and has been perfected by Messrs. Frank Groch and W. E. Simpson, of Cobalt. The machine is the product of Canadian inventive genius and is being manufactured by Knight Bros. & McKinnon, of Cobalt, under contract.

Fast Shaft Sinking at Ankerite.

Operations at the Ankerite property of the Coniagas Mining company are in full swing since the installation of the powerful mining plant. The contract for the three compartment shaft to a depth of 500 ft. is being executed at a record rate. A depth of about seven feet per day is being maintained in the execution of this work. If this pace is kept up it will require only about six weeks to complete the shaft to the 500 ft. level. Shaft sinking at the rate of 200 ft. per month has been exceeded in very few instances in any part of the world and demonstrates the increasing efficiency with which mining operations are being conducted in Northern Ontario.

Gowganda.

Shipments of high grade silver ore are being made regularly from the Miller Lake-O'Brien mine at Gowganda. According to the official figures of the T. & N. O. railway this company shipped 61,960 pounds of ore during the month of November.

Porcupine Crown.

The main orebody of the Porcupine Crown mine has been encountered in the crosscut at a depth of 1,000 ft. The average grade of the ore has not been ascertained as yet; but the width of the vein and the appearance of the ore is very similar to that on the preceding level where some of the richest ore yet encountered has been found. It is reasonable to suppose that in view of the favorable results being met with the ore reserves at the mine should exceed those of one year ago, which, after deducting practically all the low grade ore, amounted to \$1,050,000. The reason for curtailing production at the mine during the past year was solely the shortage of labor and the high cost of material, the physical condition of the mine being in no way a factor. With the ore reserves conservatively estimated at \$1,050,000 and a net surplus of about \$275,000 on hand the financial and physical condition of the Porcupine Crown may be considered very good. It is estimated that the net profits in sight from treatment of ore reserves will exceed \$500,000, and with the \$275,000 surplus the intrinsic value of

the company's issued capital of \$2,000,000 is upwards of 38 cents per share. It would appear from the present favorable development at the 1,000 ft. level that there are great probabilities of the main orebody continuing to a much greater depth than yet attained.

Nickel from Alexo Mine.

During the month of November the Alexo Mine at Porquais Junction shipped thirteen cars of nickel ore containing 1,066,900 pounds. This is about 160,000 pounds less than shipped during the month of October.

Trethewey.

The Castle property at Gowganda has been taken under option by the Trethewey Mining Company of Cobalt. The Castle is looked upon as one of the most promising properties in the Gowganda silver area as it is situated along the contact zone along which the Miller Lake-O'Brien is encountering its rich ore. The irregular trend of the Miller Lake-O'Brien vein leaves room for uncertainty as to whether it can be picked up on the Castle property. However, there are a number of other veins on the Castle which possess considerable merit. Early last fall a second-hand mining plant was purchased from the McIntyre mines and this plant is now being transported to the property.

Miller Independence

Milling operations at the Miller Independence Mine at Boston Creek have been suspended until the early spring owing to the scarcity of water. The supply of water was being drawn from an abandoned shaft and when this gave out the mill was forced to close down. Underground operations were suspended for the holiday season, but have been resumed again and will be carried forward with renewed energy.

Prospecting in Cane Township.

Work has been commenced on a group of three claims in Cane township, near Kenabeek station, by a company known as the Cane Silver Mines. Considerable exploration work has been done and several promising veins in which fair silver values occur have been opened up. Arrangements have been made to sink a shaft on one of the largest veins, and the work is now under way.

Good Reports from Lightning River.

Latest reports from the Lightning River district are of a highly favorable nature. The work of sampling the main vein of the discovery group is under way and is said to be proving very satisfactory. The trail from Kirkland Lake to the new gold field is in good condition, and further staking in the vicinity of the find is still going on.

Patricia.

The No. 1 shaft at the Patricia property at Boston Creek has reached a depth of 130 ft., according to latest advices received here. The vein is said to be widening out with depth. The gold content of the ore is high, running as much as 24 ounces to the ton. Work at the No. 2 shaft is also progressing satisfactorily having reached a depth of over fifty feet. Here also the mineralization is heavy and shows a tendency to increase with depth. The new mining plant is giving good results, four machines being used and a maximum speed is being kept up. It is stated that enough gold has been put in sight already on this property to pay for the installation of the plant and development work to date. This record has only been equalled by one other quartz mine on the American continent and that mine was the Croesus, in Munro Township.

The shafts on this property are headed for a depth of 200 ft. and should the ore depositions continue to that depth it is the intention of the management to install a small mill at the property this winter.

Murray-Mogridge.

Excellent results are attending the work in the south drift on the 200 ft. level of the Murray-Mogridge at Bourke's Siding. The full width of the drift is in ore, with only one wall showing. A crosscut is being made near the present face to determine the exact width of the vein at this point. The north drift is through the fault and the drills continue in good ore. The face at this point is somewhat shattered owing to severe faulting, but sampling taken about a month ago have satisfactory average values on this level, but values from the last thirty feet of drilling in the south drift have not been announced as yet, but judging by the appearance of the ore the values will average high.

