

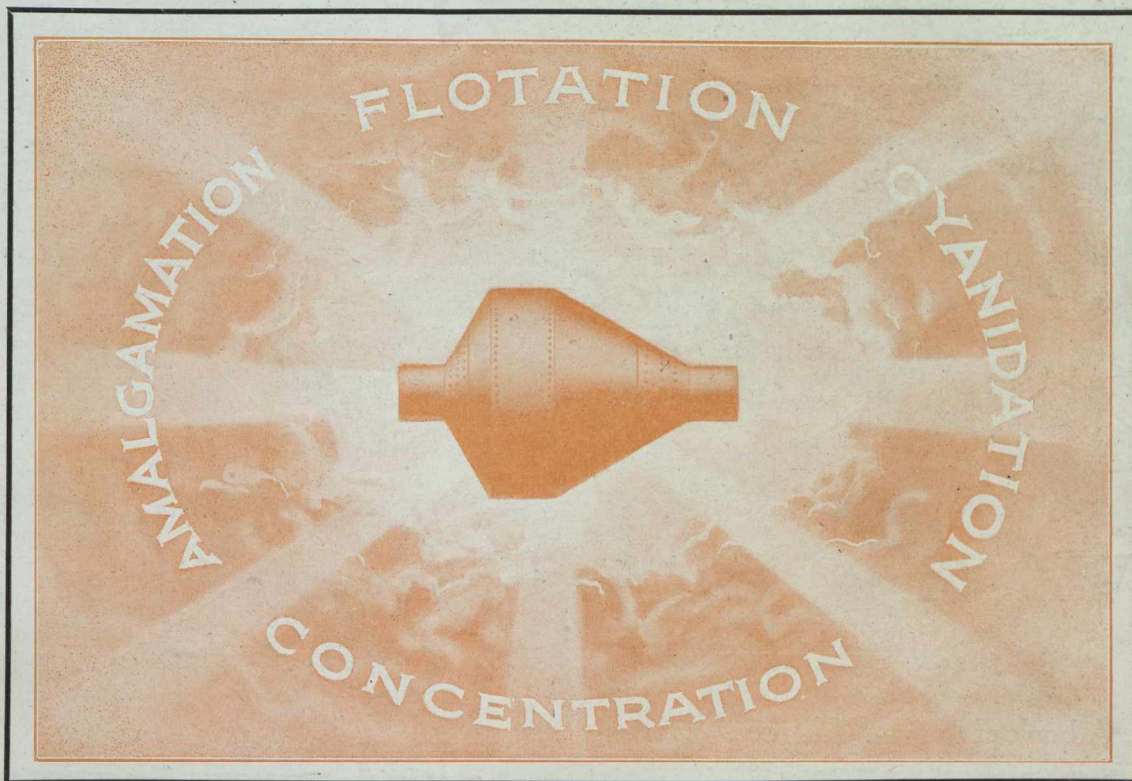
CANADIAN MINING JOURNAL

VOL. XXXVIII

TORONTO

No. 13

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