

# CANADIAN MINING JOURNAL

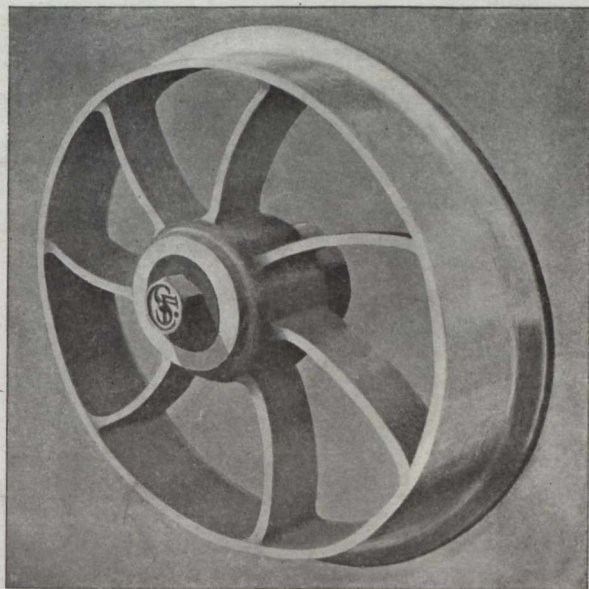
Vol. XL

GARDEN CITY PRESS, Ste. Anne de Bellevue, SEPTEMBER 10, 1919.

No. 36

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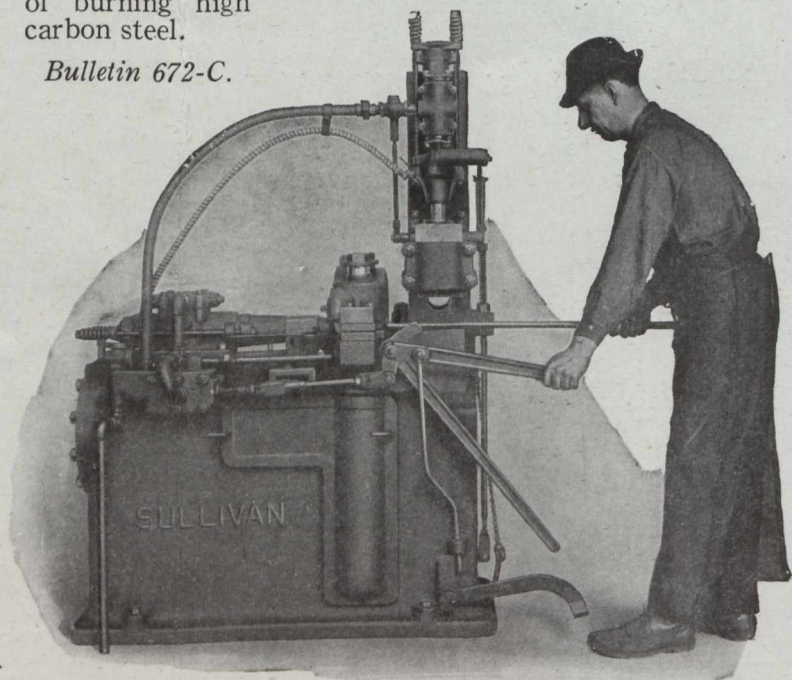
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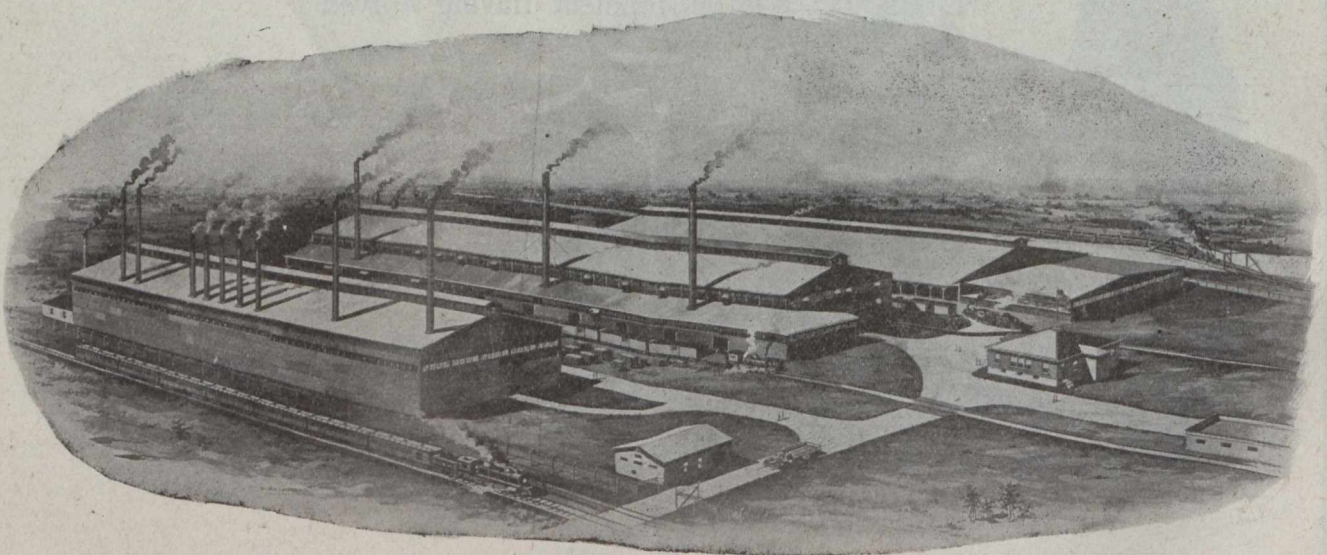
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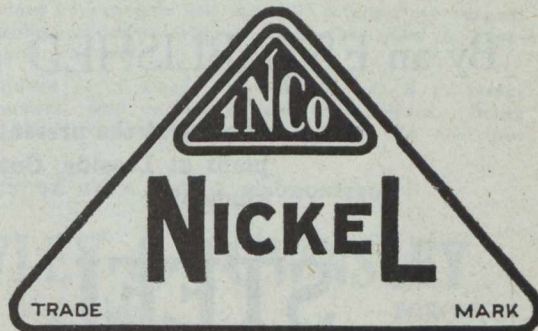
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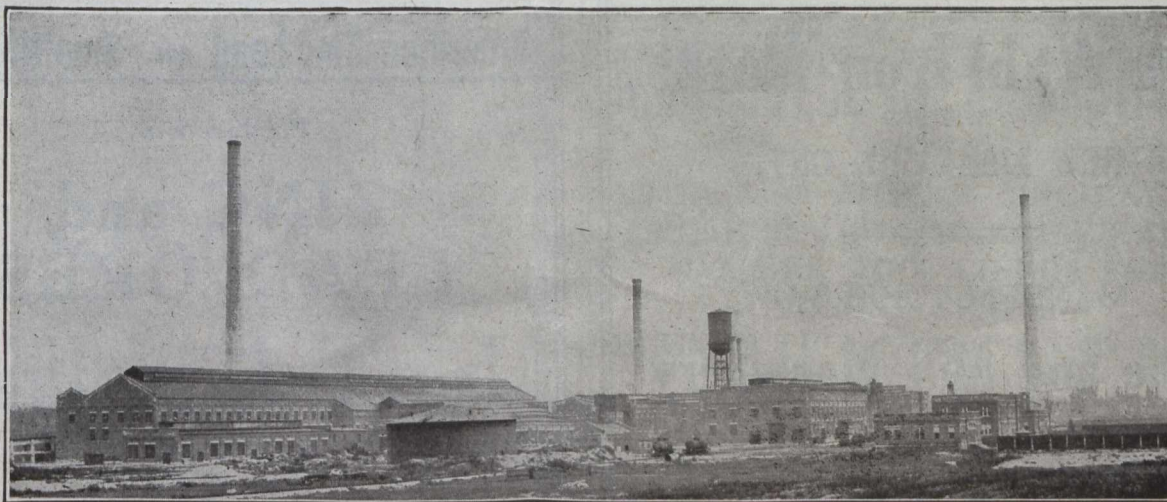
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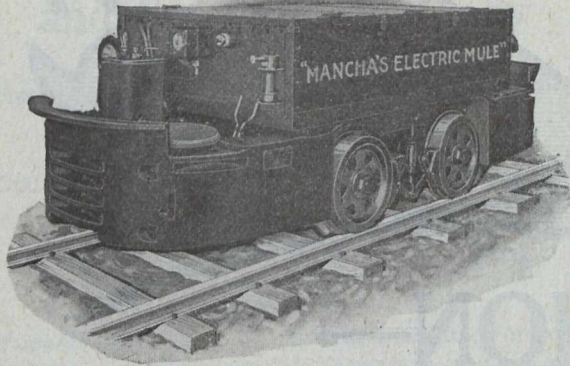
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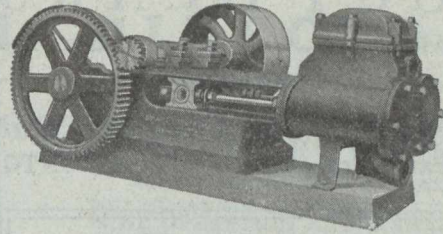
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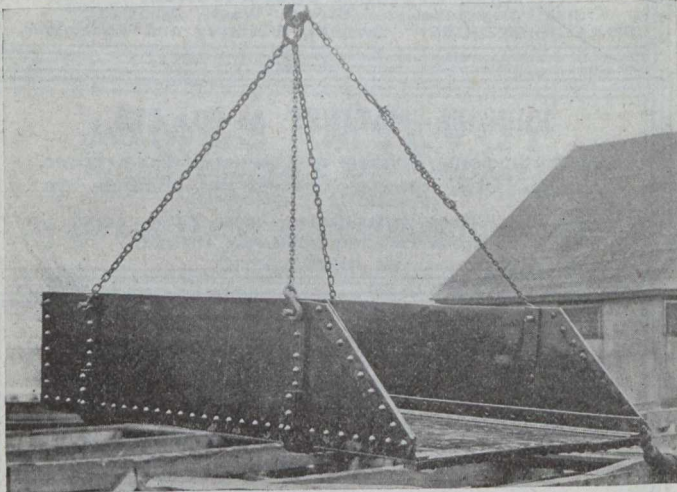
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Practically all economic minerals (with the exception of coal and tin) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and tale. This Province has the largest deposits on the continent of tale, feldspar, mica and graphite.

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Ontario in 1918 produced 45 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1918 to be worth \$80,308,972 of which the metallic production was \$66,178,059.

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

**Thos. W. Gibson,**

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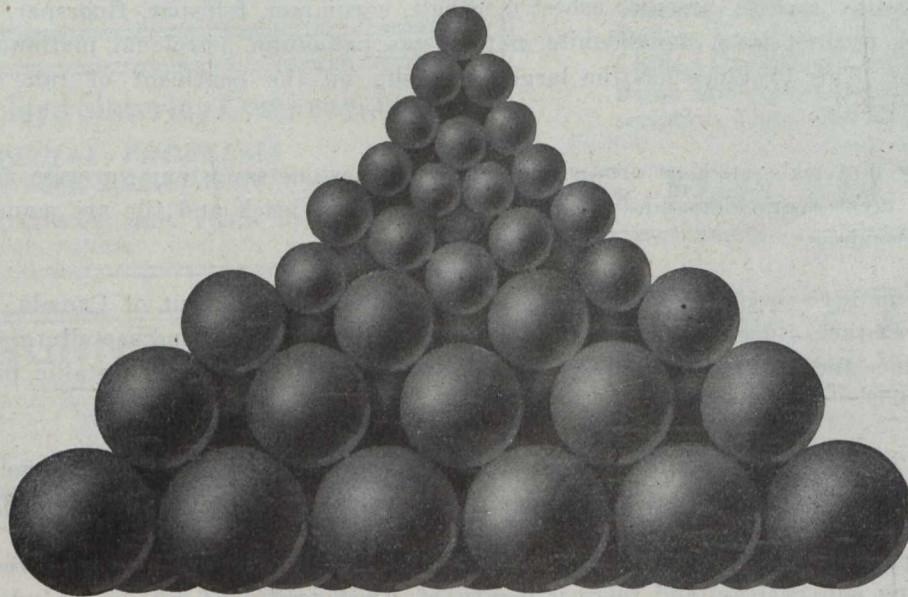
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The editor cordially invites readers to submit articles of practical interest which, on publication, will be paid for.

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VOL. XL.

GARDEN CITY PRESS  
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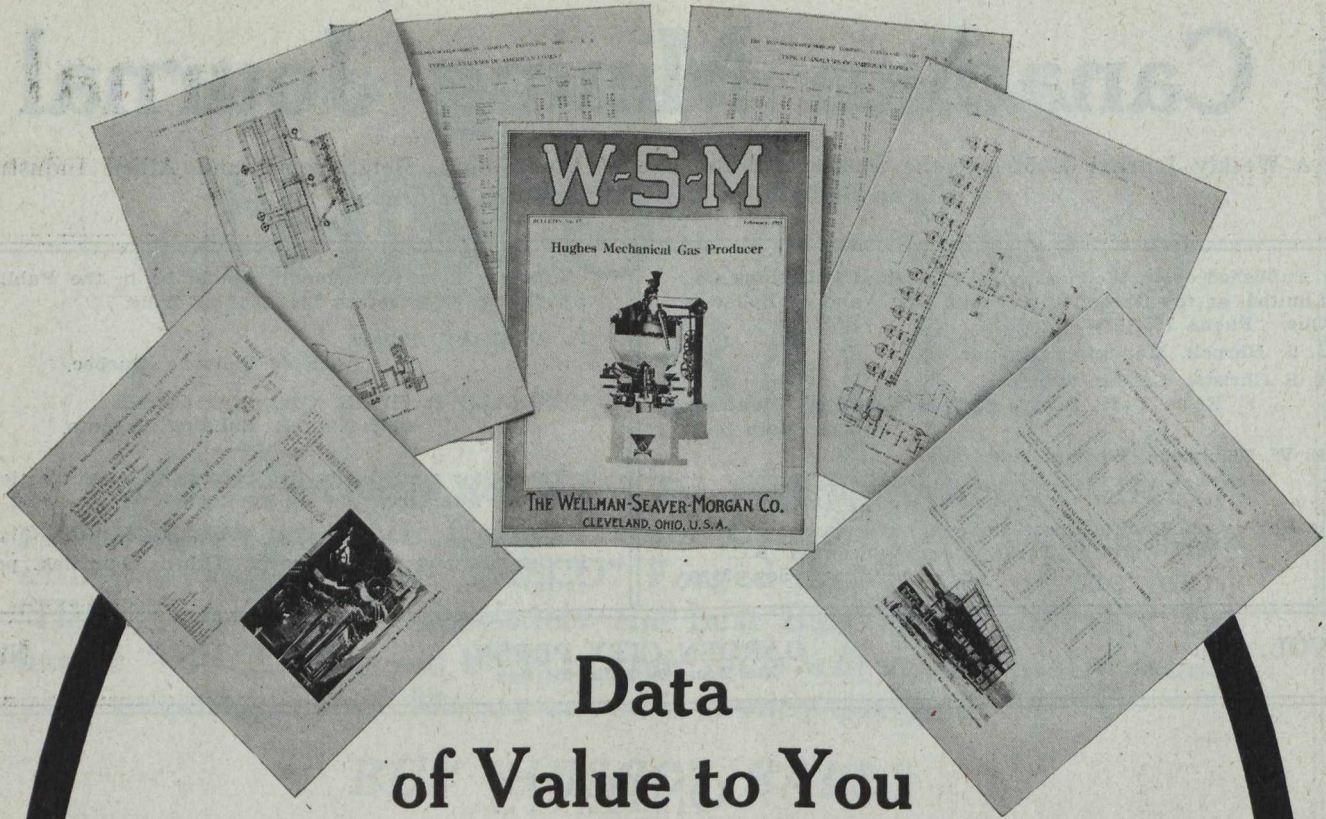
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## Data of Value to You

In preparing our new twenty-two page Gas Producer Bulletin, we took the opportunity to gather under one cover the engineering data of value in the installation and operation of a Gas Producer Plant.

The tables and drawings shown above are typical of the ones included. Some of the subjects treated are:

**Analyses of all American Coals.**

Heating Value of Gases and Hydrocarbon Liquids in the State of Gas.

The Volume and Weight of Oxygen or Air Necessary to Burn One Pound of Various Elements, Together with the Products of Combustion.

The Volume of Oxygen and Air Necessary to Burn One Cubic Foot of Certain Gases Together with the Products of Combustion.

Combustion Data General Efficiencies of Furnaces.

Composition of Air.

**Metric Equivalents.**

Density and Weight of Gases.

Layout for Open Hearth Steel Plant.

General Layout of Gas Flues for Gas Producer Plant.

Heat Carried Away By Dry Chimney Gases per Pound of Combustible.

Loss of Heat Due to Incomplete Combustion of Carbon to Carbon Monoxide.

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# EDITORIAL

## *THE COBALT STRIKE ENDED.*

It is with much pleasure that we hear of the ending of the strike of the mineworkers at Cobalt.