BRITISH COLUMBIA.

Strike at Trail Declared Off.

Finding themselves without the support of the International Union of Mine, Mill and Smelter Workers, duly accredited representatives of which organization had after investigation found that the Trail Trades and Labor Council had no authority under the laws of the American Federation of Labor to call a strike; that the local union had violated the constitution of the organization to which it belonged, and the smelting works of the Consolidated Mining and Smelting Company of Canada at Trail was "fair," the men who had "walked out" declared the strike off and the company was asked to permit them to return to work, which it consented to do. It will be some weeks, however, before all departments of the company's smeltery and refineries will be again operating at similar capacity to that prevailing when the strike was called. The Trail News estimates that the strikers lost approximately \$216,000 in wages by the strike, which it says "was inaugurated to enforce the eight-hour day for some 450 men—machinists, carpenters, plumbers, pipefitters and day laborers. Further, that "the walkout occurred Nov. 15, a vote having been previously taken at which 352 men balloted in favor of the strike and 42 opposed. In other words, about one-fourth of the employees took the trouble to vote."

There was, in addition to the direct loss of wages to the strikers, that of the large number of miners, railway men and others who were deprived of employment during the period of the strike. Reviewing the whole field that was affected by the strike, Northwest Mining Truth expressed the following opinion: "Loss in one way and another has certainly reached a cool \$1,000,000, and, as far as we can see, for no good purpose."

Mining Companies' Dividends.

Dividends paid by companies operating metalliferous mines in British Columbia are stated to have exceeded \$3,000,000 for the calendar year 1917. Published details are as follows:

Consolidated M. & S. Co.....	\$ 996,503
Granby Consolidated Co.....	1,499,848
Hedley Gold Mining Co.....	240,000
Le Roy No. 2, Ltd.....	29,199
Rambler-Cariboo Mines, Ltd.....	35,000
Standard Silver-Lead Mining Co...	300,000
Utica Mining Co.....	64,000

Total for 1917\$3,164,550

The total for 1916 is shown to have been \$2,891,583, so that there seems to have been an increase for 1917 over 1916 of \$272,967. In the last-mentioned year, however, the Crow's Nest Pass Coal Co. paid dividends stated to have totalled \$372,756, but, so far as known, did not make any profit distribution in 1917, in which case the total of declared dividends from all mining companies operating in the province was nearly \$100,000 higher in 1916 than in 1917.

Copper and Coal Production.

It is reported that there has been a substantial increase in the quantity of copper produced by the Britannia Mining and Smelting Company in 1917, as compared with its production in 1916. If this be so it may make the total quantity of copper produced in British Columbia greater than in 1916, and add this metal to the two or three other metals estimated to have also made an increase. It will have to be a considerable amount, however, to offset the estimated increase in some other metals, notably lode-gold.

The quantity of coal produced in 1917 will probably be found to have been somewhat less than that in 1916. For eleven months ended November 30 the total production reported was 2,196,898 long tons gross, that is, including the coal made into coke. This total is 288,682 tons short of the quantity produced in 1916, an amount thought to be larger than the production for December will be found to have been. However, the decrease for the year is not likely to be more than 30,000 or 40,000 tons.

The French Zinc Recovery Process.

At a public meeting held in Nelson, West Kootenay, on December 19, under the auspices of the Nelson Board of Trade, a committee was appointed to draft a resolution to be forwarded to the Provincial Government, from which further financial aid is being sought with the object of getting into operation the zinc works at Nelson, designed to recover zinc by the French electrolytic process, the rights to which are held by the French Complex Ore Reduction Company. The Provincial Government has already guaranteed the company's bonds to the amount of \$40,000, which amount is understood to have been expended in altering and adding to the plant at the zinc works near Nelson, at which there has been in past years considerable experimentation in connection with the electric smelting of zinc-lead ores. The resolution since drafted urges the Provincial Government "if possible, to either secure entire control at the earliest possible date of the process, patents and all other property of that company, or to take steps to complete the necessary financing of that company in order to bring its plant at Fairview, near Nelson, to successful production." It was stated that the meeting believes that at the plant successful production was on the point of being attained. It was suggested that about \$25,000 is required to place the enterprise in the position of being a going concern.

Mining and Smelting on Vancouver Island.

The proportion of the total production of coal in the province during eleven months to the end of November, 1917, credited to Vancouver Island collieries is 71 per cent., which indicates that there has been much more activity at the Island mines during the year than at those of the Crow's Nest district. The Canadian Collieries (Dunsmuir) Limited comes first, with an output of approximately 740,000 long tons—471,000 from its mines in the Comox district and 269,000 tons from those at Extension. The Western Fuel Company's total for the eleven months was about 597,000 tons, and

that of the Pacific Coast Coal Mines nearly 141,000 tons. Other mines together produced about 85,000 tons.