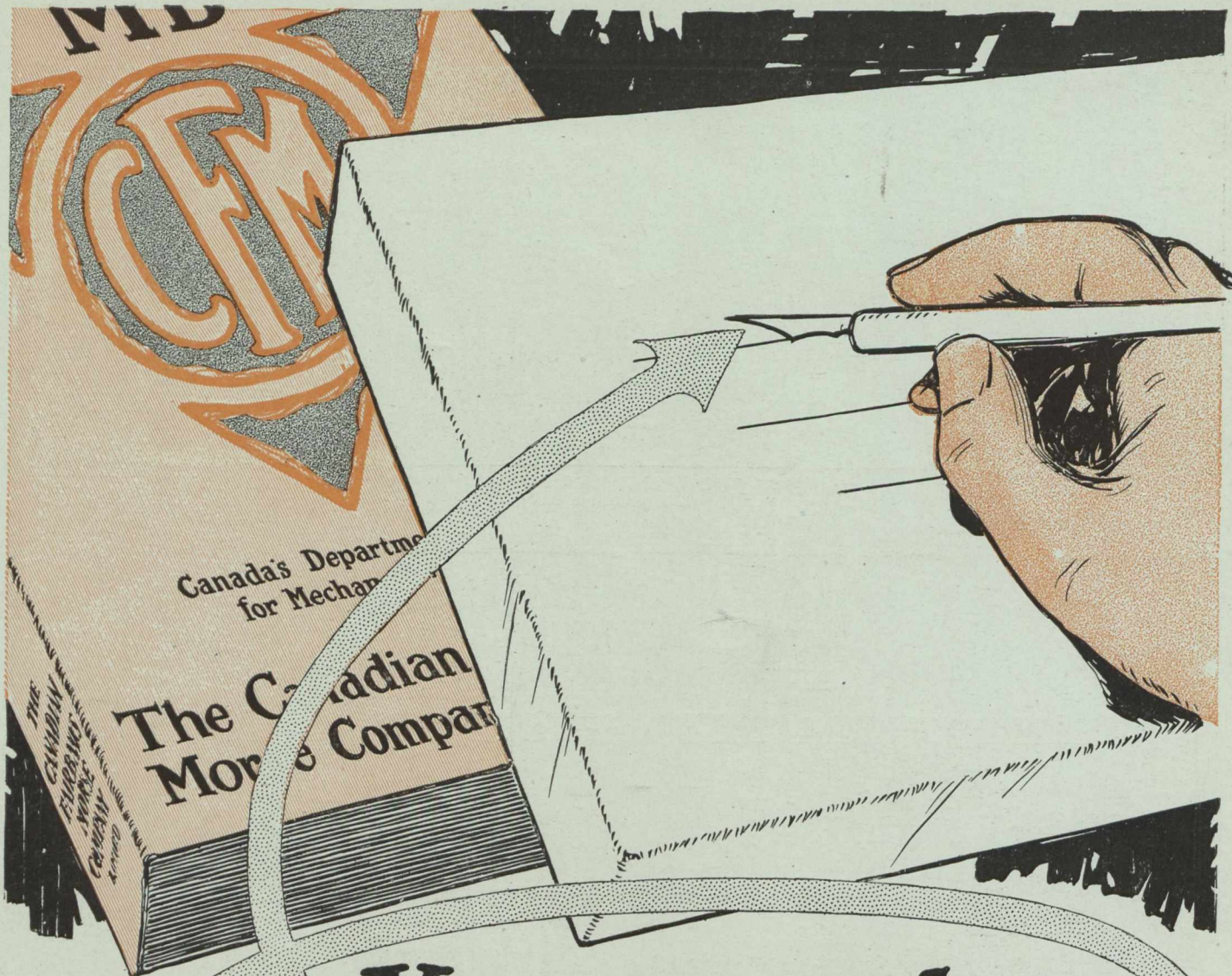
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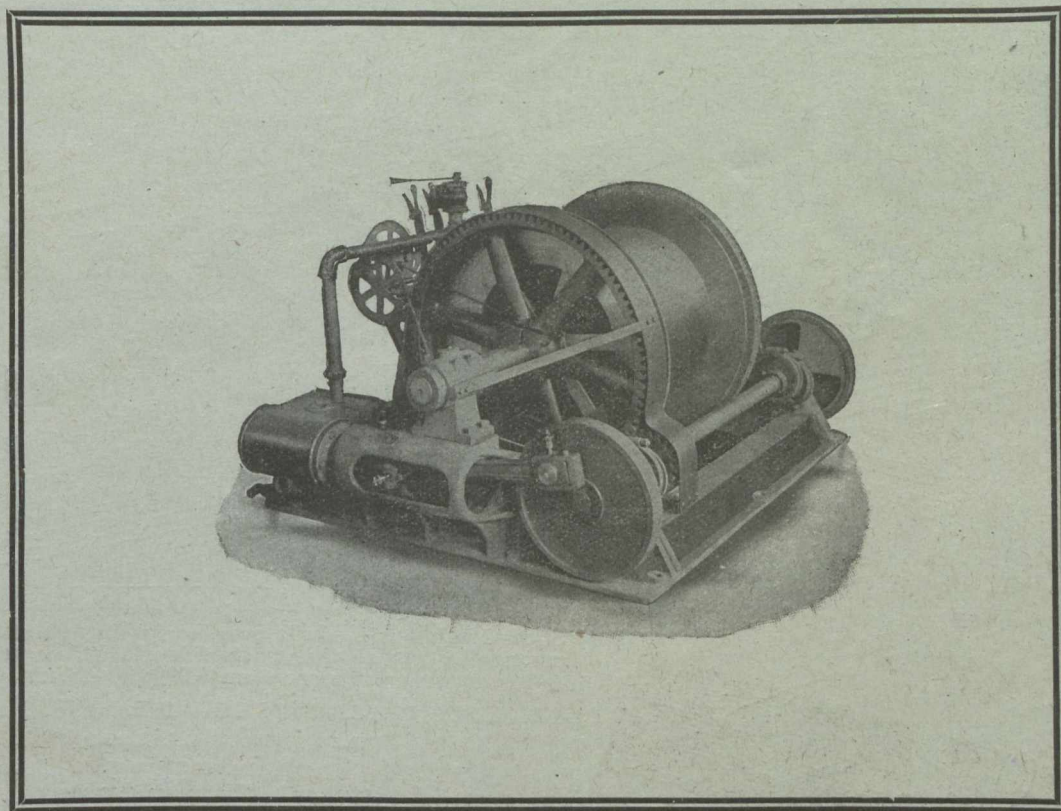