No good object is to be gained by discussing the causes of the strike now that it is fortunately discontinued, but it may properly be observed that the strike was not justified by any grievances arising out of the working conditions of the industry, and was called to enforce recognition of a labor union alien in origin and alien in policy to the ideals of Canadian citizenship.

The Mine Managers' Association is to be congratulated on the proper stand it has taken and maintained against the political aims of a few men who are more concerned about the extension of the influence of United States labor organizations to the new and opulent mining camps of Canada than they are about the effect of their confessedly political plans upon the economic progress of Canadian industry.

The strike was settled, as this Journal intimated it could only be settled, by a representative committee of men from all the mines affected, a possibility that the Mine Managers' Association always held out.

As is often the case, during the progress of the strike the original leaders found themselves eclipsed by more thorough-going extremists, who became more vociferous as their proportionate numbers were increased by such workmen as were able leaving the district.

Much credit is due to the Returned Soldiers' Committee, which, although its efforts were temporarily nullified by the passing dominance of the radicals—who compelled the miners' leaders to go back on their undertaking—formulated the conditions on which work has been resumed.

It is reassuring to find the tremendous power which is reposed in the organizations of returned soldiers exerted against undesirable importations into Canadian life. The safeguard to the security of our national fabric is brought most clearly into relief where, as at Cobalt, the ideas of the returned men come sharply into conflict with the political aims of men who not being Canadians and having no stake in this country, have nevertheless been successful in temporarily depriving others of their means of livelihood, and in stopping the mining of silver during a period when the need for its production is sufficiently evidenced by the high price the market is willing to pay for it.

## *THE INDUSTRIAL CONFERENCE.*

The provisional lists of those who are expected to attend the conference of representatives of Canadian industrial activities shows a most catholic selection of

diversified interests, so diversified in fact that it will be a cheering sign of the times should any common agreement on principles be found possible.

We venture to forecast that the first concrete problem which the Conference will be called upon to consider—and not necessarily to solve, for some things are too difficult even for conferences—is the provision of remunerative employment in some of the pivotal industries of Canada during the coming winter.

If the Conference expends its united wisdom on academic discussion of the very debateable items of the draft agenda, many platitudes will be exchanged, some steam will be blown off by representatives of both capital and labor who will feel that the situation demands eloquence, but the root of the matter will not be exposed.

Canadian industries—that is such industries as serve by assembling the raw materials and manufacturing therefrom some necessary of life, and are not purely engaged in exporting the irreplaceable resources of our country—cannot compete with industries more favorably situated, and unemployment is on the increase.

It is too often forgotten by leaders of labor that some of our most basic industries in Canada, industries whose prosperity or decline involve influences that ramify to every quarter of our economic situation, are really bonused industries, buttressed, and we believe very properly buttressed, by protective tariffs and other forms of national assistance. This in itself is an admission of economic disabilities accompanying the as yet juvenile and undeveloped character of our industries, the geographical position of our coal deposits, and the choice which Canada has made to be an independent political state of North America.

Under these limiting conditions Canadian industry can only prosper by an agreement of both parties to the industrial contract to work together for Canadian interests, always keeping in mind our national limitations, which are opposed to and confronted by an energetic opulent and populous neighbor, a nation possessing unprecedented natural resources, with whom we desire to live in peace, as we have lived for a hundred years, but whose political or industrial guidance we do not accept.

Herein lies the danger of the propaganda of international unionism when it is advocated with such enthusiasm that it loses sight of the struggle which many Canadian industries have had to make, and must still make, to meet the aggressive commercial competition of the United States.

The cold truth is that a number of Canadian manufacturing industries, particularly the steel and metal industries, are facing an extended period of unemployment with winter approaching, and the most pressing item upon the agenda of the Industrial Conference at Ottawa is how to lessen the costs of production and how to increase the volume of output, and these vital considerations should take the precedence their actual importance calls for over the relatively secondary and political considerations that form so large a part of the matters now outlined for the consideration of the Conference of next week.

### THE CLOSE OF THE STRIKE AT COBALT.

The striking workmen and the Mine Managers' Association at Cobalt, aided by local business interests, following the splendid, though unfortunately unsuccessful attempt of the Returned Soldiers' Committee, to bring about an amicable understanding, have now got together and work at the mines has been resumed, the following statement of the Mine Managers' Association being the basis of agreement:

"To the Committee of Employees, Cobalt:

"Since our recent meeting with you, the managers have carefully considered the points brought forward, and agree on the following statement:

"In regard to the wage situation, the main contention appeared to be that while the bonus system was favorably regarded, you believed the base wage was too low. Your reason for this was that in the event of a considerable drop in the price of silver, the low paid married men could not meet the present cost of living.

"To meet this objection we will strongly recommend to our directors as soon as the men return to work, if they do so without delay, that the base wage be raised fifty cents per day for all occupations and that the bonus start on 80 cent silver instead of on 60 cent silver as at present.

While this does not mean an increase in wages, it does mean an added security against a drop in the price of silver. This change would put the base wage of the miner on a par with the base wage in other large mines in this country and in addition the miner here would receive \$1 per shift bonus on the present price of silver.

"Regarding hours of labor, the Ontario Government has enacted that eight hours at the face constitutes a day's work underground. We do not consider that eight hours labor is any more than a day's work. The employers have more to complain of in this respect than the employees, as it is a well-known fact that the efficiency underground has dropped very materially since the war started and this leads to corresponding increase in the cost of production. Consideration must also be given the fact that the Saturday night shift underground usually works five or six hours instead of eight.

The surface men working nine hours are on day shift every day. There is no good reason for changing this, as it is a well-known fact that most men prefer a nine-hour day shift to changing shifts and working eight hours at night. This is no time to talk about decrease in hours of labor. The whole world realizes that the output per man must increase if the cost of living is to come down.

"Regarding Sunday labor, you will realize that there are some operations that must be carried on continuously and also that unless certain jobs are done on Sunday, it would of necessity throw many men out of employment during the week. We have not found that the men employed in these operations generally object to Sunday work if they know it is necessary and in fact we often have applications for such. We shall endeavor to eliminate Sunday labor to a very minimum and if a man objects to it we will try to change him to another job which does not necessitate such work. Also, if a man must work on Sunday he shall have the right to have a day off on the following week. If Sunday work were paid for on an increased scale, the tendency would be to neglect repair jobs during the week with a consequent loss of employment to the regular workers.

"As soon as possible after a full crew has returned to work we shall ask the men to decide whether they wish to put in operation the plan of collective bargaining already outlined to your committee. Unless it is accepted in good faith by the men, it will not be inaugurated, because it would be a failure without their sincere co-operation.

"The outline of the scheme is as follows: The employees at each mine will elect an Employees' Committee from employees at that mine to discuss with their management questions concerning that individual mine. These several Employees' Committees will elect from their numbers a Central Council, which the companies will recognize as representing the employees of the district. A committee of managers will meet the council and deal with all general questions affecting the camp as a whole, such as wages, hours, and general working conditions.

"This council could very well consider the advisability of starting a system of sickness insurance and some scheme for lowering the price of commodities to the workers. Both these questions would receive sincere consideration by the companies and it is believed that some satisfactory results would follow.

"It is hereby agreed that all workers may return to work as positions are available.

"TEMISKAMING MINE MANAGERS' ASSOCIATION.

H. H. Kee, President.

3rd Sept., 1919.

Work cannot be immediately resumed, as pumping has, in some instances, been discontinued during the strike and the mines must be relieved of an accumulation of water consequent on the stoppage of pumping and made larger by the steady rains of the past few weeks.

The president of the Mine Managers' Association states that the date of resumption of work will depend on the conditions existing at the individual mines, which will, of course, be dealt with by the several managements as quickly as possible.

"Canadian Mining Journal," with "Iron & Steel of Canada" will be "at home" to all visitors in Booth 138 at the National Exhibition of Chemical Industries, September 28th, at the Coliseum and Armories in Chicago.

It is understood the Patricia Mining Company, Boston Creek, Ont., is in the market to purchase complete new outfit of surface mining-plant and reduction plant to renew the loss which it recently experienced through forest fires, which destroyed all the mine buildings.

Dr. T. L. Walker, Director of the Royal Ontario Museum of Mineralogy, and Mineralogist of Toronto University, is visiting British Columbia. He explains that his presence in British Columbia is for the purpose of obtaining specimens for the Ontario mineral collection and to keep in touch with mining development in this province.

Charles E. Taylor, chief geologist to the Imperial Oil Company, has announced that drilling for oil will be started at once at a point to the southwest of Lethbridge, Alberta. Twelve parties under Mr. Taylor have been exploring the foot-hill section of Alberta since the early spring and as a result the point indicated has been selected as the most likely for the obtaining of the results desired.

## Oil In The Western Provinces

By N. C. PEARCE.

Seriously hampered by exceptional weather conditions, drilling work in the Northwest Territories will have to be postponed until next year. This is the latest word from the North. Two drilling rigs were expected to be sinking this season, one at Great Slave Lake, the other on the rim of the Arctic Circle, at Fort Norman on the Mackenzie River.

This summer has been very wet, and to the conditions brought about by heavy rainfall have been added unanticipated troubles connected with getting the rigs around the long rapids of the northern rivers. The Government has sent in bridging and engineering parties to assist the Imperial Oil Company's men and now the best that can be hoped for is that the rigs will be on their locations before cold weather sets in, ready for drilling next Spring. The Great Slave Lake crew will come out this Fall; the Mackenzie River crew will winter in the lonely wastes of the Arctic.

As to drilling, the Summer has had disappointments for the oil men, but the efforts of the many geological parties scattered over Alberta and the North West Territories have been distinctly successful in the amount of good work accomplished. Advance reports from the geologists of the Imperial Oil Company appear to eliminate certain districts and to bring favorable attention to others. The private and Government stratigraphical work is far from completed for the season. When full reports are in there will remain to be done a detailed co-ordination of all examinations.

Meantime, until this co-ordination of reports makes available a full statement of this year's findings, a summary of conditions and developments in the Province of Alberta and the Territories should be worth while.

A great deal of the information for this article was secured by personal investigation on the ground by the writer. Mr. T. O. Bosworth, the Imperial Oil Company's chief geologist, and Mr. C. E. Taylor, their Western production manager; Mr. J. S. Stewart of the Dominion's Geological Survey, Mr. J. B. Tyrrell and others were sources of valuable data and opinion.

Broadly, there are two formations of the Province of Alberta, the North West Territories and certain sections of British Columbia and Saskatchewan that contain oil—the Cretaceous and the Devonian.

These formations are each thousands of feet thick. Throughout the southern and populated parts of Alberta the Cretaceous is the surface, while the Devonian is buried below at depths reaching to 5,000 and 6,000 feet. Well to the north the Devonian comes to the surface, out-cropping first at Vermillion Chutes on the Peace River and down north in the territories it forms the surface over very broad expanses of country.

It will thus be seen that in the populated parts of the west the hopes of oil must be concentrated on the Cretaceous, while in the parts that are difficult of access promise is centred on the Devonian.

In the vicinity of the town of Peace River, a section that has received a great deal of prominent notice in recent months, the Cretaceous is 1,100 feet thick and

lies in gentle unconformity upon the Devonian. The drills in several places have explored the Cretaceous with no striking results, and two drills are now penetrating the Devonian with a progress that is, of course, being eagerly watched.

Taking the oil possibilities of the west, district by district, we will examine what investigation tells.

There is little chance of oil being found in the central part of the province of Alberta. In the narrow strip that extends north and south and takes in Ed-



McArthur No. 3 now being Drilled at Peace River.

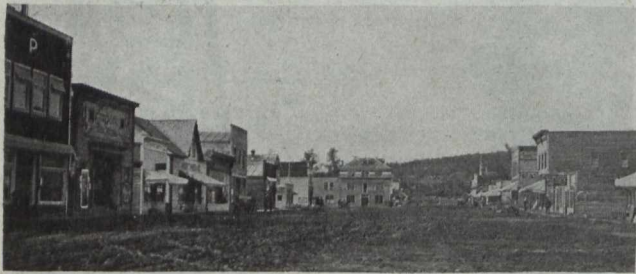
monton, Calgary and McLeod, the country is in the bottom of a synclinal trough, the strata lies almost flat, while well away to the east, south and west they incline upwards. Deep wells have been drilled in this strip without oil being obtained. The depths of some of these bores are, Morinville, 3,350 feet; Edmonton, 1,800 feet; Wetaskiwin, 1,511 feet; Ponoka, 2,257 feet; Calgary, 3,414 feet; Gleichen, 2,795 feet.

Traces of oil, however, were found, and gas. No one can say that in this strip oil will be found, but conditions are decidedly against it. What lies below the Cretaceous is practically a sealed book.

Taking now the eastern part of Alberta, some folding has been found in the Cretaceous, which is largely littered with debris of the ice sheet. Those folds, being little exposed, have escaped attention until recently. There is a slight similarity to the oil bearing anticlines of Wyoming and a deep test hole is now being bored by the Imperial Oil Company. This is on a fold near Czar, on a C.P.R. line. The well will be sunk to the Devonian floor, the borings having the additional objective of geological knowledge of the lower stratas. While boring was to have started on this, the deepest hole in Canada, last June, it began only in August. Delay in shipping supplies was the cause. The total cost is estimated at \$150,000; a steel derrick, 106 feet high, designed to carry a working strain of 250,000 pounds, has been erected. The hole will begin with 20 inch casing and finish with six inch casing, and will take 18 months to complete.

In this general region a number of wells have already been drilled but it is said that not one is located on a fold. The deepest is at Fusilier, just across the border in Saskatchewan, and it reaches 2,826 feet. There is no sign of structure here. Small showings of oil have been encountered, chiefly at Gratton and Viking.

A promising gas fold has been proven at Viking around a depth of 2,000 feet. There are at present nine wells with fairly large capacity, but not as great



The Frontier Town of Peace River.

as the wells of the Bow Island field. The pressure is 730 pounds and some of them run four to five million feet a day. The extent of the field has not yet been limited and its possibilities are considered very good. There is also the likelihood of other fields being located in the same general neighborhood.

Coming down to the south border of Alberta interest naturally centres on the district of the Sweet Grass Buttes. Here there was almost feverish activity early in the war; the Cretaceous strata tilt upward and almost all the beds outcrop. In general the structure is a gently arched monocline, dipping towards the north. In some of the wells traces of gas and oil were found. United Oils No. 3, at Etzikom Coule, 30 miles north of the boundary, is the most important well. It went 3,705 feet and through the Cretaceous into the limestones beneath. At the base of the Cretaceous a 60-foot bed of sand was found, resembling the famous tar sands of northern Alberta. No commercial oil was found but plenty of gas.

To the north thirty-six miles at Bow Island, we find one of the most important gas fields in Canada, developed largely through the energy of Mr. Eugene Coste and his partners. There are here about twenty gas wells, running 2,200 feet deep, with capacities averaging six and a half million cubic feet a day, and with a gas pressure of 800 pounds. This field supplies

Calgary and other cities. Medicine Hat has also developed an important gas field.

While the accumulations of gas are without doubt extensive and of great importance, the gas itself is dry. While just now hopes of extracting gasoline from the gas fields of southern Alberta are based on rather slim promise, there is no doubt that this resource will all ultimately be of great value. An interesting fact is the presence of Helium, which is said to be a one per cent content, a percentage comparing very favorably with most of the American gases available for use in inflating airships.

Over in the extreme southwest corner of Alberta, on Waterton Lake, there is the oldest oil-field of Alberta. Twenty years ago seepages were found and



Three Creeks Well now being re-opened at Peace River.

several wells drilled to 1,400 feet. In two a fair amount of oil was secured. One, the Lineham, is said to have flowed 100 barrels a day. This summer this well was cleaned out and many barrels of oil baled. Arrangements for drilling a new well alongside this old producer are under way. The presence of oil here is decidedly surprising, for the wells are really within the Rocky Mountains. There is great faulting and overthrusting, the crystalline rocks having been pushed over the Cretaceous. The oil appears in pockets in the older rocks.

Along the foothills of the Rockies we find the Cretaceous tilted upward and crinkled into sharp anticlines. This fold-belt has a width of ten to twenty miles and a length of 800 miles from the boundary northward. Geologists think that this foothill belt is one of the most promising in the west, but it requires

very careful examination. There is excessive faulting, crushing and other disturbance and the structure is often difficult to determine.

Wells placed on the faulted rocks would, of course, be wasted, and wells placed on the anticlines have to be precisely located, owing to the steep flanks of the folds. The outer folds are generally the least steep and the most favorable. As an illustration, the Turner Valley anticline might be mentioned; its dip on both flanks is forty-five degrees, three-quarters of a mile from the axis.

In the foothills some fifty wells have already been drilled, a few of them with regard to structure. These wells cannot be even said to have tested the southern section of the foothills belt, while the Edmonton and Peace River sections are utterly virgin land. The foothill wells are scattered from the boundary to Rocky Mountain House, but cluster chiefly in the Okotoks field, which has five producing wells, with a total yield of about 75 barrels a day. Last year the production was 18,000 barrels of very high gravity oil—some of it almost pure gasoline. The oil is found at 3,000 to 4,000 feet. At the Dingman well there is a high flow of wet gas from which the gasoline is now being extracted by the first plant in Canada.