Metalliferous mining is not yet resulting in the production of any considerable quantity of ore. The Ladysmith Smelting Corporation, however, is again operating the smelting works at Ladysmith, and is also doing some development work on the Willow Grouse group of copper claims at Sooke, in Victoria mining division. In the same neighborhood, the Margaret group is producing ore and shipping it to Ladysmith. Other Island mines are not shipping to Ladysmith.

INCREASING VARIETY OF PRODUCTS FROM CANADIAN STEEL PLANTS.

In an article written for the Annual Financial Survey of the "Globe," Mr. J. Frater Taylor, President Algoma Steel Corporation, says in part:

"It is intensely difficult to diagnose the general steel situation at the present moment on account of existing conditions.

"The situation in the United States has changed, not so far as intensity of demand is concerned, but on account of the new factors, such as control of output and prices in view of America's entry into the European war. Conditions in the United States have an intense bearing upon the situation in Canada, not only as regards consumers of steel, but upon steel plant operations as well. Everything of the nature of iron or steel and everything entering into the production of iron and steel, must now, of necessity, come under microscopic investigation, so that the proper uses of all materials vital for war purposes may be established. The inevitable consequence is that export licenses, priority certificates and so forth, are necessary, both in respect of internal consumption and of exports to Canada. It is indeed difficult to say what the precise effect will be upon the Canadian steel industry and upon the consumption of steel products in Canada, but unless one is well provided, delays would appear to be the least of the prospective evils to be faced, and the worst of these evils is the possible curtailment and stoppage of certain supplies altogether.

"To some extent—indeed to a considerable extent—Canada can become and should become self-supporting. At the Algoma Steel Plant many materials and articles hitherto imported are now manufactured and there is every probability that 'self help' will be still further developed, but there are propositions which no ordinary Canadian steel company would care to face, such as the installation and development of the great basic plants necessary for the production of certain classes of steel."

MURRAY MINE.

Good results are being obtained in developing the nickel-copper orebody at the Murray mine of British America Nickel Co. The underground work is disclosing ore, as indicated by the diamond drills.

WAREHOUSE AT MURRAY MINE BURNED.

Fire broke out at 7 a.m. in the warehouse of the British America Nickel Co. at Murray mine on Jan. 2. The warehouse, which was well stocked with supplies, was a total loss. The building was an old office building, which had been remodeled for use as a warehouse and construction office. While a considerable quantity of supplies was destroyed, no serious delay in construction is expected to result. The fire was caused by trouble with the heating apparatus.

:-: Markets :-:

TORONTO MARKETS.

Cobalt oxide, black, \$1.50 per lb.
 Cobalt oxide, grey, \$1.65 per lb.
 Cobalt metal, \$2.25 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 15 cents per lb.

Jan. 11, 1918—(Quotations from Canada Metal Co., Toronto).

Spelter, 12 cents per lb.
 Lead, 9 cents per lb.
 Tin, 85 cents per lb.
 Antimony, 17 cents per lb.
 Copper, casting, 31 cents per lb.
 Electrolytic, 32 cents per lb.
 Ingot brass, yellow, 20 cents; red, 26 cents per lb.

Jan. 11, 1918—(Quotations from Elias Rogers Co., Toronto).

Coal, anthracite, \$9.85 per ton.
 Coal, bituminous, nominal, \$9.00 per ton.

SILVER PRICES.

	New York. cents.	London. pence.
Dec. 19.	85 $\frac{7}{8}$	43
" 20.	86 $\frac{3}{8}$	43 $\frac{1}{4}$
" 21.	86 $\frac{5}{8}$	43 $\frac{5}{8}$
" 24.	86 $\frac{5}{8}$	43 $\frac{5}{8}$
" 25.	86 $\frac{5}{8}$	holiday
" 27.	86 $\frac{5}{8}$	43 $\frac{3}{8}$
" 28.	86 $\frac{1}{8}$	43 $\frac{1}{8}$

NEW YORK MARKETS.

Connellsville Coke—
 Furnace, 6.00.
 Foundry, 7.00.
 Crushed, over 1-inch—
 Beehive, 7.30.
 By-product, 6.50.
 Straits Tin, spot, f.o.b., none offering.
 Copper—
 Prime Lake, *23.50 cents.
 Electrolytic, *23.50 cents.
 Casting, *23.50 cents.
 Lead, Trust price 6.25 cents.
 Lead, outside, nominal, 6.50 to 6.75 cents.
 Spelter, prompt western shipment, 7.82 $\frac{1}{2}$ to 7.92 $\frac{1}{2}$ cts.
 Antimony—
 Chinese and Japanese, nominal, 14.75 to 15.00 cents.
 Aluminum, nominal—
 No. 1 Virgin 98-99 per cent., 36.00 to 38.00 cents.
 Pure 98-99 per cent. remelt, 34.00 to 36.00 cents.
 No. 12 alloy remelt, 26.00 to 28.00 cents.

Powdered aluminum, 75.00 to 85.00 cents.
 Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.
 Nickel—Shot and ingot, 50.00 cents.
 Electrolytic, 55.00 cents.
 Cadmium, nominal, \$1.45 to \$1.50.
 Palladium, \$115.00.
 Quicksilver, nominal, \$130 to \$135.
 Platinum—Pure, \$105.00.
 10 per cent. Iridium, \$113.00.
 Cobalt (metallic), \$2.70.
 Tungsten—
 Wolframite, \$22.00 to \$24.00.
 Scheelite, \$26.00.
 Gravel Fluorspar: f.o.b. mines—
 Prompt, \$28.00 to \$30.00.
 Contract, year 1918, \$25.00.
 Silver (official), 86 $\frac{1}{8}$.
 *Government price.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet copper—Base prices—
 Hot rolled, 31.50 to 33.00 cents.
 Cold rolled, 32.50 to 34.00.
 Copper bottoms, 39.50 to 41.00 cents.
 (Shipments from stock 2c per pound extra.)
 Copper rods—Base prices—
 Round, 32.50 cents.
 Square and rectangular, 33.50 cents.
 Copper wire—Base prices—
 Nominal, 27.00 cents.
 Brass Products—base prices—
 High Brass—
 Sheets and wire, 27.50 to 29.50 cents.
 Rods, 24.75 to 26.75.
 Low brass—
 Sheets and wire, 30.00 to 32.00 cents.
 Rods, 30.75 to 32.75 cents.
 Brazed tubing—
 Brass, 34.75 to 36.75 cents.
 Bronze, 39.75 to 41.75 cents.
 Seamless tubing—Base prices—
 Brass, 35.50 to 37.50 cents.
 Copper, 38.00 to 40.00 cents.
 Bronze, 42.50 to 43.50 cents.
 Full lead sheets, 9.25 cents.
 Cut lead sheets, 9.50 cents.
 Sheet zinc, f.o.b smelter, 19.00 cents.

A new journal devoted to the iron and steel industries is to be published in Canada by the Industrial and Educational Press, of Montreal. Prof. Stansfield of McGill University will be Editor-in-chief. He will be assisted by an expert in foundry practice, and will have the cooperation of the metallurgy section of the Canadian Mining Institute.

STANDARD MINING EXCHANGE.

Messrs. J. P. Bickell & Co. report the following closing quotations on the Standard Stock and Mining Exchange on January 10, 1918:

Gold.		
	Bid.	Asked.
Apex. . . . .	.05 1/2	.05 3/4
Boston Creek . . . . .	. . . . .	.24
Dome Extension . . . . .	.11	.12
Dome Lake . . . . .	.13	.14
Dome Mines	8.75	9.25
Imperial. . . . .	.02 1/4	.03
McIntyre.	1.47	1.48
Hollinger	5.00	5.05
Newray. . . . .	.48	.49
Porcupine Crown . . . . .	.23	.27
Vipond. . . . .	.16 1/2	. . . . .
Preston East Dome . . . . .	.02 1/2	.03 1/4
Teck-Hughes. . . . .	.47	. . . . .
West Dome. . . . .	.13 1/2	.14

Silver.		
	Bid.	Asked.
Adanac. . . . .	.11	.12
Bailey. . . . .	.05	.05 1/2
Beaver. . . . .	.25	.26 1/2
Ferland. . . . .	.10	.10 1/2

Coniagas.	3.25	. . . . .
Crown Reserve . . . . .	.20	. . . . .
Gifford. . . . .	.03 1/2	.04
Great Northern . . . . .	.04 1/2	.05
Hargraves. . . . .	.11	.11 1/4
Hudson Bay	36.00	. . . . .
Kerr Lake	5.10	5.40
La Rose . . . . .	. . . . .	.37
McKinley. . . . .	.58 1/2	.59
Nipissing.	8.20	8.45
Peterson Lake . . . . .	.09 1/2	.11
Right of Way . . . . .	.03 3/4	. . . . .
Seneca Superior . . . . .	.01	.02
Silver Leaf . . . . .	.01 3/4	.02
Temiskaming. . . . .	.24 1/2	.25 1/4
Tretheway. . . . .	.15	.15 1/2
Wettlaufer. . . . .	.04 1/2	. . . . .
Mining Corporation . . . . .	. . . . .	3.75
Provincial. . . . .	.47 3/4	.49

HISTORY OF DEVELOPMENT OF PETROLEUM INDUSTRY

At a meeting of the Toronto section of the Society of Chemical Industry, to be held at the Engineer's Club on Friday evening Jan. 18, Mr. Schorman, technical expert of the British American Oil Co., will present a paper on the history of development of the petroleum industry. Those who are interested in this subject and wish to attend the meeting may obtain further particulars from the Secretary, Mr. Alfred Burton, 114 Bedford Road, Toronto.