At this time the most extensive geological surveying in Canada is being done in the foothills. On the work of the Government stratigraphists a half dozen Imperial Oil parties, and several other parties, are basing their examinations. Some very promising determinations have been set down, a number of gas and oil seepages found and numerous anticlines mapped.

Down the river from the town of Peace River for ten miles a number of wells have been drilled. The first was put down in 1915-16 for J. D. McArthur and a syndicate of fifty associates. This syndicate has drilled three wells and the third of these is now into the Devonian limestones. The Tar Island Oil Company have also a well into the limestones, both holes being now at 1,200-1,300 feet. Close to the contact an occurrence of water, highly agitated by gas and in dangerous proximity to loose and crumbling sand, had to be met and defeated. This has been a great problem for the drillers. The Victory Oil Company are putting two wells also down into the Devonian and there is talk of other holes, at present idle, being deepened.

The oil so far secured is in encouraging quantities and from some of them several barrels a day were baled out. One is reported to be capable of twenty barrels daily. It is a heavy, tarry oil, occurring near the bottom of the Cretaceous. A relation with the famous tar sands of the Athabaska has been hinted.

The Peace River field is 140 miles east of the nearest known folding in the foothills. The structure has been mapped three times by geologists, and a very gentle structure with a slight westward dip noted.

The Devonian is not exposed anywhere at the surface in the neighborhood of the field but it is known by geologists that it is almost certainly folded, and to the north it contains oil. The difficulty of course, is to strike folds that are hidden from view.

If the wells were spread much further apart, and the Smoky River section bared, the chances of hitting something around the town would be bettered tenfold.

In a two-hundred mile stretch between the Peace River and the Athabaska there is a good looking field about which little is known but is probably underlain by tar sands.

To come to the tar sands, it may not be generally appreciated that in the vicinity of McMurray on the Athabaska River, Canada has the largest natural oil exposure in the world. But have these sands economic importance?

They exist in a bed of ordinary sandstone, 100 to 200 feet thick, saturated almost completely with heavy, asphaltic oil. It contains 15 per cent of bitumen and yields 15 to 25 imperial gallons of oil to the ton when heated. The oil is low grade, with specific gravity of 25 Beaume, but on distillation it yields five per cent of gasoline. The area over which the tar sands are spread is, at the lowest estimate, 10,000 square miles, and may be more than 20,000 square miles.

Dr. Bosworth makes the very interesting calculation, based on the supposition that the economic elements of the tar sands can be secured and extracted, that the area is 15,000 square miles, the thickness 50 feet, and the yield 10 gallons per ton, that the famous sands contain three hundred thousand million barrels of oil. This quantity is only 500 times the world's annual production.

The thing is to get it, to get it away from the exposures. The Government drilled a test well at Pelican where it was hoped to strike the oil under a thick cover of clay shales. Drilling difficulties caused the hole to be abandoned. That was many years ago; in recent years at least six prospecting wells have tried to find the tar sands under a proper cover of clay shales. Three of these holes were along the Great Waterways railway and encountered the tar sands at 400, 600 and 1,000 feet, respectively. A fourth well at House River found the sands at 400 feet; the fifth and sixth were at Pelican, and at about 900 feet. None of these encountered commercial yields but no one, least the experienced geologist, is ready to condemn the whole region. If drilling for oil fails other methods for utilizing the tar sands will be tried. Gas has been proven here to exist in very large quantities. For twenty years there has been a heavy flow from the Pelican well, drilled by the Government. Later wells have proven it. At present far from population and railways its value lies in the future.

Now to discuss the northern parts of Alberta and the territories which the Imperial Oil hoped to explore with the drill this year but have been prevented from doing by weather and abnormal physical conditions. This is the country where in broad reaches the newer formations have been eroded, and the Devonian bared to view. Near McMurray and Fort McKay wells have been drilled without much success. Beneath the limestones there are thick deposits of red shales with salt and gypsum and the prospect of finding oil in the Devonian of this locality is not at all bright.

The Devonian is also laid bare at Vermillion Chutes, where there was some excitement in 1914-15. The initial venture of the late Lord Rhondda was here and, unfortunately it was not a success. Interests connected with his estate are now visiting the country and there is hope that they will show by new oil enterprises that they are not discouraged. The strata at Vermillion are almost horizontal and are beds of brecciated or fine limestone containing blobs of tar.

On Great Slave Lake are some of the most interesting oil indications in Canada. The shores are largely low and swampy but enough of the structure is visible to make clear that the beds are in gentle undulating

folds. On Windy Point, on the north shore, the most noticeable seepages of oil are found. Here a bed of crystalline dolomitic limestone has cavities containing a light, yellow oil. Oil rises to the surface of the water where the rocks are submerged, and on land are great pools of oil. At present it is not known whether any oil bearing beds lie below the one near surface. That will be determined by the drill next summer. The Imperial Oil men say that in the Great Slave region the oil showings are so widespread that it seems quite probable that oil fields will eventually be developed.

Northward even from here indications of oil are found in many places. Some of the chief seepages occur in the country beyond Fort Norman, on the Mackenzie River at the Arctic Circle, where, through an extensive region, the Devonian consists of deposits very favorable for the formation of oil. There are here 300 feet of black bituminous limestones upon which rest 300 feet of black bituminous shales. The shales smell very strongly of oil and in places there are large cliffs of them undergoing combustion on the surface. This bituminous series is overlain by a series of clay shales and sandstones and it is in these sandstones that the oil occurs. The structure is also favorable for the strata are folded into long, large anticlines. A preliminary test well was to have been drilled this year but is postponed until next spring.

It is considered by very conservative authorities that here, on the Arctic Circle, a number of oil fields must eventually be proved. This is a long way from civilization, and the average person will think that the spending of money a thousand miles inside a land of waste and wilderness is a crazy performance. But shrewd, expert men think the money will be well spent and are eagerly confident that if oil is found that they can get it out. It is a bold enterprise, there is nothing going on in Canada approaching it for daring.

Since the "Shell" Company's vain effort to get the oil monopoly of the north half of Alberta and a piece of the territories equally large, there has been far more interest on the part of the big petroleum people. Although the Imperial Oil Company's prospecting bill for this year will run around a million dollars, they have not got the field to themselves. Other interests have geological parties scouting the country but the nature of their operations makes quietness an easier matter.

Searching for oil is not solely the rich company's privilege. The small company, or the individual, has not the same facilities for checking and examining the geology of a province in one campaign but the same facilities for acquiring land are open. Leases are secured from a Dominion Land office at a cost of 25 cents an acre the first year and 50 cents an acre for subsequent years. The individual is limited to 1920 acres at a time but can secure as much as he wishes by using the names and assignments of relations and friends. Drilling must start at the end of the first year, and the cost of boring is deducted from rentals.

More has been learned this year of the oil possibilities of the Canadian west than during the previous ten years. Oilless areas are being eliminated and promising sections are being circumscribed. Actual drilling operations do not approach, in extent, the hopes of the more optimistic people, but it is most certainly true that great strides have been taken toward the production of a natural resource vitally necessary to Canada's growth.

### MINING MEN MEET TO START ASSOCIATION. Prominent Mining Brokers, of Winnipeg and the Twin Cities Organize.

Plans have now been completed for the formation of a Winnipeg Mining association to represent the interest identified with the development of mining in Northern Manitoba. The first preliminary meeting of those interested in the new association was held some time ago and plans were further developed at a recent meeting. The membership of the new association will include mine owners, owners of mining claims, large shareholders of companies already in existence, as well as brokers and financiers interested in the development of the mineral fields of this province. Another immediate purpose of this association will be to act as a central clearing house for all information as to the development of Manitoba mineral properties and to supervise and censor the issuance of authentic information and publicity regarding the development of the Manitoba mining field.

It is expected that the organization of the association will be completed at an early date then a bureau of information will be established in this city, where the public can seek and at all times secure accurate and unbiased information regarding Manitoba mineral developments. The first meeting, which was of an informal character, was largely attended.

The officers elected were: President, J. Murray Baird; vice-president, John Beckman; directors, J. Murray Baird; John Connor, secretary Winnipeg Stock Exchange; W. Tobias.

Among those present, were: Edward McCarthy (St. Paul, Minn.), D. D. Shaw, R. R. Pattinson, L. W. Hicks, L. E. Blummer, J. M. Baird, E. W. Jackson, H. B. McTavish, J. D. Perrin, John Connor, N. Tobias, W. Pow, J. W. Harris, H. B. Montgomery, and E. E. Kain, of Minneapolis.

### AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS.

#### Chicago Meeting.

September 22nd to 26th the American Institute of Mining and Metallurgical Engineers holds its Fall Meeting in Chicago. The Congress Hotel is designated as the convention headquarters and most of the meetings and technical sessions will be held there. For the gratification of the technical appetites a feast of upwards of a hundred and fifty papers have been prepared for discussion at this meeting.

The first of the social activities during the session will be the smoker at the Congress Hotel on Monday evening, and for this a lively programme has been prepared. The Committee in charge guarantees that at this smoker—in spite of the restrictions against 23¼%—any existing trace of coolness or strangeness between members will be absolutely annihilated. An inviting series of excursions has been arranged for the members and their wives. These include a boat trip to the Gary Steel Mills, one day in the LaSalle district with its zinc smelters, coal mines and cement plants; the East Chicago lead refineries, the oil refineries at Whiting, the tungsten and molybdenum plant of the Fansteel Products Company, the Milwaukee mining machinery manufacturies and the coal mines in Franklin and McCoupin Counties. Also arrangements have been made for the members to visit the various industrial plants of interest in and about Chicago.

## Recent Developments In Wasapika Gold Area

By REGINALD E. HORE.

Encouraging results are being obtained by those who are developing gold properties in the Wasapika area, Sudbury Mining Division. Some account of this area was published in the July 9th number of the Journal. I have recently re-visited several of the properties and I found that where work is being done, the chances of developing profitable mines have been considerably improved.

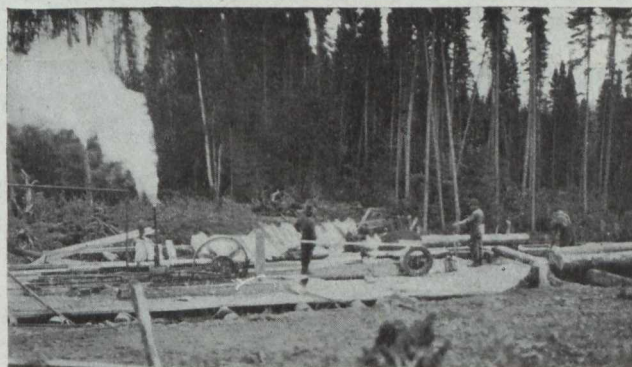
The Wasapika property is particularly interesting as it appears to have the makings of a very big mine. The West Tree is developing a smaller but very rich orebody. It is significant that the vein

the vein the thickness and assay value of the deposit is as yet unknown. When the crosscut is completed it will take some time to drift north and south along the vein to develop it thoroughly at this level. Then it must be carefully sampled and assayed. No one knows what the results of sampling and assaying will be, and most people will prefer to wait and see before expressing an opinion as to the nature of the deposit. Being myself more interested in probabilities than certainties, I have formed an opinion after examining the ore and rocks at surface and in the crosscut. It is only an opinion, but it may interest



The West Tree Headframe.

matter just broken at the 100 level of the Wasapika is very similar in character to the ore that is being taken from the West Tree shaft. I saw no coarse gold where the Wasapika vein was first encountered at the 100 feet level, but the white quartz with its dark sericitic seams and with many small pyrite crystals and occasional grains of chalcopyrite has a striking resemblance to the veins which on the West Tree carry very high gold values. I will be very much surprised if rich shoots are not found in the Wasapika deposit. As the cross cut has not yet passed through



The Saw Mill—Wasapika Mine.

some readers of the Journal. It is that the underground work so far done indicates that the ore deposit is even bigger than it appears to be on the surface and the surface indications are that it is a big one.

The Wasapika shaft was started in the hanging wall rocks about 80 ft. west of the outcrop of the Ribble vein. At a depth of 100 ft. a crosscut is being driven towards and through the vein. At the shaft there are narrow quartz veins in the rock. Similar



A Glimpse of the Michikawakenda Lake from the Herrick Camp.

narrow veins were cut at intervals in driving east. At about 30 ft. a big vein was encountered and the face was in quartz when I visited the property. When I left the district on August 23rd another round had advanced the opening to a distance of 8.7 feet in the vein.

While development at the shaft is the chief activity at the Wasapika mines, progress is being made in other work. A saw mill is in operation and is proving very useful in squaring timber and cutting lumber

for building purposes. The mill is located close to the Wasapika power house. It supplies the needs of the Wasapika, West Tree and Herrick properties.

Transportation has been improved by the completion of the road to the Herrick property. Supplies for the Wasapika mine are brought to the west shore of Michikawakenda lake from the railway by team and thence by motor boat to the Wasapika. The cost of freighting has consequently been greatly reduced. Low water in some of the streams was causing the freighters much trouble on the water route, much heavier loads can be comparatively easily handled by wagons.

#### The West Tree

At the West Tree the sinking of the shaft is progressing rapidly under contract. A suitable head frame and power house has been constructed and a hoist installed. The contractors are encountering rich ore in quartz veins in the shaft. Very rich pieces of



Mr. Fitzgerald and the First Cores from the Herrick.



One of the Herrick Buildings.

ore are of common occurrence. The quartz is white with dark sericitic seams. The gold is partly along these seams and partly at some distance from the seams in the white quartz. Pyrite is abundant and chalcopyrite is often present in the ore. The pyrite is commonly in well formed crystals, while the more yellow chalcopyrite is in shapeless grains.

While development of the rich ore deposit is at present the chief activity at the West Tree, there are other and bigger deposits that will receive attention later. There is at present a natural desire to learn the nature and content of the rich deposits which have been found on either side of Upper Wasapika Lake and development will in the near future be largely under the lake. With rich ore on either side of the lake and another vein running into the end of the lake from the south, one may confidently expect interesting developments in the drive across.

#### Herrick.

At the Herrick, camp buildings are being constructed and a diamond drill is in operation. The wagon road to the property has been completed and supplies can now be brought in from Westtree station on the Canadian National Railway by team at the cost of about 2c a pound.

The diamond drill has been set up west of the Herrick shaft and drilling has been started at a dip-angle of 60 degrees. If the vein continues vertical it should be encountered at a depth of about 450 feet. The drill is in lower ground than the shaft, about 30 ft. lower than the collar. When I last visited it, the drill was turning merrily at a depth of about 150 ft. Mr. Fitzgerald, who has the contract for the diamond drilling is largely responsible for the speed with which the Herrick end of the wagon road was completed. With a first class machine and exper-



On the Water Route to Wasapika.



A View of the West Tree Headframe and Power House from the North.

enced drill men on the job there should soon be several holes completed that will give information of great value to the owners of the property.

#### Other Properties.

While most of the work being done is at the Wasapika, West Tree and Herrick there are other properties on which some work is being done and several other promising properties which merit attention. At the Atlas, camps have been built and a small force is at work. The Saville-McVittie, a promising property, is still idle. At the Churchill, a little work is being done, but development is not proceeding as vigorously as the property merits. The Gold Corona or Queen of Sheba is also still idle. Prospecting has been begun on the Anzac (now Wakenda) properties which lie north of the Herrick. Further west, a number of claims are being prospected. Walter and John Knox have several men at work on claims west of Michikawakenda lake.



## Nova Scotia Notes

### Dominion Coal.

The production of the Glace Bay collieries of the Dominion Coal Company in August was 240,744 tons, comparing with 288,781 tons in August 1918. The output shows a slight decrease from the previous month, July which showed a production of 249,396 tons.

For the first eight months of the year the output was approximately 2,029,000 tons, comparing with 2,257,000 tons in the corresponding period of 1918, showing a decline for the year of 232,000 tons.

While the further release of requisitioned ships will permit of more steady working of the collieries during the remainder of the season of open navigation, it does not appear likely that the aggregate outputs of the Cape Breton collieries for 1919 will much exceed three million tons, if at all. With the exception of the strike year 1909, it is necessary to go back to 1901 to find records of production so low as they promise to be for 1919. The Glace Bay collieries in 1918 produced 3,272,000 tons.

The output by collieries during July and August is shown below:

Mine	Aug.	July.
No.1	25,953	26,766
No. 2	47,835	49,756
No. 4	26,117	27,552
No. 5	5,841	6,442
No. 6	17,229	18,712
No. 9	16,406	22,194
No. 10	8,249	8,613
No. 11	13,578	13,031
No. 12	16,365	16,625
No. 14	13,724	11,836
No. 15	12,255	12,527
No. 16	16,660	12,468
No. 21	12,159	11,681
No. 22	12,373	11,193
Total	240,744	249,396

It is understood that a new shaft is likely to be put down by the Dominion Coal Company on the sea-shore at Glace Bay to serve the submarine territory of Caledonia (Dominion No. 4) Colliery, and also to tap the Emery Seam underlying the Phalen Seam, which is worked out in the land area tributary to the Caledonia Shaft.

The Caledonia Colliery is one of the oldest mines operated by the Dominion Coal Company, the colliery having been commenced in 1866. As an example of excellent workmanship, it may be mentioned that the Caledonia coalhoist was brought from the Gardiner Mines in 1870, after being used there, and is still in daily use. The engine was made by Coupe, England.

The plans for the new shaft indicate the further development that must take place in the Glace Bay and other submarine coalfields in Cape Breton in order to win the submarine coal. Not only much larger shafts, in diameter, but much deeper shafts, will be required in the future, in order to win the underlying and un-worked seams. No really deep shafts are as yet sunk in the Sydney coalfield. The shaft contemplated

would be about 600 feet to reach the Phalen Seam, the Emery Seam underlying at a further depth of about 160 feet.

A shaft sunk to a depth of less than 1,500 feet near the present No. 2 Colliery of the Dominion Coal Company would include about seven workable seams of coal, aggregating nearly forty feet of coal in total thickness.

The seams are so spaced that they can be worked without seriously interfering with one another, if the workings are properly laid out and ordinary precautions are taken. This section is substantially the same as underlies the workings in the Phalen Seam at Caledonia Colliery, and indeed the whole of the submarine coalfield in the Glace Bay district.

A new shaft, now being sunk, is approaching completion between collieries Nos. 1 and 2, which, like the proposed shaft at Caledonia, is being sunk to facilitate the operation of the submarine areas, and to shorten the distance the workmen have to proceed from the surface to the working face.

### Nova Scotia Steel and Coal Co.

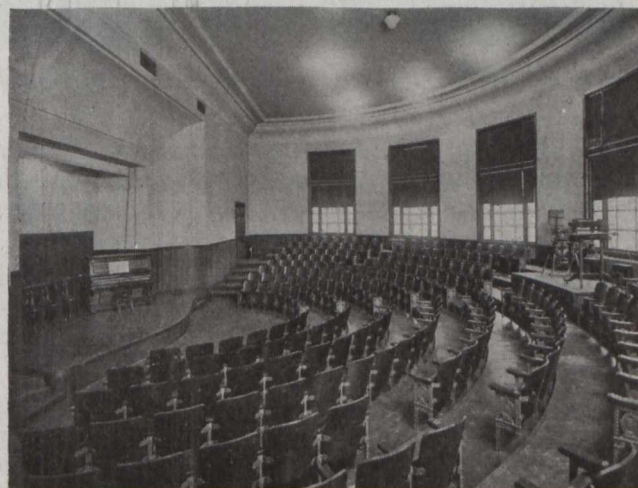
The output of the Scotia Collieries for August, compared with August 1918, was as shown below:

	Aug. 1919	Aug. 1918
	Tons.	Tons
Princess	14,347	10,454
Florence	18,250	12,884
Scotia	7,544	6,598
Jubilee	10,794	11,521
	50,890	41,457

The collieries worked full time throughout August, the Jubilee Mine being the single exception, and losing only one day.

Coal was banked out to equalise shipping opportunities, but it is expected that stocks will be completely lifted before Winter commences.

At the new mine near Point Aconi coal is now being hoisted to the extent of about 25 tons daily. This quantity will, of course, be increased as development proceeds. So far the coal produced is being stored on the ground awaiting the building of a railway line to the new colliery site.



U. S. Bureau of Mines Auditorium.

### OPENING OF N. S. BUREAU OF MINES RESEARCH LABORATORIES.

The new laboratories of the Interior Department's Bureau of Mines at Pittsburgh, costing more than a million dollars, are to be dedicated on September 29, 30 and October 1, with appropriate ceremonies in which the mining and metallurgical industries of the country are to take part. The program for the three days has been arranged by the Bureau of Mines in co-operation with the Pittsburgh Chamber of Commerce.

One of the biggest features of these ceremonies will be the Nation-Wide First-Aid and Mine-Rescue Contest to be held during the last two days. Already

deeds in the saving of human life in the mining and metallurgical industry, or who had developed some safety appliance to further the saving of life in those industries, will make its first awards. Dr. Van H. Manning, President of the Association, will announce the list of recipients of diplomas and medals and recite the deeds for which they are presented. The committee on awards has recommended that twelve gold medals be awarded all for heroic deeds performed by miners in coal and metal mines in efforts to save the lives of other fellow-workmen. In several instances where men lost their lives in endeavoring to save others, the medals will be awarded to their nearest living relative. It is intended that this organization serve the mining industry in the same



View of the New Oxygen Breathing Apparatus for Mine Rescue Work perfected by the United States Bureau of Mines.

nearly 100 teams from the coal and metal mining companies throughout the country have entered the lists and more are expected by the time the entries close.

On October 1, there will be a holiday for the miners of the Pittsburgh district and thousands will attend this National Meet and witness the awarding of the prizes to the winners.

In addition to the usual prizes for these contests, the Joseph A. Holmes Safety Association, an organization created in 1916 in honor of the memory of the First Director, for the purpose of giving recognition to persons who had performed meritorious and heroic

manner as the Carnegie Hero Commission attempts to serve industry generally.

Speaking of the accident condition generally in the mining industries and of the outlook, Dr. Van H. Manning, Director of the Bureau of Mines, says:

"I am often asked, 'What has the Bureau of Mines accomplished in saving of human life in the mines?'

"It is difficult to say that so many miners might not have been killed if it were not for the Bureau of Mines, there are so many varying factors involved. I may say, however, that if you consider the prevailing average death rate in the mines for a period of years

before the Federal government took up this work, and compare it with the average fatality rate since the bureau was created, you will find that 5,000 less miners have been killed. In other words, had the old fatality rate been maintained through the last few years, 5,000 more men would have lost their lives.

"I am of the opinion that the statement of 5,000 lives saved is a conservative one, for it must be remembered that the situation was gradually becoming worse in the mines, and who knows but what there might not have been 7,000 or 8,000 lives lost. We also have to take into consideration that, thanks to the many improvements in life-saving methods and the greater understandings of the causes of accidents,

## Special Correspondence

### NORTHERN ONTARIO.

The result of development work on the Clifton-Porcupine property in the Porcupine district is arousing a good deal of interest. Work which got well under way only a few weeks ago has already resulted in blocking out considerable commercial ore, according to late reports from the property.

The Clifton-Porcupine is understood to be well-financed, the property being all paid for and with no bonded indebtedness. Ample funds are said to be in the treasury with which to carry out the development program outlined. The interests behind the enterprise



View of the New Oxygen Breathing Apparatus for Mine Rescue Work perfected by the United States Bureau of Mines.

that the tide has definitely turned and that this saving of 5,000 human beings within a few years will be accentuated and increased as the years roll on until we can show several times 5,000 lives saved.

"Whatever statisticians attempt to make out of these figures, however, they may endeavor to twist them, it is indeed a glorious record of human progress. Five thousand lives saved! Perhaps, 2,000 less widows. At least 3,000 children who still have fathers.

Mr. James McEvoy of Toronto is on his way to the Belcher Islands, Hudson Bay, to examine iron ore deposits.

have shown genuine ability and integrity in the past, and it is their belief that their property will develop into a producer.

The property is situated immediately south of and adjoining the Dome Mines. Success at this point would considerably enlarge the so-called Dome area. As a consequence of this the Clifton-Porcupine is the center of more than ordinary interest.

"Canadian Mining Journal," with "Iron & Steel of Canada" will be "at home" to all visitors in Booth 138 at the National Exhibition of Chemical Industries, September 22nd, 28th, at the Coliseum and Armories in Chicago.

Although official advice has not yet been obtained, it is learned on good authority that the Lake Shore Mine has a further construction program under contemplation. It is intimated that the necessary steps may be taken in the near future to prepare for the installation of additional mill equipment at the end of the coming winter.

The present mill of the Lake Shore has a capacity for treating between 60 and 70 tons of ore daily. The grade of the ore formerly treated has averaged around \$25 to the ton. Also, the physical condition of the mine is understood to be such as to insure ample tonnage of such high grade ore for considerable time to come. At the same time, as in all gold mines, outside of the high grade usually lies more or less large bodies of low grade. The Lake Shore will probably prove to be no exception to this rule. Thus, instead of mining high grade ore entirely during the early years of its career, and leaving low grade only for the balance of its life, it is the usual practise to provide the requisite facilities for mixing the high grade with the low grade and by so doing place the mine on a production basis that will at once be highly profitable and remarkably uniform.

Opinion seems to be that by so doing the Lake Shore can add to the volume of output, add to the life of the mine and without difficulty go on a dividend basis somewhat higher than the quarterly disbursements of  $2\frac{1}{2}$  per cent before the labor strike caused the mine to close.

According to unofficial reports from the Fort Matachewan district the Matachewan Gold Mines Company, owners of the Otisse, have acquired another property lying adjacent to their own. The new property is stated to have previously been controlled by R. Norrington, who is associated with the Allied Gold Mines Company.

A second shaft is being sunk on the Otisse property of the Matachewan Gold Mines Company. The point selected for the new shaft is about a thousand feet from the original workings and along the strike of ore deposition.

The first shaft put down on the Otisse reached a depth of 170 feet some time ago, and, as stated recently, lateral operations are being conducted in three directions at that depth. This work, it is understood, will be continued, the sinking of the new shaft being but an enlargement of the exploration and development program.

In a number of instances, according to present plans, a number of old Cobalt properties which have lain in idleness for the past several years will be re-opened soon after the ending of the Cobalt strike.

The high quotations for silver is having a salutary affect, and, following the re-establishment of harmonious conditions, not only will the big producing mines be operated with increased vigor, but practically every small or idle property will probably be examined with increased care and explored in a manner commensurate to the increased possibilities which they offer as a result of the strong position which the white metal now commands in world finance.

The re-opening of the Porcupine V.N.T. in the near future, and the development of the known series of gold-bearing veins on the west and the north part of

the property seems to present possibilities not surpassed by any other property in the Porcupine district, with the exception of the Hollinger, McIntyre and Dome Mines.

Already to a depth of 600 feet the Porcupine V.N.T. has been found to contain large quantities of commercial ore on the main vein worked to date. A series of veins occur in close proximity on which only surface work has been done. Not only does the property border on the Hollinger Consolidated and share similar formation, but it also borders on the Porcupine Crown, the main vein of which dips onto the V.N.T. at depth.

The dividend of 5 per cent declared by the Nipissing Mining Company, payable October 20th, will call for the disbursement of \$300,000 and make a total of \$19,440,000 paid by this company since its first disbursement on July 20, 1906.

The record of the Nipissing, both in the value of production and in the amount of dividends disbursed is considerably better than any other precious metal mining company in Canada. The company has produced upwards of fifty million ounces of silver during the past thirteen years.

The report issued early in the year showed a very satisfactory ore reserve developed in advance of production, estimated to contain about six million ounces of silver. The company has considerable territory which has as yet not been explored. Also, the financial position of the company is strong, the financial statement issued last week showing a balance of. \$3,863,386.50.

According to reliable information about 900 tons of ore is being treated daily at the Dome Mines. Mill heads are stated to have recently shown an average of about \$9.80 a ton. Allowing for the usual small loss in recovery, it is evident that output has recently averaged about \$8,400 daily or at the rate of about \$250,000 a month.

In its best days, in 1916, the Dome treated ore at the rate of around 1,300 tons daily, but the average grade was around \$5 to the ton. As a consequence of which for the year ended March 31, 1917, an output of \$2,171,784 was recorded. Thus, although present tonnage is not equal to that of 1916-17, the higher grade ore being treated serves to make the current rate of output the highest in the company's history. Were the Dome to be able to maintain an average output of a quarter of a million dollars monthly, or an annual production of around three million dollars, it can readily be seen that net profits would soar to new high levels.

Through fear of misleading the public the directorate of the Dome hesitates to present an official monthly statement, in that conditions over which there might be no control might arise, and, further, that in view of ore reserves being estimated to contain around \$5.10 a ton, it could hardly be expected that mill heads will be held at the present high average and a favorable statement for a brief period might be found to be unreliable when calculating the value of shares as regards holding them over a long period. But the outlook is exceedingly favorable.

Developments at depth on the Dome Extension mine being conducted by the Dome Mines through the workings of the latter, and facilitated by reason of the great mining equipment and managerial organization of the Dome Company, is taking on proportions that leads to

the belief that the Dome Extension will on or before March next actually become a part of the Dome Mines itself.

Interests in the north who are watching the developments point to the nature of work on the Dome Extension as reasonable assurance that the Dome Mines Company already anticipate actually taking over the Dome Extension, in that the work being done is not only exploratory, but is preparatory to actual production. The terms which the Dome Company holds its option on Dome Extension is on a basis of thirty shares of Dome Extension for one share of Dome Mines. Here arises an interesting situation. For instance, the quotations for shares of the Dome Mines have recently ranged from \$14 to \$15 a share, while shares of the Dome Extension have ranged from 30 to 35 cents a share. In buying shares in the Dome Extension at 30 cents a share it is equivalent to buying shares in the Dome Mines at \$9 a share or upwards of \$5 of a saving—in reality, profit. In buying Dome Extension shares at even 35 cents a share is equivalent to buying shares in the Dome Mines at \$10.50, provided, of course, that the option is exercised.

It is an interesting fact that the leading men of the Dome Mines Company already control the Dome Extension stock, which fact would appear to be reasonable assurance that the outlook is such as would indicate a successful consummation of the deal along the proposed lines. The situation appears to offer food for thought among those who speculate.

The question being asked is this: Is there actually a way in which Dome shares may be bought for \$10.50 a share.

Mr. John A. Brownlee, who is interested in the development of the Lucky Cross property at Swastika, says:—

“The Marigold Mining Company, Limited bought the property of the Lucky Cross Bondholders Limited and started pumping out the workings the latter part of June, working two shifts, the operation took three weeks.

“When the 100 foot level was reached some assaying done returned high values in gold. The Company then decided to install a complete assaying plant which consisted of gasoline engine, crusher, pulverizer and complete equipment for all work necessary.

“Channel sampling was begun and extended from the surface to the 200 foot level and then to the face of the drift. Five foot sections were taken and careful checking of the assays gave returns of \$17.20 per ton gold with an average width of 44 inches. Right at the 200 foot level there is five feet two inches of ore that averages \$107.60 per ton.

“In the raise from the 200 and about 40 feet above that level 10 feet 5 inches of ore averages \$15.60 for the entire width.

“Vein Number 4 on which there has been some surface work done averages \$34.40 for two and a half feet.”

L. P. Burns, Limited, announce the incorporation of a company under this name, which was formerly Burns & Roberts, Limited, of Toronto. The new company is still at the same address, 301 Bank of Hamilton Building, Toronto. They are manufacturers of tanks, boilers, smoke stacks, plate work, and specialize in new and used machinery of all kinds.

## BRITISH COLUMBIA.

### THE METAL MINES.

#### Victoria, B.C.

It appears to be likely that there will be considerable mining development in the Mount Sicker region, Vancouver Island. Following the recent announcement that New York interests had bonded the old copper holdings of the Tye Copper Company, comes word that the Guggenheimers have acquired the Mount Brenton claims, which are located in the same district. It is stated that development work will be expedited and that if the expectations of the engineers who have reported upon the property are realized, mining will be carried on actively, a concentrator being installed and other necessary equipment provided.

Some months ago the Canadian newspapers carried a statement purporting to come from the Advisory Council for Scientific and Industrial Research to the effect that the prospects of an iron and steel industry being established on the Pacific Coast was extremely remote. Hon. Wm. Sloan, Minister of Mines, immediately took the matter up with Prof. A. B. McCallum, Administrative Chairman of the Research Board, who recently visited British Columbia. He called upon Mr. Sloan and assured him that when the full details of the Board's report are made public it will be found that nothing is said prejudicial to the future of the iron and steel industry in the Pacific Northwest.

The Sechart Mercury Mine, Vancouver Island, which has been idle for some time, has been purchased by Capt. E. H. Mansfield, who proposed to install a distillation plant to produce mercury on the ground. The property is well located for transportation, being situated on an island in Barclay Sound. The mercury content is about 2.5 per cent. If this mine becomes a producer it will be the second in British Columbia to produce quicksilver.

#### Merritt, B.C.

There have been a number of prominent mining men visiting the Merritt district during the past few weeks. Among them are Joseph Errington, M.E., of San Francisco; A. Leopold and Mr. Mills, of New York; C. G. Davis, representing English interests, and R. S. Lennie, K.C., of Vancouver, accompanied by N. W. Sweetser, M.E., Frank M. Hawkes, secretary of the Donohoe Mine Corporation, and J. F. Knapp, M.E., of Seattle. Messrs. Errington, Leopold and Mills are inspecting the Aspin Grove property. Messrs. Davis, Lennie and Sweetser have been going over the Aberdeen mine, which has been unwatered for their inspection. Messrs. Hawkes and Knapp are interested in the Donohoe Mine Corporation, and J. F. Knapp, M.E., of these properties will be actively developed. The Aspen Grove Amalgamated Mines, Limited, already have been diamond drilled and a considerable quantity of low-grade ore has been blocked out at the Aberdeen. R. R. Hedley, M.E., is prosecuting development work at the Mary Reynolds mine in the Stump Lake district. The new wagon road giving this and other properties transportation facilities, has been completed so that work may now proceed with an assurance that adequate supplies may readily be secured.