NICKEL



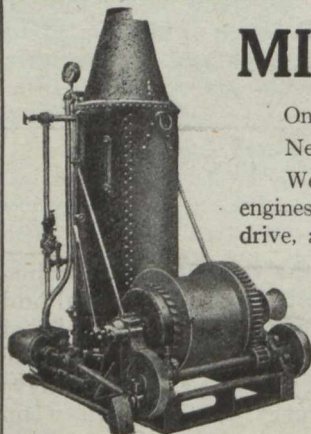
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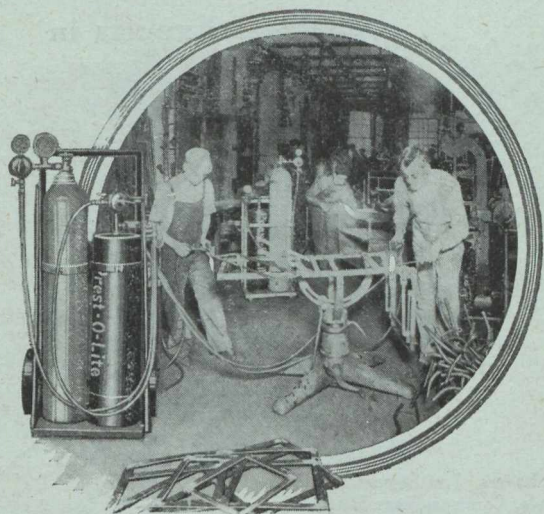
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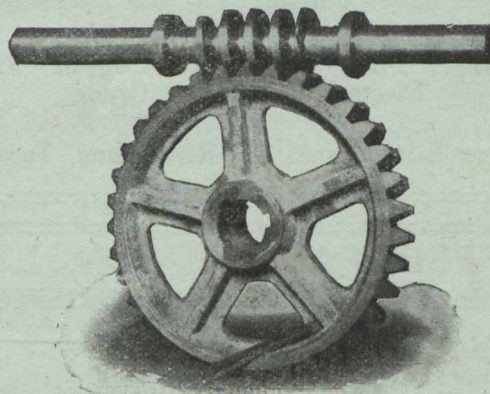


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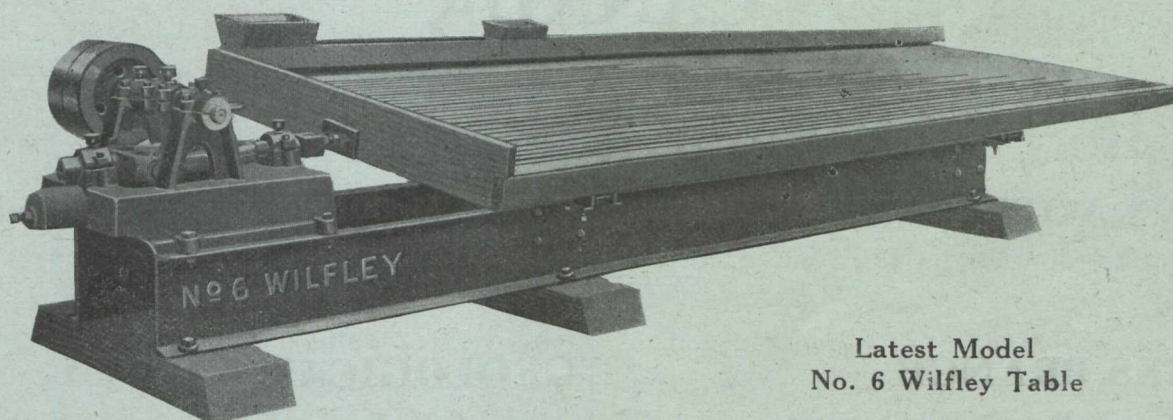
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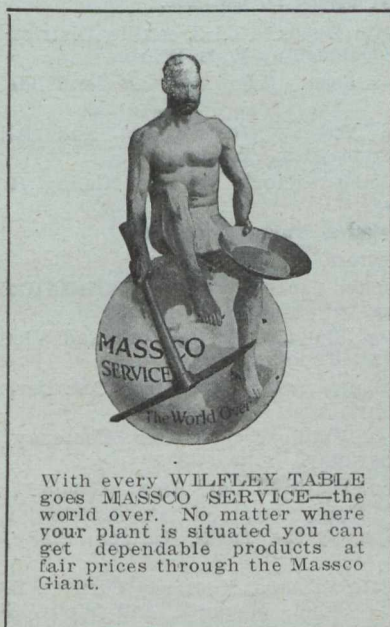
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- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
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GEOLOGICAL SURVEY