### Alice Arm, B.C.

With the practical completion of the railway from Tidewater at Alice Arm to the Dolly Varden mine, the operators of other mines in the district are giving evidence of some concern as to the policy of the Taylor Engineering Company towards the handling on the railroad of ore from properties other than the Dolly Varden. The Alice Arm Commercial Club has taken the matter up with the Minister of Mines and the Minister of Railways. It is stated that the company is adverse to committing itself on this point and that as a result work on a number of properties at the head of Kitsault River is being delayed. Mr. Taylor, however, the manager of the Taylor Engineering Company, has given his assurance that everything will be done in his power to assist in the development of the mineral resources of the district.

### Creston, B.C.

What is known as the British Columbia Iron Company, Limited, has been formed to develop forty claims situated about three miles west of Kitchener, B.C., and extending in a belt north and south which crosses the C.P.R. line at Thompson Creek. It is stated that this is one of the largest deposits of hematite in the province. Considerable work was done last Fall in opening it up and the management assert that a large body of hematite running from sixty to seventy-five per cent iron has been uncovered. E. C. Wragge, of Nelson, who is interested in the proposition, states that what has been discovered so far is very satisfactory. There are, however, some points to be determined before it can be asserted that this is a commercial proposition. It will take diamond drilling to obtain the knowledge required and the question of taking this step is now being discussed.

### Nelson, B.C.

A school for prospectors is likely to be opened this winter in Nelson, B.C. The proposal is favored by the school board of that city and if an instructor can be obtained with the necessary qualifications action will be taken. It is felt that laboratory training and lectures to prospectors would be of material value to the prospectors of the adjacent district and of ultimate benefit to the mining industry.

Construction of a small concentrator on the Emerald Silver-Lead Mine property, Sheep Creek district, is making good progress according to R. W. Mifflin, the superintendent. The work is expected to be complete by the end of November. The plant, which, by running two shifts a day, will have a daily capacity of 30 tons, is designed primarily to demonstrate the feasibility of treating the ore of the Emerald Mine in which lead predominates, by this method.

The plant of the French Complex Ore Reduction Company has been closed down. This enterprise has been supported by the Provincial Government to the extent of about \$65,000, which purpose was to demonstrate the practicability of treating with commercial success the fractionous silver-lead-zinc ores of the Kootenays by means of the French electrolytic process. A company was formed consisting mainly of Victoria and Nelson men, by whom the patents are held. In addition to the experimental plant at Nelson, one was installed at the Standard Mine at Silverton. The Canadian Consolidated Mining and Smelting Company

took an option on the process but did not close on it, having developed in its own plant an electro-chemical process which met its requirements. While the Nelson plant has gone out of operation and the loans made by the Government thus will have to be written off. It is claimed by Mr. French that the Company's experimental work is responsible for the ultimate success attending the development of the electro-chemical processes in the handling of complex zinc ore.

### Trial, B.C.

The Consolidated Mining & Smelting Company has offered a scholarship to the student who is the son of any of its employees making the highest marks in the 1919 matriculation examination. The award consists of an allowance of \$500.00 a year toward an applied science course, the same to be taken at the British Columbia University or any other Canadian university. S. G. Blaylock, general manager of the company, now is applying for applications for this scholarship. He explains that these applications must be accompanied by a statement of the marks obtained, the name of the father of the applicant and the position the latter holds in the company.

Ore receipts in gross tons for the week from August 14 to August 21, inclusive, at the Canadian Consolidated Company's smelter at Trail, totalled 5,492 tons. This makes an aggregate for the year of 222,987 tons. The heaviest shipper for the week was the Centre Star Mine of Roseland with 2,151 tons, while next in order is the Sullivan Mine of Kimberley.

### Kaslo, B.C.

A new road has been constructed to the California Mine, and what is known as the Athabasca mill, is expected to be in operation on ore from this mine within the next two months.

### Grand Forks, B.C.

The possibility of the Granby Consolidated Mining and Smelting Company resuming operations at Grand Forks is the subject of considerable speculation. The smelter at Grand Forks was closed down in June, the reason given being lack of coke, occasioned by labor trouble in the Crows Nest Pass district. At the time of the cessation of operations the price of copper was so low that the prospects were not particularly encouraging. Since the close-down Granby officials at Phoenix and Grand Forks are said to have been working on several schemes for the handling of at least fifty thousand tons of good grade ore from the Phoenix property. Shipment to Trail smelters or to Anyox and the installation of a concentrator at the mine, are plans reported to have been considered. There is no doubt, however, that there is the quantity of ore mentioned available and that the company is desirous of treating it before withdrawing entirely from the camp. Having this in mind, and the fact that the coal mines of the Crows Nest are now in operation, which assures a supply of coke, those interested in the district are hopeful that the smelter will be reopened. And meanwhile the citizens of Greenwood are said to have opened negotiations, having in view the acquirement of the Granby Company's ore at Phoenix. This, presumably, would be used by the Greenwood people in their operations of the Canada Copper Company's smelter, providing the same is secured by them in the negotiations now under way.

**Greenwood, B.C.**

Negotiations between the committee of the citizens of Greenwood and the Canada Copper Corporation, whereby the former propose to take over the Company's properties at Phoenix and the smelter at Greenwood, are said to be practically completed, requiring only ratification by the directors of the company to be effected. Those interested in the transaction are hoping that it may be possible to have the smelter blown in before the end of the year.

**THE COLLIERIES.**

**British Columbia Coal Output in July.**

The output of the coal mines of British Columbia for the month of July totalled 143,341 tons, which was made up as follows:

	Tons.
Corbin Coal and Coke Co. ....	221
Middlesboro Coal Mines, Ltd. ....	7,216
Fleming Coal Co. ....	3,477
Coalmont Coal Company ....	1,800
Princeton Coal Mines, Ltd. ....	1,104
Canadian Western Fuel Co., Nanaimo ....	43,612
Canadian Collieries (D), Ltd., Comox.....	41,782
"    "    "    "    Extension ..	17,714
"    "    "    "    S. Wellington	6,966
Pacific Coast Coal Mines, S. Wellington.....	4,208
B. C. Coal Mines, E. Wellington .....	3,851
Nanoose Collieries .....	1,915
Granby Collieries, Ltd., Cassidy's .....	7,475
<hr/>	
Total .....	143,341

**Alberta Collieries Resume Normal Operation.**

Conditions are gradually resuming the normal in District 18, U.M.W. of A., which comprises Eastern British Columbia and the Province of Alberta, and according to reports received by the Minister of Labor up to the 25th of August, thirty-one of the leading coal mines of the district are again being worked. This represents sixty percent of the total output. While some opposition still is being experienced by the officials of the United Mine Workers from advocates of the One Big Union Idea, the resistance of the latter appears to be declining.

The books, papers and monies, property of the International Mine Workers of America, District 18, which were in the custody of Edward Brown, secretary of the International of Calgary, who later transferred his allegiance to the O.B.U., have been handed over to International officers. The latter have left to attend the convention to be held at Cleveland, Ohio, at which it is expected there will be some representation of District 18, if the same can be arranged.

The Coal Commissioner, W. H. Armstrong, in a recent statement said that the O.B.U., as far as District 18 is concerned is non-existent. He asserts that the miners who forsook the International Union are seeking reinstatement and that their applications are being granted in the majority of cases. He said that the men are going back on exactly the same terms as they were working before but that when they were in a position to sign a contract it was likely that a new agreement would be entered into between them and the miner owners. During the strike between 8,000 and 9,000 men were idle, and the wives and families of the miners suffered to a considerable extent. The

mines, however, were not materially affected, and while it might be a few weeks before full shifts could be taken back, they all would be working in the near future.

**Coal Shortage Next Winter Not Anticipated.**

Commissioner Armstrong predicted that there would be no shortage of coal this winter because, although the mines were idle for several months, the capacity production is greater than the demand during the autumn months and by working to capacity the reserve stocks for winter can be restored.

An advance of fifty cents a ton on Western Canadian coal is prophesied by D. H. Connor, assistant to the Fuel Controller of Canada, who has returned after an inspection of the Alberta mines. He states that an adequate supply of cars will be available for the transport of coal during the winter months.

Notwithstanding that it has been said by operators and others that no shortage need be feared in the Canadian West, the Canadian Commission of Conservation, is surveying the situation throughout the Dominion, asserts that it is almost a certainty that the supply will be inadequate. Up to June 7 of the present year the total production of anthracite was only 33,349,500 net tons, as compared with 42,858,000 tons in the corresponding period of 1918, a decrease of 9,500,000 tons, or 22 per cent. It is assumed that the 1919 production will be less than 80,000,000 tons, whereas the production last year was 99,514,334 tons. Thus a shortage of 20,000,000 tons, or 20 per cent, is anticipated.

**DISCOVERY OF COLD WATER THAWING PROCESS IN YUKON GOLD AREAS.**

The work of dredging the famous Bonanza and Eldorado creeks, a total length of forty miles, has been completed and the dredges which did the work and which belong to the Guggenheim or Yukon Gold fleet, have been dismantled and hauled to Dawson. On August 25th, the first of the two left Dawson by steamer for Seattle via St. Michael, her final destination being unknown. It is reported the Guggenheim may send them to Burma, India or the Malay Peninsula to dig tin. Dredges owned by the same Company are operating on Hunker, Gold Run and Bear creeks, and one at Guggieville on the Klondike River.

With several years life ahead of this field and prospects that a new discovery in cold water thawing will reduce the cost of thawing one-half, many more miles of low-grade properties in this country will be brought into profitable operating range. It is known that one hundred miles of dredging ground remain to be worked in the vicinity of Dawson.

It is claimed that every camp in the frozen ground of Alaska and the Yukon will benefit by the cold water system which will give increased acreage and prolonged life. The Yukon Gold Company of Dawson, up to August 27th, have turned over yardage which exceeds several times that removed at the Panama Canal.

Many hydraulic plants are still working gold on the high benches of Bonanza and Klondike river and also on the numerous Hunker hills. The Canadian Klondike Company are operating steadily three large dredges on the Upper Yukon Valley. The gold yield to date is \$200,000,000. It is estimated that fully that much more will be received before the camp placers are exhausted.

For those who are not familiar with the cold water thawing, this is practically the same as steam, using points or even pipe with hose attached through the water is forced at a pressure into the ground. As long as the pressure is kept up there is no danger of freezing. A ten foot pipe will force its way into the ground and the earth about for three or four feet will be loosened up and thawed out in about an hour's time with a pressure of from forty to sixty pounds.

#### DISCOVERY OF FREE MILLING GOLD AT DRUM LUMMON.

Prof. Edwin T. Hodge, of the University of B. C. has just completed a report on the Drum Lummon mine near Hartley Bay, Douglas Channel, in which he comments on the discovery of free milling gold in the workings of this mine.

Prof. Hodge declares that there is a wonderful showing on this property, not only of high-grade copper and gold, but of other minerals, the formations being of a rare nature, almost suggestive of gems.

In his report, Prof. Hodge, says: "This property is usually looked upon as a copper mine, but I am of the opinion that gold values may be the determining factor in making it a productive mine. Every sample that I have taken shows a trace of gold. The gold occurs as irregular shaped nuggets, as sheets and as tiny flakes, but in close association with shalcoecite and bornite.

"Gold values are constant in all the ore. Small gold shoots have been found and I anticipate the finding of larger gold shoots, some, perhaps, of bonanza type. The finding of a few large shoots of rich ore is one of the possibilities in this property—a possibility which makes it worthy of further development."

Mr. Porteous Sloan, managing director of the company, who arrived in Vancouver from the mine the first week in August says that the work of driving the west drift, in which high-grade copper was encountered last year a further distance of 2000 ft. will be undertaken at once. This was suggested by Prof. Hodge after examining the mine and the geology of the locality.

The high values in the mine are being maintained as the drill is advanced, declares Mr. Sloan. A large amount of ore has already been blocked out and exploration work will be carried on through the winter. Shipments of concentrates are being made to the smelters at Tacoma, the mill recently installed concentrating the general run of the mine.

#### COAL-MINING IN SPITSBERGEN.

Coal was first discovered in Spitsbergen in 1900, when a Norwegian ship exported the first cargo. The Gulf Stream affects the climate on the west coast of the island, where the principal settlements are found, most of the claims being taken up by Norwegian, English, Swedish, and Russian companies.

The Norwegian Spitsbergen Company, which is the principal concern, has acquired one English, one American and one Norwegian company, and in two years exported 85,000 tons of coal. Six other Norwegian companies have started work during the last few years.

The coal, according to the *Teknisk Ukeblad*, is of superior quality, containing very little ash, is comparatively free from sulphur and has a high calorific value, varying from 13,000 to 14,500 B.Th.U. per 1 lb.

It is excellent steam-coal, but does not contain sufficient volatile matter for a gas coal. It does not clinker.

Mining is easy, as the ground is frozen to a great depth and perfectly dry. There is very little dust and no fire-damp. The temperature of the headings seldom rises above 25 deg. F., but the absence of humidity makes the low temperature quite tolerable. The coal is found below a bed of smooth sandstone, which forms an excellent safe roof.

The upper tertiary beds, which contain the best coal, consist of three seams with a combined thickness of 6 ft. They are separated by beds of shale 1 to 2 ft. thick, and nearly horizontal; the dip being only 2-3 deg. Sporadically, the dip increases to 10-12 deg.

The coal in the lowest seam, which is 3 ft. 3 in. thick, is free from shale or other impurities.

#### RECENT MINING INCORPORATIONS.

Davidson Consolidated Gold Mines, Limited, Incorporators: Joseph Montgomery, barrister-at-law; Daniel Alexander Sherriff and Russel Edwards Evans, accountants; Elsie White, book-keeper; and May Stern, stenographer—all of Toronto. Capital \$5,000,000, divided into 5,000,000 shares of \$1 each. Head office, Toronto.

Symmes-Young Silver Mines, Limited (no personal liability.) Incorporators: Mervil MacDonald, Geoffrey Walters Adams, and Percy Edwin Smily, barristers-at-law; Robert Roy McKay, student-at-law; and Bertha Rice, stenographer—all of Toronto. Capital \$2,000,000, divided into 2,000,000 shares of \$1 each. Head office, Toronto.

Nipissing Extension Mines, Limited. Incorporators: John Wellington Pickup, solicitor; Thomas Arthur Dark, actuary; Charles Quincy Parker, company secretary; Harold Aldis Bernard, insurance clerk; and George Barner, accountant—all of Toronto. Capital \$3,000,000, divided into 3,000,000 shares of \$1 each. Head office, Toronto.

The Brown Feldspar Potash, Limited. Incorporators: Lena Adams, bookkeeper; Henry Cartwright Secord, broker; Kenneth Alexander McRae, engineer; Mary Winnifred Hunt, stenographer; and Mabel Gray, teacher—all of Toronto. Capital \$500,000, divided into 500,000 shares of \$1 each. Head office, Toronto.

Granby-Kirkland Gold mines, Limited. Incorporators: Newton Carman Shaver, prospector; Verneta Brown Shaver, Claudene Brown Bagshaw, and Dorothy Howard Brown, married women—all of Toronto; and Howard Milton Brown, Chicago, Ill., sales manager. Capital \$2,000,000, divided into 2,000,000 shares of \$1 each. Head office, Toronto.

Camburn Silver Mines, Limited (no personal liability.) Incorporators: Archibald Woodburn Langmuir, Donald Black Sinclair, and Harold Wilson Shapley, solicitors; George Charles Loveys, accountant; and Jennie Jardine Elliott Hayes, office secretary—all of Toronto. Capital \$1,500,000, divided into 1,500,000 shares of \$1 each. Head office, Toronto.

Pittsburg and Northern Ontario Exploration and Development Company, Limited. Incorporators: George Arthur Young, broker; James Howard Young, insurance agent; Joseph Edward Hallatt, prospector; Norman Currie Urquhart, accountant; and Eva Leach, stenographer—all of Toronto. Capital \$100,000, divided into 10,000 shares of \$10 each. Head office, Toronto.



## Book Review

**MINERAL DEPOSITS.** By Waldemar Lindgren, professor of economic geology, Massachusetts Institute of Technology, and formerly geologist U. S. Geological Survey. Published by McGraw-Hill Book Co., New York.

This is the second edition of a splendid book. The author has endeavored to bring the subject up to date, and, owing to his exceptional ability, has been very successful in interpreting the results of recent investigations and in giving them the proper place in the discussions. All of the chapters have been revised and many of them largely rewritten. The result is an up to the minute treatise by a man who has an international reputation as a geologist.

Dr. Lindgren takes up the subject of mineral deposits in a scientific and at the same time simple manner. He makes it plain at the outset that the intelligent study of mineral deposits requires a very good working knowledge of physics and chemistry, as well as keen observation on the part of the student. To such readers the book will seem in part a very elementary treatise; but this very simplicity helps one to follow the application of principles to the particular deposits selected as examples.

In the introductory chapter the author first gives definitions of the terms used in economic geology. He refers briefly to the occurrence of metals in the earth's crust, and to their value.

In a chapter on formation of minerals there is discussed solution and precipitation; influence of pressure and temperature; precipitation by evaporation, by reaction between solutions and solids and between gases or gases and solutions. Crystalline minerals and colloids are described.

Then follow three chapters on underground water-flow, composition and chemical work of. In these three chapters a very good idea of the nature and behavior of the water circulating in the rocks is given. Particularly instructive is the discussion on alteration of rocks by the formation of new minerals which take the place of other minerals which have been removed by the same agency.

The author then discusses the origin of underground waters. He makes it clear that most of the water is of meteoric origin—such water as we have at the surface, but temporarily laden with mineral substances dissolved from the rocks, and thus potential formers of new mineral deposits. Of less volume, but also of great importance, are the magmatic or juvenile waters, such as escape from some springs in volcanic regions.

Spring deposits and the relation of mineral deposits to mineral springs form the subject of two chapters. Interesting and significant are the descriptions of deposits now being formed by hot springs.

Chapter 9 deals with folding and faulting. Faults are classified and several types described.

Openings in rocks, is the subject of the next chapter. Cavities originate in many ways; by original mode of formation, as in the case of amygdaloidal volcanic rocks; by solution as in limestones; by fractures such as contraction joints produced by tensile stress or shrinkage; expansion joints as in serpentines. Fissures are also produced by torsional stress; by folding of sedimentary strata, by shearing stress under action of gravity and by compressive stress.

The next two chapters deal with the form and structure of mineral deposits and their texture. Here comes the natural classification into two groups — those ore deposits which were formed with the rocks that enclose them and those were which formed later than the enclosing rocks. The former are called syngenetic and the latter epigenetic. The author attaches less importance to form than to mineral association in classifying deposits, but he points out that the form, while often largely accidental, is of great importance in mining. He defines veins, lodes, sheeted zones, stockwork, stringer lode, pipe, ladder veins, lenticular veins, bed veins, gash veins and vein systems. Texture of the deposits is considered with reference to the temperature of formation. In veins formed at lower temperatures and comparatively shallow depths crustified and drusy forms and fine granular texture predominate, while in deep seated veins the texture is commonly coarsely crystalline and massive. Crushing and brecciation of the early minerals is extremely common, and repeated opening of the fissure is sometimes indicated by the texture of the deposit.

The occurrence and form of ore-shoots is dealt with in chapter 13. The deposition of valuable minerals from solutions is partly by decrease in pressure and temperature, but there are important accompanying factors such as favorable character of the wall rock. A number of diagrams are used with the text to illustrate various forms of ore-shoots and the influence of rocks and intersections.

The classification of mineral deposits is then taken up. Grouping by substances and uses is briefly referred to. A genetic classification is adopted as most desirable, both theoretically and practically. The author considers that each deposit should be considered as a problem in physical chemistry. In his scheme he makes two major divisions: (1) The deposits such as placers formed by mechanical processes of concentration. (2) The great majority of deposits which have been produced by chemical processes of concentration. Two cases are distinguished; the substances were originally contained in the same geological body in which the deposit is found, or they may have been introduced from the outside. Most metal deposits belong to the latter class. Deposits of this kind occur along fissures or from replacements along fissures or are found in general where opportunity is offered for vigorous circulation of the depositing waters.

The metal deposits genetically connected with igneous rocks are sub-divided into several groups according to the evidence of mineral association and geological relations.

The first group includes ores deposited at slight depth below the surface; the temperature is here relatively low, perhaps from 50 deg. to 150 deg. C. and the pressure will scarcely exceed 100 atmospheres. Examples of this group are found in the gold and silver veins of Tonopah, the Cripple Creek gold telluride veins and the California quicksilver veins.

A second group of deposits was formed by hot ascending waters at moderate depths, say from 5,000 to 10,000 feet below the surface at temperature of perhaps 150 deg. to 250 deg. C and correspondingly increased pressure. Examples of these are the gold-quartz veins of California and the metasomatic pyritic deposits of Leadville.

A third, deep seated group includes veins and contact-metamorphic deposits. The temperature of for-

mation in these cases was high, but in most cases below 575 deg. C, the crystallographic inversion point for quartz. The pressure was probably very high. Some gold quartz veins, including those of the Porcupine and Kirkland Lake districts, Ontario, are placed in this group. Cassiterite veins and tourmaline-copper veins are also in this group.

Another class of deposits includes those formed by concentration in igneous magmas, as in the case of the iron ores of northern Sweden and the nickel-copper ores of the Sudbury district, Ontario.

Following these introductory chapters, which take up 206 pages, comes the description of ore deposits in groups in accordance with the scheme of classification adopted. The chapter headings are:

15. Deposits formed by mechanical processes of transportation and concentration; detrital deposits.
16. Deposits produced by chemical processes of concentration in bodies of surface water by reaction between solutions.
17. Deposits formed by evaporation of bodies of surface waters.
18. Deposits formed from processes of rock decay and weathering.
19. The hematite deposits of the Lake Superior region.
20. Deposits formed by concentration of substances contained in the surrounding rocks, by means of circulating waters.
21. Deposits resulting from regional metamorphism.
22. Deposits of native copper with zeolites in basic lavas.
23. Lead and zinc deposits in sedimentary rocks; origin independent or igneous activity.
24. Deposits formed near the surface by ascending thermal waters and in genetic connection with igneous rocks.
25. Deposits formed at intermediate depths by ascending thermal waters and in genetic connection with intrusive rocks.
26. Veins and replacement deposits formed at high temperatures and pressure and in genetic connection with intrusive rocks.
27. Deposits formed by processes of igneous metamorphism.
28. Deposits of the pegmatite dikes.
29. Deposits formed by concentration in molten magmas.
30. Metamorphosed deposits.

These chapter headings summarize the author's scheme of classification. In each chapter will be found described a group of deposits. Examples are taken from all parts of the world, but American deposits naturally receive the most attention. Many Canadian mining districts are referred to. In chapter 15 there are many references to the Klondike gold deposits. The Quebec asbestos deposits come in the group treated in chapter 20. In chapter 25 the Nova Scotia and Deloro gold deposits are mentioned, and the Cobalt silver deposits receive special attention. This chapter and the succeeding one, which deals with the group which includes many of the gold deposits of Ontario, are specially well worth reading. What Dr. Lindgren has to say about the gold deposits dealt with in these two chapters should prove useful to anyone interested in the development of gold properties in Canada.

In chapter 27 the Hedley gold deposit at Hedley, B.C., is described as the best known example of the

gold-arsenopyrite type formed by igneous metamorphism. The graphite deposits of Eastern Ontario and Quebec and the copper deposits of the boundary district, B.C., are also described here. The Canadian mica deposits are mentioned in chapter 28, and some of the molybdenite deposits belong to this group. In chapter 29 the Sudbury nickel-copper deposits, the Quebec chromite deposits and the Ontario corundum deposits are mentioned. The Sudbury deposits are described at some length.

Chapter 31 deals with the oxidation of metallic ores by weathering agencies. It is noted that in glaciated areas there has been comparatively little oxidation since the glaciers cleaned away the older accumulations of weathered products. In other areas oxidation may extend to very considerable depth and the proper interpretation of surface outcrops necessitates a good working knowledge of the nature of the alterations that take place as a result of exposure.

In chapter 32 an attempt is made to group ore deposits by reference to the metallogenic epochs or time intervals favorable for the deposition of certain useful minerals. In treating those of North America the author deals separately with those of the east and of the west. In the east he distinguishes: 1, the Pre-Cambrian epochs; 2, Paleozoic sedimentary epochs; 3, Paleozoic epochs of saline deposits; 4, epochs of Triassic copper deposits; 5, Cretaceous and later periods of lead and zinc concentration; 6, Tertiary and recent products of rock decay.

In the Western or Cordilleran part of the continent Dr. Lindgren distinguishes: 1, The Pre-Cambrian epoch; 2, The Early Mesozoic epoch; 3, The Late Mesozoic epochs; 4, The Early Tertiary epoch; 5, The Late Tertiary epoch; 6, The Post-Pliocene epoch; 7, Cretaceous or later epochs of copper concentration in sedimentary rocks.—R. E. H.

#### COAL SITUATION AND MINERAL PRODUCTION IN NEW SOUTH WALES.

Sydney, as the chief commercial entrepot of Australia, largely owes its position to the existence of the most valuable coal mines in Australia at its feet. The coal deposits, which are almost inexhaustible, extend 100 miles north, south, and west of Sydney—also under the bed of the Pacific Ocean to an undetermined extent. The coal is of the highest grade and suitable for all purposes, such as gas making, coke making, household or factory purposes, and for bunkering steamers.

Labour troubles in connection with the mining of coal are always existent, and one trouble is no sooner settled than another crops up. Two years ago the price of coal was, at the instance of the Government, put up three shillings per ton, which, of course, meant an increased hewing rate. Labour troubles have again arisen, and the Commonwealth Government has therefore intervened and announced its intention to take over the mines of New South Wales, and a proclamation has been issued to that effect. According to the Canadian Government Trade Commissioner at Sydney, there is much talk about nationalisation," and this action, of course, again resurrects such suppositions; but what the ultimate end will be remains to be seen.

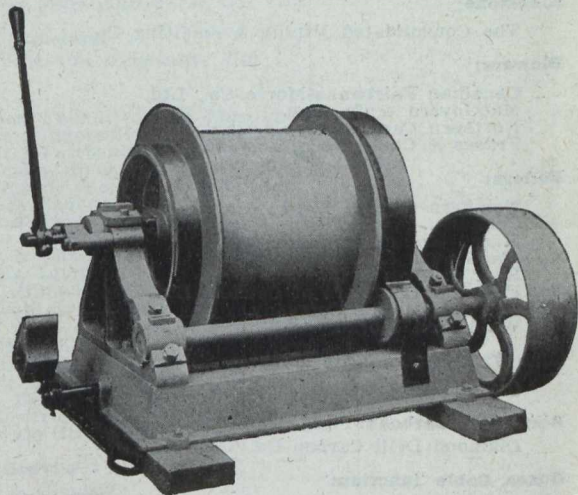
The coal trade of the State has of course been considerably interrupted during the war period, foreign exportation having almost entirely ceased owing to the cost and difficulty of obtaining freightage. Business relations with foreign buyers have, however,

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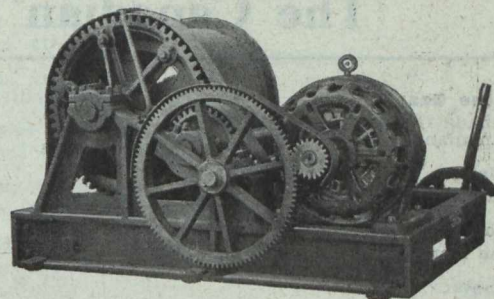
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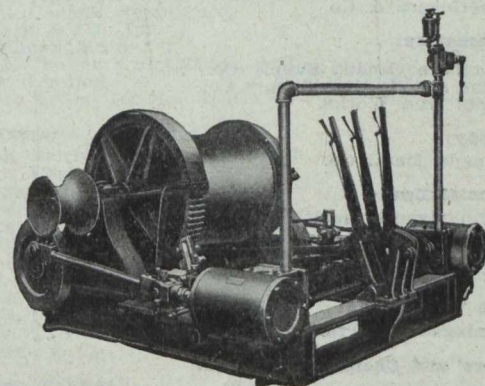
We make two distinct types of Mine Hoists  
**DRUMS, FRICTION DRIVEN**, revolving only when Frictions are engaged. Load may be lowered by gravity, without expenriture of power, controlled by the powerful Band Brake.  
**FIXED DRUMS**, keyed fast to shaft. Drums cannot revolve in either direction except driven by the engines or motor. The load is under absolute positive control at all times.



**BELT HOISTS**—Made in the same large range of sizes as the Steam and Electric Hoists.



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again been resumed, but labour troubles which are at present looming, appear as if they would cause another interruption to trading relations.

### Mineral Output for 1918.

War prices for most metals made the New South Wales mineral output for 1918 a record so far as value is concerned. The production totalled £14,391,981, which was £1,439,262 better than 1917, the State's previous best.

There was also a small recovery in the gold won—87,145 ounces, valued at £369,473, as compared with 82,171 ounces valued at £349,038 in the year 1917. Most of the gold now obtained is extracted from copper ore in its treatment. Of the £696,580 worth of copper produced, £501,685 was obtained from the great Cobar copper mine, which, owing to the reduced price of copper and labour troubles, has been closed down for the present.

Tin gave £548,876 in 1918, compared with £373,696 in 1917.

The output of the silver-lead mines was £5,712,138, being an increase of £600,000 over the previous year.

The aggregate mineral production of the States now totals £300,499,184, of which coal has provided the major part of £92,721,420, silver-lead £86,235,094, gold, £62,368,521, copper £14,988,804, zinc £13,000,000, and tin £11,511,880.

### Coke Production.

Upwards of one-half of all the coke produced in the state of New South Wales, the value of which last year was £387,000, is produced in the Illawarra District (40 miles from Sydney), the balance being produced at Newcastle and the western districts. Owing

to the closing down of the metalliferous industry in many directions, there has been a large curtailment of smelting operations. Consequently huge stacks of coke have accumulated and most of the works are only running half time. Not long ago the main concern of the managers was the securing of sufficient slack for the purpose, but at present their trouble is to use all the slack available.

### BELGIAN COLLIERIES RECOVERING

The total Belgian output of coal during July amounted to very nearly 87 per cent. of the average monthly production during 1913. In the Mons and central districts the coal output in July reached practically the pre-war output. In the Charleroi the output amounted to 85 per cent. and in the Liege district 77 per cent.

### PERSONALS.

Mr. P. E. Hopkins of the Ontario Bureau of Mines has gone to the Wasapika gold area, where he will spend the balance of the field season in geological mapping of the area.

Mr. A. G. Burrows of the Ontario Bureau of Mines is now at Metachewan, revisiting the gold properties there. He will be at Matachewan a short time and will then go to Gowganda.

Mr. M. Y. Williams of the Geological Survey, Ottawa, who is an authority on the geology of oil areas, and Mr. Jos. Keele of the Mines Branch, Ottawa, who specializes in clays, are making examinations along the proposed T. & N. O. railway extension north of Cochrane.

# The Canadian Miners' Buying Directory.

**Acetylene Gas:**

Canada Carbide Company, Ltd.  
Canadian Fairbanks-Morse.

**A.C. Units:**

MacGovern & Co.

**Agitators:**

The Dorr Co.

**Air Hoists:**

Canadian Ingersoll-Rand Co., Ltd.  
Mussens, Limited.

**Alternators:**

MacGovern & Co.

**Amalgamators:**

Northern Canada Supply Co.  
Mine and Smelter Supply Co.  
Wabi Iron Works.

**Antimony:**

Canada Metal Co.

**Antimonial Lead:**

Pennsylvania Smelting Co.

**Arrester, Locomotive Spark:**

Hendrick Manufacturing Co.

**Arsenic White Lead:**

Coniagas Reduction Co.

**Assayers' and Chemists' Supplies:**

Dominion Engineering & Inspection Co.  
Lymans, Limited  
Mine & Smelter Supply Co.  
Pennsylvania Smelting Co.  
Stanley, W. F. & Co., Ltd.

**Assayers and Chemists:**

Milton L. Hersey Co., Ltd.  
Campbell & Deyell  
Ledoux & Co.  
Thos. Heys & Son.  
C. L. Constant Co.

**Asbestos:**

Everitt & Co.

**Balls:**

Canadian Foundries and Forgings, Ltd.  
Canadian Steel Foundries, Ltd.  
Hull Iron & Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works.  
The Hardinge Conical Mill Co.

**Ball Mills:**

Hardinge Conical Mill Co.  
Mine and Smelter Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works.

**Balances—Heusser:**

Canadian Fairbanks-Morse Co., Ltd.  
Mine and Smelter Supply Co.

**Babbit Metals:**

Canada Metal Co.  
Canadian Fairbanks-Morse Co., Ltd.  
Hoyt Metal Co.

**Ball Mill Feeders:**

Hardinge Conical Mill Co.

**Ball Mill Linings:**

Hardinge Conical Mill Co.

**Belting—Leather, Rubber and Cotton:**

Canadian Fairbanks-Morse Co., Ltd.  
Link Belt Co.  
The Mine & Smelter Supply Co.  
Northern Canada Supply Co.  
Jones & Glasco.

**Belting:**

R. T. Gilman & Co.

**Belting (Transmission):**

Goodyear Tire & Rubber Co.

**Belting (Elevator):**

Goodyear Tire & Rubber Co.

**Belting (Conveyor):**

Goodyear Tire & Rubber Co.