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- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argen-teuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- 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 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

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

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To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by 'an agitation greater than, and different from that which had been resorted to before,' resulting in a froth concentrate of economical value,*" and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.** Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

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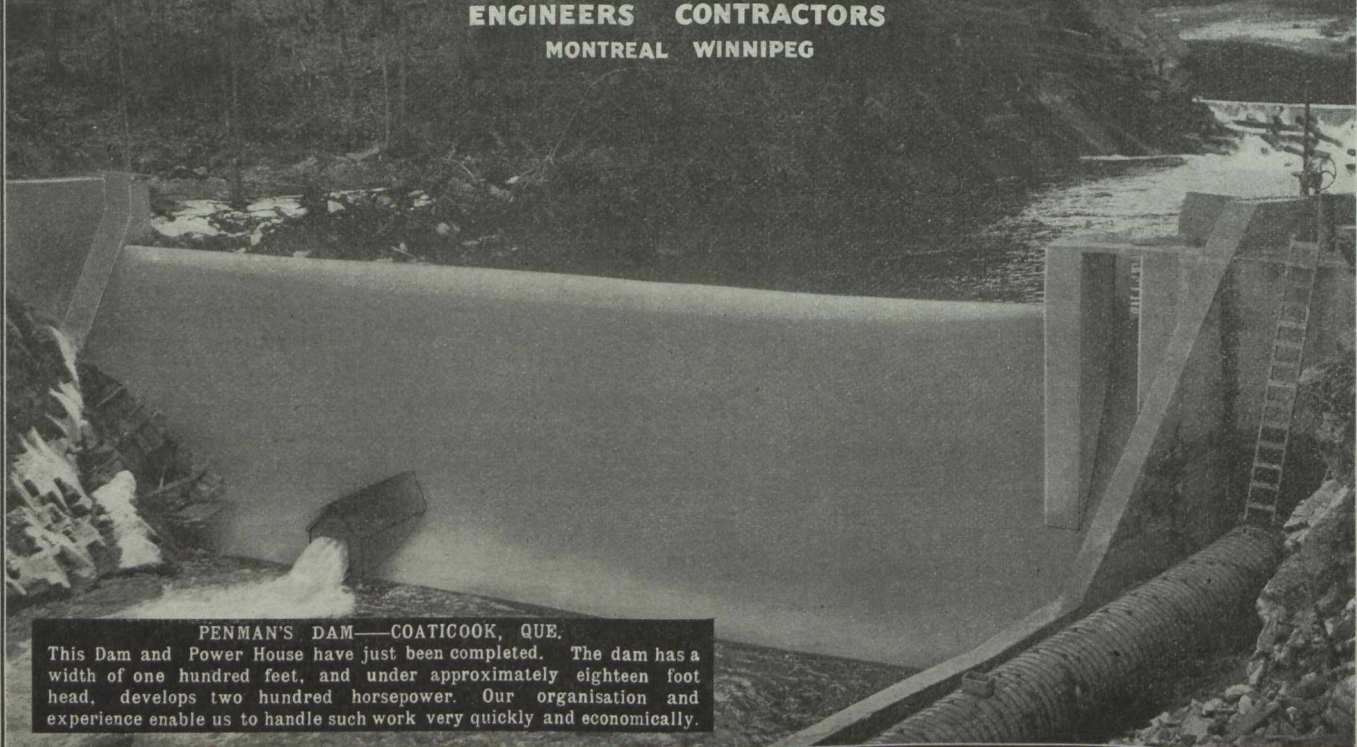
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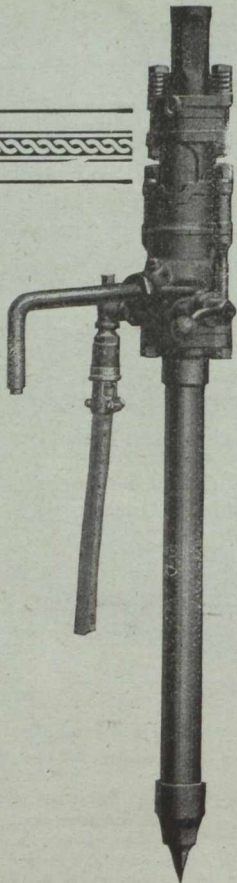
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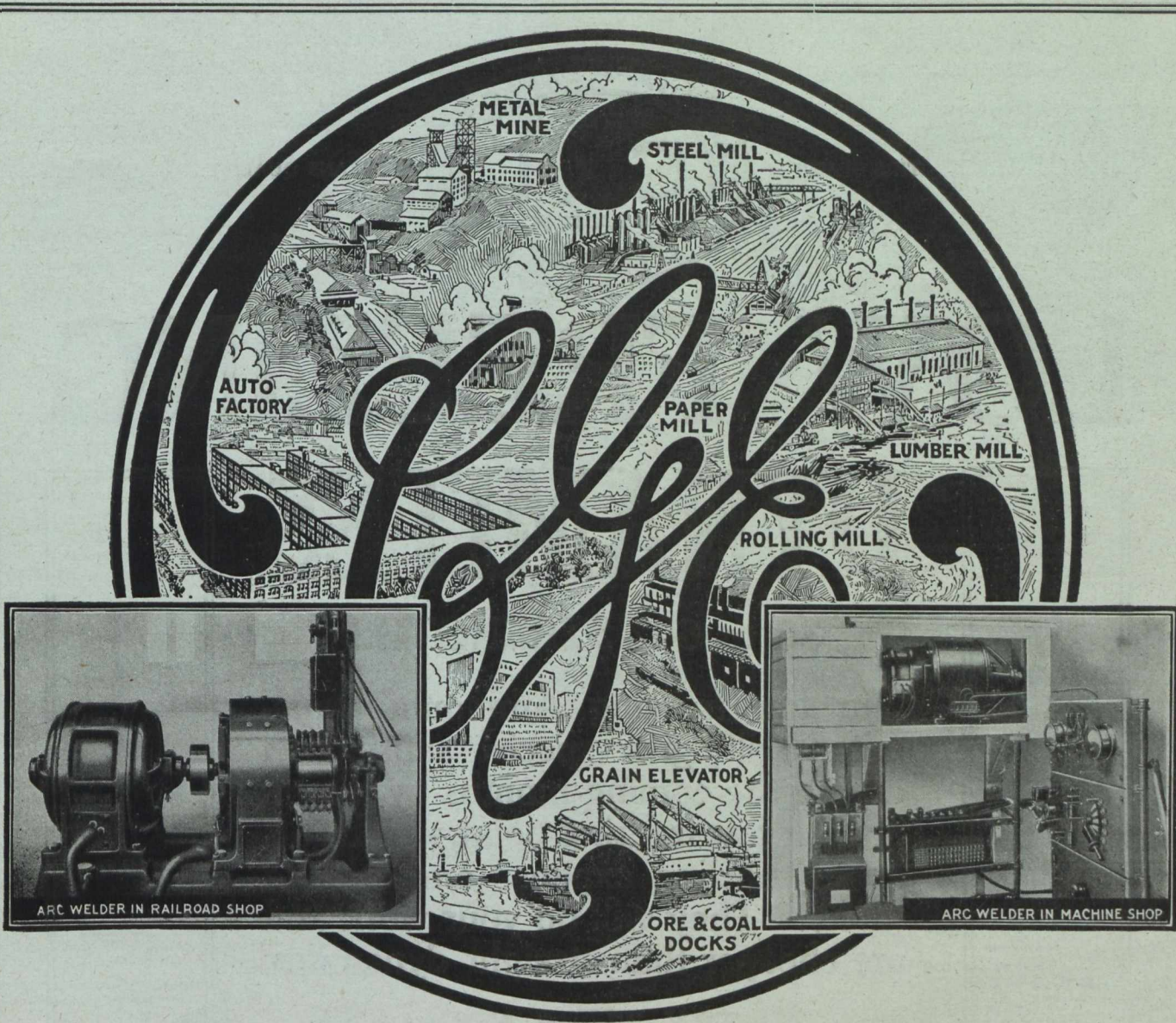
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Sullivan Machinery Co.
Smart-Turner Machine Co.
Can. Allis-Chalmers, Ltd.
- Engines—Haulage**—
Can. Fairbanks-Morse Co.
Canadian Ingersoll-Rand Co. Ltd., Montreal, Que.
Can. Allis-Chalmers, Ltd.
Marsh & Henthorn, Ltd.
- Engines—Marine**—
Can. Fairbanks-Morse Co.
Smart-Turner Machine Co.
- Engines—Steam**—
Smart-Turner Machine Co.
M. Beatty & Sons.
Can. Allis-Chalmers, Ltd.
- Fans—Ventilating**—
Can. Fairbanks-Morse Co.
Can. Allis-Chalmers, Ltd.
- Flotation Oils**—
Georgia Pine Turpentine Co. of New York
- Forges**—
Can. Fairbanks-Morse Co.
Northern Canada Supply Co. Ltd.
- Forging**—
M. Beatty & Sons.
Smart-Turner Machine Co.
- Furnaces—Assay**—
Lymans, Ltd.
- Fuse**—
Curtis & Harvey (Canada), Ltd.
Canadian Explosives.
Northern Canada Supply Co.
- Generators**—
Can. Gen. Electric Co., Ltd.