**Blasting Batteries and Supplies:**

Canadian Ingersoll-Rand Co., Ltd.  
Mussens, Ltd.  
Northern Canada Supply Co.  
Canadian Explosives, Ltd.

**Bluestone:**

The Consolidated Mining & Smelting Co.

**Blowers:**

Canadian Fairbanks-Morse Co., Ltd.  
MacGovern & Co., Inc.  
Northern Canada Supply Co.  
Fraser & Chalmers of Canada, Ltd.

**Boilers:**

Northern Canada Supply Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Marsh Engineering Works  
MacGovern & Co., Inc.  
R. T. Gilman & Co.  
Fraser & Chalmers of Canada, Ltd.  
The John Inglis Company  
Wabi Iron Works.

**Blue Vitriol (Coniagas Red):**

Canadian Fairbanks-Morse Co., Ltd.

**Bortz and Carbons:**

Diamond Drill Carbon Co.

**Boxes, Cable Junction:**

Standard Underground Cable Co. of Canada, Ltd.  
Northern Electric Co., Ltd.

**Brazilian Rough Diamonds:**

Diamond Drill Carbon Co.

**Brazilian Mica:**

Diamond Drill Carbon Co.

**Buggies, Mine Car (Steel)**

Hendrick Manufacturing Co.

**Brazilian Ballas:**

Diamond Drill Carbon Co.

**Brazilian Rock Crystal:**

Diamond Drill Carbon Co.

**Brazilian Tourmalines:**

Diamond Drill Carbon Co.

**Brazilian Aquamarines:**

Diamond Drill Carbon Co.

**Bronze, Manganese, Perforated and Plain:**

Hendrick Manufacturing Co.

**Buckets:**

Canadian Ingersoll-Rand Co., Ltd.  
The Electric Steel & Metals Co.  
R. T. Gilman & Co.  
Hendrick Manufacturing Co.  
Link-Belt Co.  
M. Beatty & Sons, Ltd.  
Marsh Engineering Works  
Mussens, Ltd.  
Northern Canada Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works

**Buckets, Elevator:**

Hendrick Mfg. Co.

**Cable—Aerial and Underground:**

Northern Canada Supply Co.  
Standard Underground Cable Co. of Canada, Ltd.

**Cableways:**

M. Beatty & Sons, Ltd.  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Ltd.  
The Wabi Iron Works  
R. T. Gilman & Co.

**Cages:**

Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.  
Northern Canada Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.  
Mussens, Ltd.  
The Wabi Iron Works

## Canadian Miners' Buying Directory.—(Continued)

**Cables—Wire:**

Standard Underground Cable Co. of Canada, Ltd.  
Canada Wire & Cable Co.  
Northern Electric Co., Ltd.  
R. T. Gilman & Co.

**Cam Shafts:**

Canada Foundries & Forgings, Ltd.

**Car Dumps:**

Sullivan Machinery Co.  
R. T. Gilman & Co.  
Canadian Fairbanks-Morse Co., Ltd.

**Carbide of Calcium:**

Canada Carbide Company, Ltd.

**Cars:**

Canadian Foundries and Forgings, Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Fairbanks-Morse Co., Ltd.  
MacKinnon Steel Co., Ltd.  
The Electric Steel & Metals Co.  
Northern Canada Supply Co.  
Marsh Engineering Works  
Mine and Smelter Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Limited  
R. T. Gilman & Co.  
The Wabi Iron Works

**Car Wheels and Axles:**

Canadian Car Foundry Co., Ltd.  
Burnett & Crampton  
Marsh Engineering Works, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works

**Carriers (Gravity):**

Jones & Glassco

**Castings (Iron and Steel)**

Burnett & Crampton  
Canadian Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works

**Cement Machinery:**

Northern Canada Supply Co.  
Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.  
Canadian Fairbanks-Morse Co., Ltd.  
The Electric Steel & Metals Co.  
R. T. Gilman & Co.  
Burnett & Crampton

**Chains:**

Jones & Glassco  
Northern Canada Supply Co.  
Canadian Fairbanks-Morse Co., Ltd.  
Link-Belt Co.  
Greening, B., Wire Co., Ltd.

**Chain Drives:**

Jones & Glassco

**Chemical Apparatus:**

Mine and Smelter Supply Co.

**Chemists:**

Canadian Laboratories  
Campbell & Deyell  
Thos. Heyes & Sons  
Milton Hersey Co.  
Ledoux & Co.  
Constant, C. L. Company

**Chrome Ore:**

The Electric Steel & Metals Co.  
Everett & Co.

**Classifiers:**

Mine and Smelter Supply Co.  
Mussens, Limited  
The Wabi Iron Works  
R. T. Gilman & Co.  
The Dorr Company

**Coal:**

Dominion Coal Co.  
Nova Scotia Steel & Coal Co.

**Coal Cutters:**

Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.

**Coal Mining Explosives:**

Canadian Explosives, Ltd.

**Coal Mining Machinery:**

Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.  
Marsh Engineering Works  
Hadfields, Ltd.

Hendrick Mfg. Co.  
Fraser & Chalmers of Canada, Limited  
Mussens, Limited  
R. T. Gilman & Co.

**Coal and Coke Handling Machinery**

Link-Belt Co.

**Coal Pick Machines:**

Sullivan Machinery Co.

**Cobalt Oxide:**

Coniagas Reduction Co.  
Everitt & Co.

**Compressors—Air:**

Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
MacGovern & Co., Inc.  
R. T. Gilman & Co.  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Limited  
The Mine & Smelter Supply Co.

**Concrete Mixers:**

Canadian Fairbanks-Morse Co., Ltd.  
Northern Canada Supply Co.  
Gould, Shapley & Muir Co., Ltd.  
MacGovern & Co., Inc.  
Mussens, Limited  
R. T. Gilman & Co.

**Condensers:**

Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
Northern Canada Supply Co.  
MacGovern & Co., Inc.

**Concentrating Tables:**

Mine & Smelter Co.  
Deister Concentrator Co.  
The Wabi Iron Works

**Converters:**

Northern Canada Supply Co.  
MacGovern & Co., Inc.

**Contractors' Supplies:**

Canadian Fairbanks-Morse Co., Ltd.

**Consulters and Engineers:**

Hersey Milton Co., Ltd.

**Conveyor Flights:**

Hendrick Mfg. Co., Ltd.

**Conveyor—Trough—Belt:**

Canadian Fairbanks-Morse Co., Ltd.  
Link-Belt Co.  
Hendrick Mfg. Co.  
Mussens, Limited  
Jones & Glassco (Roller, Belt and Chain)  
Hendrick Mfg. Co.  
The Wabi Iron Works

**Conical Mills:**

Hardinge Conical Mill Co.

**Copper:**

Consolidated Mining & Smelting Co.

**Cranes:**

Canadian Fairbanks-Morse Co., Ltd.  
Link-Belt Co.  
R. T. Gilman & Co.  
Smart-Turner Machine Co.  
M. Beatty & Sons, Ltd.

**Crane Ropes:**

Allan Whyte & Co.  
Greening, B., Wire Co., Ltd.

**Crucibles:**

Canadian Fairbanks-Morse Co., Ltd.  
Mine and Smelter Supply Co.

**Crusher Balls:**

Canada Foundries & Forgings, Ltd.

**Crushers:**

Canadian Fairbanks-Morse Co., Ltd.  
Canadian Steel Foundries, Ltd.  
Hardinge Conical Mill Co.  
The Electric Steel & Metals Co., Ltd.  
R. T. Gilman & Co.  
Lymans, Ltd.  
Mussens, Limited  
Mine and Smelter Supply Co.  
Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works

## Canadian Miners' Buying Directory.—(Continued)

**Cyanide Plant Equipment:**

The Dorr Co.

**D. C. Units:**

MacGovern Co.

**Derricks:**

Smart-Turner Machine Co.  
M. Beatty & Sons, Ltd.  
Marsh Engineering Works  
R. T. Gilman & Co.  
Canadian Fairbanks-Morse Co., Ltd.  
Mussens, Limited

**Diamond Drill Contractors:**

Diamond Drill Contracting Co.  
E. J. Longyear Company  
Smith & Travers  
Sullivan Machinery Co.

**Diamond Tools:**

Diamond Drill Carbon Co.

**Diamond Importers:**

Diamond Drill Carbon Co.

**Digesters:**

Canadian Chicago Bridge and Iron Works

**Dies:**

Canada Foundries &amp; Forgings, Ltd.

**Dredger Pins:**

Canadian Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
Hadfields, Limited

**Dredging Machinery:**

Canadian Steel Foundries, Ltd.  
M. Beatty & Sons  
Hadfields, Limited  
R. T. Gilman & Co.

**Dredging Ropes:**

Allan, Whyte & Co.  
Greening, B., Wire Co., Ltd.  
R. T. Gilman & Co.

**Drills, Air and Hammer:**

Canadian Ingersoll-Rand Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Canadian Rock Drill Co.  
The Mine & Smelter Supply Co.  
Mussens, Limited

**Drills—Core:**

Canadian Ingersoll-Rand Co., Ltd.  
E. J. Longyear Company  
Standard Diamond Drill Co.  
Sullivan Machinery Co.

**Drills—Diamond:**

Sullivan Machinery Co.  
Northern Canada Supply Co.  
E. J. Longyear Company

**Drill Steel—Mining:**

Hadfields, Limited  
Mussens, Limited

**Drill Steel Sharpeners:**

Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.  
Sullivan Machinery Co.  
Canadian Rock Drill Co.  
The Wabi Iron Works

**Drills—Electric:**

Canadian Fairbanks-Morse Co., Ltd.  
Sullivan Machinery Co.  
Northern Electric Co., Ltd.

**Drills—High Speed and Carbon:**

Canadian Fairbanks-Morse Co., Ltd.  
Hadfields, Limited

**Dynamite:**

Canadian Explosives  
Northern Canada Supply Co.

**Dynamos:**

Canadian Fairbanks-Morse Co., Ltd.  
MacGovern & Company

**Ejectors:**

Canadian Fairbanks-Morse Co. Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
Northern Canada Supply Co.

**Elevators:**

M. Beatty & Sons  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Limited  
The Wabi Iron Works

**Engineering Instruments:**

C. L. Berger &amp; Sons

**Engines—Automatic:**

Canadian Fairbanks-Morse Co., Ltd.  
Fraser & Chalmers of Canada, Ltd.

**Engines—Gas and Gasoline:**

Canadian Fairbanks-Morse Co., Ltd.  
Alex. Fleck  
Sullivan Machinery Co.  
Gould, Shapley & Muir Co., Ltd.  
MacGovern & Co., Inc.  
The Mine & Smelter Supply Co.

**Engines—Haulage:**

Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.  
Marsh Engineering Works  
Fraser & Chalmers of Canada, Ltd.

**Engines—Marine:**

Canadian Fairbanks-Morse Co., Ltd.  
MacGovern & Co., Inc.

**Engines—Steam:**

Canadian Fairbanks-Morse Co., Ltd.  
M. Beatty & Sons  
R. T. Gilman & Co.  
MacGovern & Co., Inc.  
Fraser & Chalmers of Canada, Ltd.

**Engineers:**

The Dorr Co.

**Ferro-Alloys (all Classes):**

Everitt &amp; Co.

**Feed Water Heaters:**

MacGovern &amp; Co.

**Flood Lamps:**

Northern Electric Co., Ltd.

**Flourspar:**

The Consolidated Mining & Smelting Co.  
Everitt & Co.

**Forges:**

Canadian Fairbanks-Morse Co., Ltd.  
Northern Canada Supply Co.

**Forging:**

M. Beatty & Sons  
Canadian Foundries and Forgings, Ltd.  
Smart-Turner Machine Co.  
Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.

**Frogs:**

Canadian Steel Foundries, Ltd.

**Frequency Changers:**

MacGovern &amp; Co., Inc.

**Furnaces—Assay:**

Canadian Fairbanks-Morse Co., Ltd.  
Lymans, Limited  
Mine & Smelter Supply Co.

**Fuse:**

Canadian Explosives  
Northern Canada Supply Co.

**Gears (Cast):**

The Link-Belt Co.

**Gears, Machine Cut:**

Canadian Fairbanks-Morse Co., Ltd.  
Canadian Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
The Hamilton Gear & Machine Co.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works

**Granulators:**

Hardinge Conical Mill Co.

**Grinding Wheels:**

Canadian Fairbanks-Morse Co., Ltd.

**Gold Refiners**

Goldsmith Bros.

## Canadian Miners' Buying Directory.—(Continued)

- Gold Trays:**  
Canada Chicago Bridge & Iron Works
- Hose (Air Drill):**  
Goodyear Tire & Rubber Co.
- Hose (Fire):**  
Goodyear Tire & Rubber Co.
- Hose (Packings)**  
Goodyear Tire & Rubber Co.
- Hose (Suction):**  
Goodyear Tire & Rubber Co.
- Hose (Steam):**  
Goodyear Tire & Rubber Co.
- Hose (Water):**  
Goodyear Tire & Rubber Co.
- Hammer Rock Drills:**  
Mussens, Limited  
The Mine & Smelter Supply Co.
- Hangers and Cable:**  
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel:**  
Canadian Fairbanks-Morse Co. Ltd.  
Hadfields, Limited
- High Speed Steel Twist Drills:**  
Canadian Fairbanks-Morse Co., Ltd.  
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam:**  
Canadian Ingersoll-Rand Co., Ltd.  
Canadian Fairbanks-Morse Co., Ltd.  
Jones & Glassco  
M. Beatty & Sons  
Marsh Engineering Works  
Northern Canada Supply Co.  
Mine & Smelter Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works  
R. T. Gilman & Co.  
Mussens, Limited  
Link-Belt Co.
- Hoisting Engines:**  
Canadian Fairbanks-Morse Co., Ltd.  
The Electric Steel & Metals Co.  
Mussens, Limited  
Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
M. Beatty & Sons  
Marsh Engineering Works  
Fraser & Chalmers Engineering Works  
Fraser & Chalmers of Canada, Ltd.  
The Mine & Smelter Supply Co.
- Hose:**  
Canadian Fairbanks-Morse Co., Ltd.  
Northern Canada Supply Co
- Hydraulic Machinery:**  
Canadian Fairbanks-Morse Co., Ltd.  
Hadfields, Limited  
MacGovern & Co., Inc.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works
- Industrial Chemists:**  
Hersey, M. & Co., Ltd.
- Ingot Copper:**  
Canada Metal Co., Ltd.  
Hoyt Metal Co.
- Insulating Compounds:**  
Standard Underground Cable Co. of Canada, Ltd.
- Inspection and Testing:**  
Dominion Engineering & Inspection Co.
- Inspectors:**  
Hersey, M. & Co., Ltd.
- Jacks:**  
Canadian Fairbanks-Morse Co., Ltd.  
Can. Brakeshoe Co., Ltd.  
Northern Canada Supply Co.  
R. T. Gilman & Co.  
Mussens, Limited
- Jack Screws:**  
Canadian Foundries and Forgings, Ltd.
- Laboratory Machinery:**  
Mine & Smelter Supply Co.
- Lamps—Acetylene:**  
Dewar Manufacturing Co., Inc.
- Lamps—Carbide:**  
Dewar Manufacturing Co., Inc.
- Lamps—Miners:**  
Canada Carbide Company, Limited  
Canadian Fairbanks-Morse Co., Ltd.  
Dewar Manufacturing Co., Inc.  
Northern Electric Co., Ltd.  
Mussens, Limited
- Lamps:**  
Dewar Manufacturing Co., Inc.
- Lead (Pig):**  
Consolidated Mining & Smelting Co.
- Levels:**  
C. L. Berger & Sons
- Locomotives (Steam, Compressed Air and Storage Steam:**  
Canadian Fairbanks-Morse Co., Ltd.  
H. K. Porter Company  
R. T. Gilman & Co  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Limited
- Link Belt**  
Canadian Fairbanks-Morse Co. Ltd.  
Northern Canada Supply Co.  
Jones & Glassco
- Machinists:**  
Burnett & Crampton
- Machinery—Repair Shop:**  
Canadian Fairbanks-Morse Co., Ltd.
- Machine Shop Supplies:**  
Canadian Fairbanks-Morse Co., Ltd.
- Magnesium Metal:**  
Everitt & Co.
- Manganese Steel:**  
Canadian Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works
- Metal Marking Machinery:**  
Canadian Fairbanks-Morse Co., Ltd.
- Metal Merchants:**  
Henry Bath & Son  
Geo. G. Blackwell, Sons & Co.  
Coniagas Reduction Co.  
Consolidated Mining & Smelting Co. of Canada  
Canada Metal Co.  
C. L. Constant Co.  
Everitt & Co
- Metallurgical Engineers:**  
The Dorr Co.
- Metallurgical Machinery:**  
The Dorr Co.
- Metal Work, Heavy Plates:**  
Canada Chicago Bridge & Iron Works
- Mica:**  
Everitt & Co.  
Diamond Drill Carbon Co.
- Mining Engineers:**  
Hersey, M. Co., Ltd.
- Mining Requisites:**  
Canadian Steel Foundries, Ltd.  
Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works
- Mine Surveying Instruments:**  
C. L. Berger & Sons
- Molybdenite:**  
Everitt & Co.
- Monel Metal:**  
International Nickel Co.
- Motors:**  
Canadian Fairbanks-Morse Co., Ltd.  
R. T. Gilman & Co.  
MacGovern & Co.  
The Wabi Iron Works



## Hose was hose — Till Goodyear Built it



**T**HE GOODYEAR CORD TIRE of to-day would not have been possible had Goodyear been guided by the hide-bound traditions of the rubber industry.

Nor could Goodyear Industrial Hose ever have reached its high degree of perfection.

But Goodyear refused to be bound by precedent or trade prejudices. Hose fit to meet modern industry's varied and severe demands was our goal. Prevailing methods of construction would not do. Better methods had to be developed.

It was typical of Goodyear to study the hose requirements of industry exhaustively—to want to know exactly the conditions industrial hose must meet in use.

To discard existing processes of hose building, rubber compounds and cotton specifications and set new and more exacting standards—to de-

velop more modern processes and methods of construction.

So you are offered the more efficient Goodyear Industrial Hose—hose that embodies all the virtues demanded by the strenuous needs of 20th century industrial life.

For foundry, paper mill, mine, railway, steel plant and every other industry there is a Goodyear Hose that will meet your needs more exactly; that will give more lasting service.

Goodyear Industrial Hose will open up to you new possibilities of economy, increased production and hose satisfaction.

A man trained by Goodyear in hose problems will gladly call upon you without obligation.

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Calgary, Edmonton, Vancouver*

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MADE IN CANADA  
**INDUSTRIAL**  
**HOSE**



## Canadian Miners' Buying Directory.—(Continued)

**Motor Generator Sets—A.C. and D.C.**

MacGovern &amp; Co.

**Nails:**

Canada Metal Co.

**Nickel:**International Nickel Co.  
Coniagas Reduction Co.  
The Mond Nickel Co., Ltd.**Nickel Anodes:**

The Mond Nickel Co., Ltd.

**Nickel Salts:**

The Mond Nickel Co., Ltd.

**Nickel Sheets:**

The Mond Nickel Co., Ltd.

**Nickel Wire:**

The Mond Nickel Co., Ltd.

**Oil Analysts:**

Constant, C. L. Co.

**Ore Sacks:**

Northern Canada Supply Co.

**Ore Testing Works:**Ledoux & Co.  
Can. Laboratories  
Milton Hersey Co.  
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  
Oxford Copper Co.  
Canada Metal Co.  
Hoyt Metal Co.  
Everitt & Co.  
Pennsylvania Smelting Co.**Packing:**

Canadian Fairbanks-Morse Co., Ltd.

**Perforated Metals:**Northern Canada Supply Co.  
Hendrick Mfg. Co.  
Greening, B., Wire Co.**Pig Tin:**Canada Metal Co., Ltd.  
Hoyt Metal Co.**Pig Lead:**Canada Metal Co., Ltd.  
Hoyt Metal Co.  
Pennsylvania Manufacturing Co.**Pipes:**Canadian Fairbanks-Morse Co., Ltd.  
Canada Metal Co., Ltd.  
Consolidated M. & S. Co.  
Northern Canada Supply Co.  
R. T. Gilman & Co.**Pipe Fittings:**

Canadian Fairbanks-Morse Co., Ltd.

**Pipe—Wood Stave:**Pacific Coast Pipe Co.  
Mine & Smelter Supply Co.**Piston Rock Drills:**Mussens, Limited  
Mine & Smelter Supply Co.**Plate Works:**John Inglis Co., Ltd.  
Hendrick Mfg. Co.  
The Wabi Iron Works**Platinum Refiners:**

Goldsmith Bros.

**Pneumatic Tools:**Canadian Ingersoll-Rand Co., Ltd.  
Jones & Glassco  
R. T. Gilman & Co.**Prospecting Mills and Machinery:**The Electric Steel & Metals Co.  
E. J. Longyear Company  
Standard Diamond Drill Co.  
Mine & Smelter Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works**Pumps—Pneumatic:**Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
Sullivan Machinery Co.**Pumps—Steam:**Canadian Fairbanks-Morse Co., Ltd.  
Canadian Ingersoll-Rand Co., Ltd.  
The Electric Steel & Metals Co.  
Mussens, Limited  
Northern Canada Supply Co.  
Smart-Turner Machine Co.  
R. T. Gilman & Co.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works**Pumps—Turbine:**Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works**Pumps—Vacuum:**Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
The Wabi Iron Works**Pumps—Valves:**

Canadian Fairbanks-Morse Co., Ltd.

**Pulleys, Shaftings and Hangings:**Northern Canada Supply Co.  
Canadian Fairbanks-Morse Co., Ltd.  
The Wabi Iron Works**Pulverizers—Laboratory:**Mine & Smelter Supply Co.  
The Wabi Iron Works  
Hardinge Conical Mill Co.**Pumps—Boiler Feed:**Smart-Turner Machine Co.  
Northern Canada Supply Co.  
Canadian Fairbanks-Morse Co., Ltd.  
Fraser & Chalmers of Canada, Ltd.  
Mussens, Limited  
Mine & Smelter Supply Co.**Pumps—Centrifugal:**Canadian Fairbanks-Morse Co., Ltd.  
The Electric Steel & Metals Co.  
Smart-Turner Machine Co.  
M. Beatty & Sons  
Canadian Ingersoll-Rand Co., Ltd.  
Mine & Smelter Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
The Wabi Iron Works**Pumps—Diaphragm**

The Dorr Company

**Pumps—Electric**Canadian Fairbanks-Morse Co., Ltd.  
Mussens, Limited  
Smart-Turner Machine Co.**Pumps—Sand and Slime:**Canadian Fairbanks-Morse Co., Ltd.  
Mine & Smelter Supply Co.  
The Electric Steel & Metals Co.  
The Wabi Iron Works  
Smart-Turner Machine Co.**Quarrying Machinery:**Sullivan Machinery Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Hadfields, Limited  
Mussens, Limited  
R. T. Gilman Co.**Rails:**Hadfields, Limited  
R. T. Gilman & Co.  
Mussens, Limited**Railway Supplies:**

Canadian Fairbanks-Morse Co., Ltd.

**Refiners:**

Goldsmith Bros.

**Riddles:**

Hendrick Mfg. Co.

**Roofing:**Canadian Fairbanks-Morse Co., Ltd.  
Northern Canada Supply Co.**Rope—Manilla:**

Mussens, Limited

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

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*Smelters and Refiners of Cobalt Ores*

Manufacturers of

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**Bar Silver—Electrically Refined**

**Arsenic—White and Metallic**

**Cobalt Oxide and Metal**

**Nickel, Oxide and Metal**

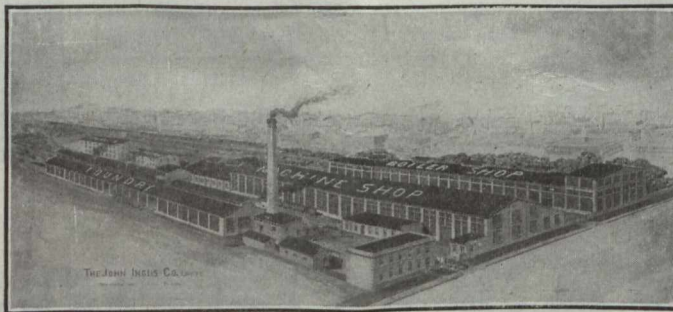
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J. W. ANDERSON, 7 Bank Street, CHAMBERS

## Canadian Miners' Buying Directory.—(Continued)

**Rope—Wire:**

Allan, Whyte & Co.  
Greening, B. Wire Co.  
Northern Canada Supply Co.  
Mussens, Limited

**Rolls—Crushing**

Canadian Steel Foundries, Ltd.  
Hadfields, Limited  
The Electric Steel & Metals Co.  
Mussens, Limited  
The Wabi Iron Works

**Samplers:**

Fraser & Chalmers of Canada, Ltd.  
C. L. Constant Co.  
Ledoux & Co.  
Milton Hersey Co.  
Thos. Heyes & Son  
Mine & Smelter Supply Co.  
Mussens, Limited

**Scales—(all kinds):**

Canadian Fairbanks-Morse Co., Ltd.

**Screens:**

Greening, B. Wire Co.  
Hendrick Mfg. Co.  
Mine & Smelter Supply Co.  
Link-Belt Co.

**Screens—Cross Patent Flanged Lip:**

Hendrick Mfg. Co.

**Screens—Perforated Metal:**

Hendrick Mfg. Co.

**Screens—Shaking:**

Hendrick Mfg. Co.

**Screens—Revolving:**

Hendrick Mfg. Co.

**Scheelite:**

Everitt & Co.

**Separators:**

Canadian Fairbanks-Morse Co., Ltd.  
Smart-Turner Machine Co.  
Mine & Smelter Supply Co.

**Shaft Contractors:**

Hendrick Mfg. Co.

**Sheet Metal Work:**

Hendrick Mfg. Co.

**Sheets—Genuine Manganese Bronze:**

Hendrick Mfg. Co.

**Shoes and Dies:**

Canadian Foundries and Forgings, Ltd.  
The Electric Steel & Metals Co.  
The Wabi Iron Works

**Shovels—Steam:**

Canadian Foundries and Forgings, Ltd.  
M. Beatty & Sons  
R. T. Gilman & Co.

**Siline:**

Coniagas Reduction Co.

**Saline Refiners:**

Goldsmith Bros.

**Smelters:**

Goldsmith Bros.

**Sledges:**

Canada Foundries & Forgings, Ltd.

**Smoke Stacks:**

Hendrick Mfg. Co.  
MacKinnon Steel Co., Ltd.  
Marsh Engineering Works  
The Wabi Iron Works

**Special Machinery:**

John Inglis Co., Ltd.

**Spelter:**

Consolidated Mining & Smelting Co.

**Sprockets:**

Link-Belt Co.

**Spring Coil and Clips Electrico:**

Canadian Steel Foundries, Ltd.

**Steel Barrels:**

Smart-Turner Machine Co.  
Fraser & Chalmers of Canada, Ltd.

**Stamp Forgings:**

Canada Foundries & Forgings, Ltd.

**Steel Castings:**

Canadian Brakeshoe Co., Ltd.  
Canadian Steel Foundries, Ltd.  
The Electric Steel & Metals Co.  
Hadfields, Limited  
The Wabi Iron Works

**Steel Drills:**

Canadian Fairbanks-Morse Co., Ltd.  
Sullivan Machinery Co.  
Northern Canada Supply Co.  
The Electric Steel & Metals Co.  
Canadian Ingersoll-Rand Co., Ltd.  
Mussens, Limited

**Steel Drums:**

Smart-Turner Machine Co.

**Steel—Tool:**

Canadian Fairbanks-Morse Co., Ltd.  
N. S. Steel & Coal Co.  
Hadfields, Limited  
Swedish Steel & Importing Co., Ltd.

**Structural Steel Work (Light):**

Hendrick Mfg. Co.

**Stone Breakers:**

Hadfields, Limited  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.  
Mussens, Limited  
R. T. Gilman & Co.  
The Wabi Iron Works

**Sulphate of Copper:**

The Mond Nickel Co., Ltd.  
Coniagas Reduction Co.

**Sulphate of Nickel:**

The Mond Nickel Co., Ltd.

**Surveying Instruments:**

C. L. Berger

**Switches and Switch Stand:**

Canadian Steel Foundries, Ltd.  
Mussens, Limited.

**Tables—Concentrating:**

Mine & Smelter Supply Co.  
Fraser & Chalmers of Canada, Ltd.  
The Electric Steel & Metals Co.

**Tanks:**

R. T. Gilman & Co.

**Tanks—Acid:**

Canadian Chicago Bridge & Iron Works

**Tanks (Wooden):**

Canadian Fairbanks-Morse Co., Ltd.  
Gould, Shapley & Muir Co., Ltd.  
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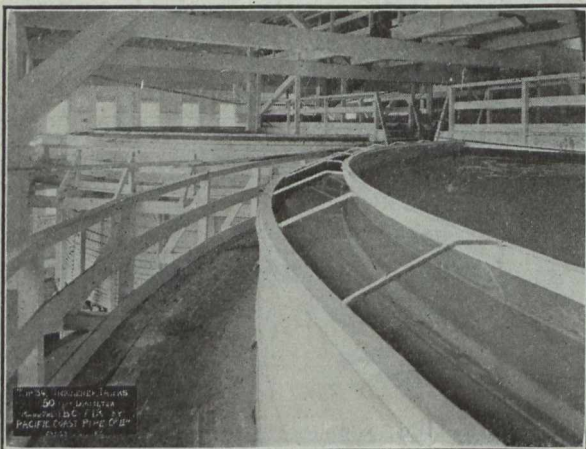
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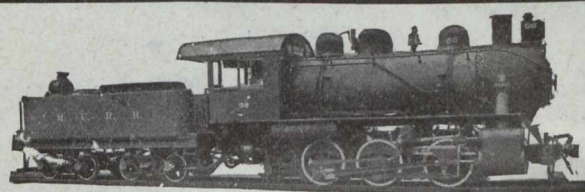
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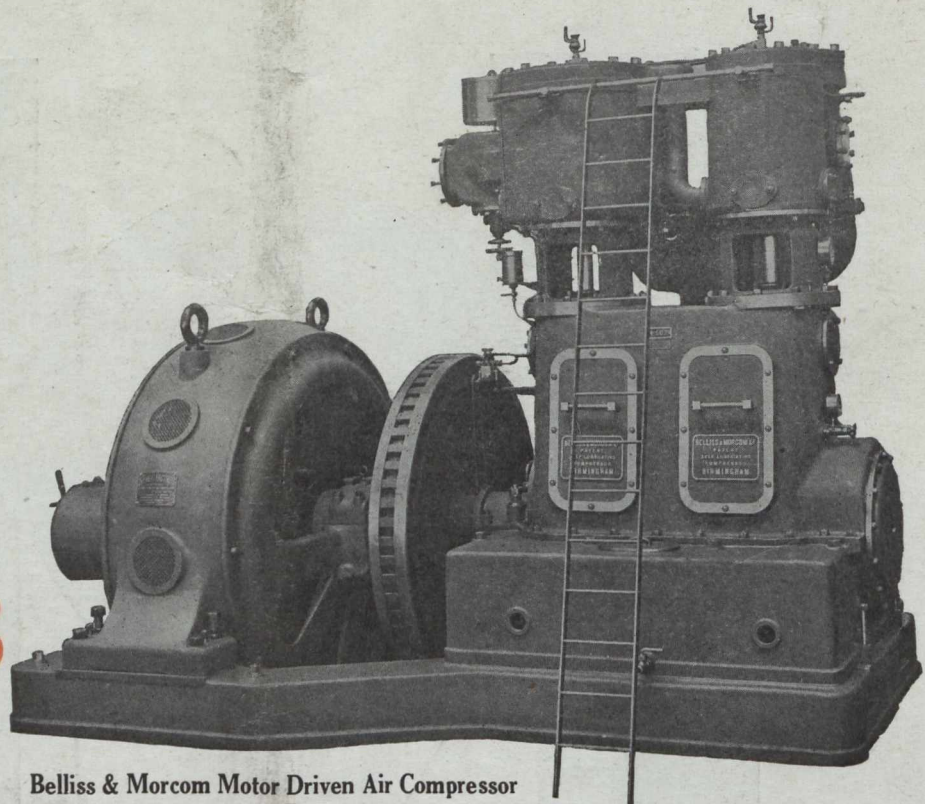
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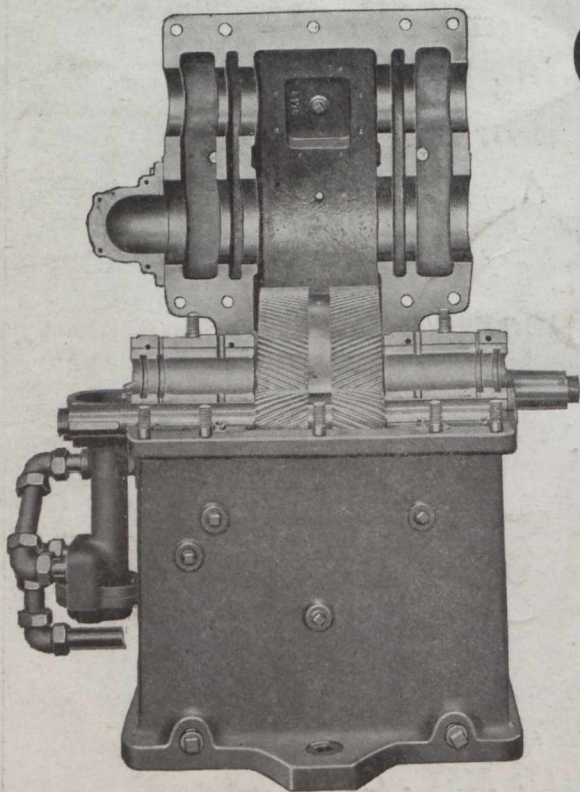


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