- Gears**—
Can. Fairbanks-Morse Co.
Smart-Turner Machine Co.
Northern Canada Supply Co.
Hull Iron & Steel Foundries, Ltd.
- Hammer Rock Drills**—
Mussens, Limited.
Can. Allis-Chalmers, Ltd.
- Hangers—Cable**—
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel**—
Armstrong, Whitworth of Canada, Limited.
- High Speed Steel Twist Drills**—
Northern Canada Supply Co.
Armstrong, Whitworth of Canada, Ltd.
- Hoists—Air, Electric and Steam**—
Can. Fairbanks-Morse Co.
Can. Ingersoll-Rand Co., Ltd.
Ltd., Montreal, Que.
Jones & Glassco.
M. Beatty & Sons.
Marsh & Henthorn, Ltd.
Northern Canada Supply Co.
Wettlaufer Bros.
Can. Allis-Chalmers, Ltd.
- Hoisting Engines**—
Can. Fairbanks-Morse Co.
Mussens, Limited.
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
M. Beatty & Sons.
Can. Allis-Chalmers, Ltd.
Marsh & Henthorn, Ltd.
- Hose**—
Can. Fairbanks-Morse Co.
Northern Canada Supply Co.
- Ingot Copper**—
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds—Standard Underground Cable Co. of Canada, Ltd.**
- Jacks**—
Can. Fairbanks-Morse Co.
Can. Ingersoll-Rand Co., Ltd.
Ltd., Montreal, Que.
Northern Canada Supply Co.
- Kiln Linings**—
Hull Iron & Steel Foundries, Ltd.
- Kominuters**—
Hull Iron & Steel Foundries, Ltd.
- Lamps**—
Can. Gen. Electric Co., Ltd.
- Lamps—Carbon**—
J. S. Aspinall.
- Lamps—Electric**—
J. S. Aspinall.
- Lamps—Safety**—
Canadian Explosives.
- Lamps—Tungsten**—
J. S. Aspinall.
- Link Belt**—
Can. Fairbanks-Morse Co.
Northern Canada Supply Co.
Jones & Glassco.
- Locomotives**—
Steam, Storage Stetam and Compressed Air.
- Motors**—
Can. Gen. Electric Co., Ltd.
- Machinists and Founders**—
Hull Iron and Steel Foundries, 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.
- 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.
- 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.

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Pipe Fittings— Can. Fairbanks-Morse Co. Northern Canada Supply Co.	Pumps—Pneumatic— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	Surveying Instruments— W. F. Stanley. C. L. Berger.
Piston Rock Drills— Mussens, Limited. Can. Allis-Chalmers, Ltd.	Pumps—Steam— Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	Scales— Can. Fairbanks-Morse Co.	Switchboards— Can. Gen. Electric Co., Ltd.
Pneumatic Tools— Can. Ingersoll-Rand Co., Ltd. Jones & Glassco. Jenckes Machine Co.	Pumps—Turbine— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. ada, Limited. Can. Allis-Chalmers, Ltd.	Screens— Jeffrey Mfg. Co. Northern Canada Supply Co. Hendrick Mfg. Co.	Tanks—Steel— Marsh & Henthorn, Ltd.
Prospecting Mills and Machinery— Standard Diamond Drill Co. Can. Allis-Chalmers, Ltd.	Pumps—Vacuum— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Can. Allis-Chalmers, Ltd.	Screens—Cross Patent Flanged Lip— Hendrick Mfg. Co.	Tanks—Cyanide, Etc.— Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd.
Pulleys, Shafting and Hangings— Can. Fairbanks-Morse Co. Jeffrey Mfg. Co. Northern Canada Supply Co.	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd.	Separators— Can. Fairbanks-Morse Co. Smart-Turner Machine Co.	Transits— C. L. Berger & Sons.
Pumps—Boiler Feed— Can. Fairbanks-Morse Co. Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Wettlaufer Bros. Can. Allis-Chalmers, Ltd.	Roofing— Can. Fairbanks-Morse Co. Northern Canada Supply Co.	Sheet Lead— Canada Metal Co., Ltd.	Transformers— Can. Gen. Electric Co., Ltd.
Pumps—Centrifugal— Can. Fairbanks-Morse Co. Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Can. Allis-Chalmers, Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Turbines— Escher Wyss & Co. Can. Allis-Chalmers, Ltd.
	Rope—Wire— Allan, Whyte & Co. Northern Canada Supply Co. Can. B. K. Morton	Shovels—Steam— M. Beatty & Sons.	Twist Drills—High Speed— Can. B. K. Morton Co.
		Smoke Stacks— Can. Allis-Chalmers, Ltd. Can. Fairbanks-Morse Co. Hendrick Mfg. Co. MacKinnon, Holmes & Co. Can. Allis-Chalmers, Ltd. Marsh & Henthorn, Ltd.	Valves— Can. Fairbanks-Morse Co.
		Steel Barrels— Smart-Turner Machine Co.	Winding Engines—Steam and Electric— Can. Ingersoll-Rand Co., Ltd. Jenckes Machine Co. Can. Allis-Chalmers, Ltd. Marsh & Henthorn, Ltd.
		Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd. Can. B. K. Morton.	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
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