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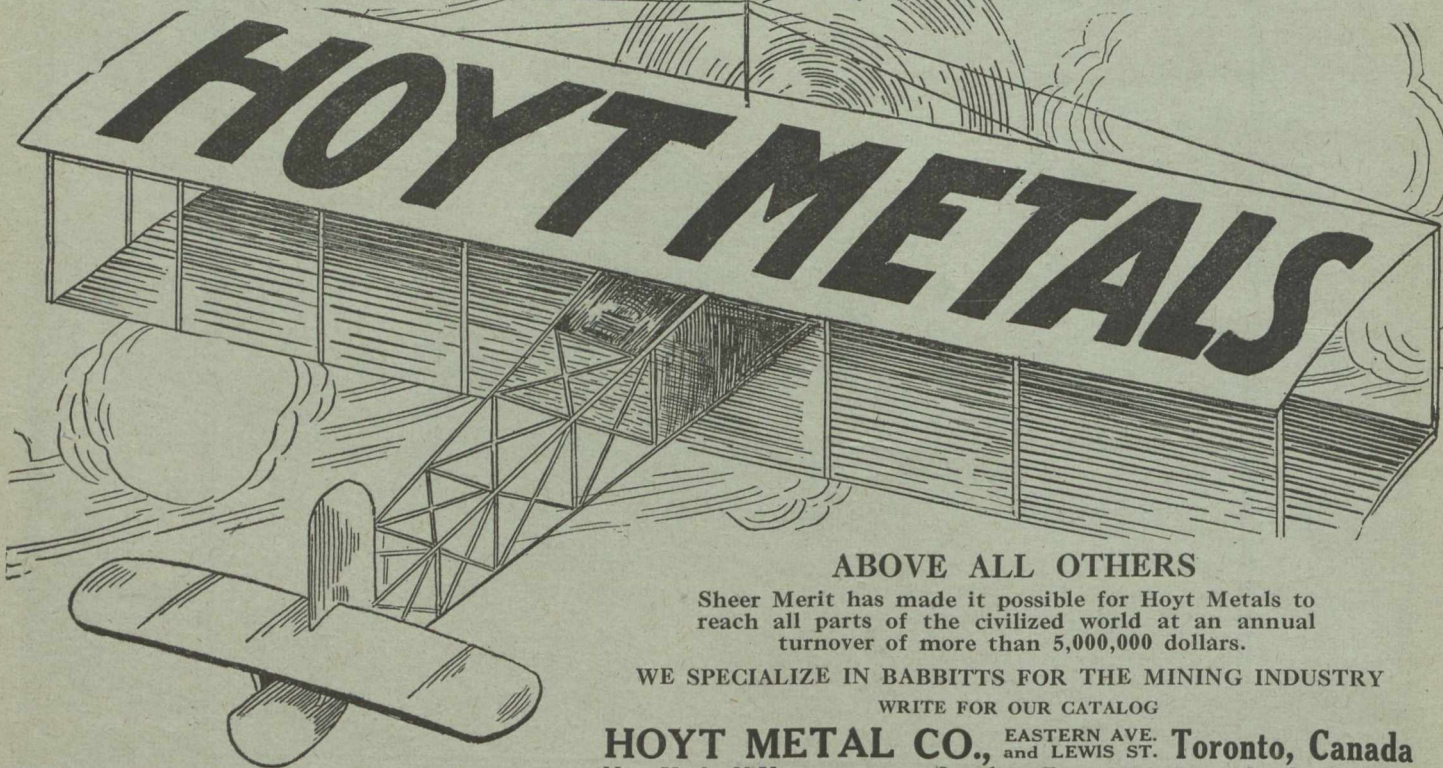
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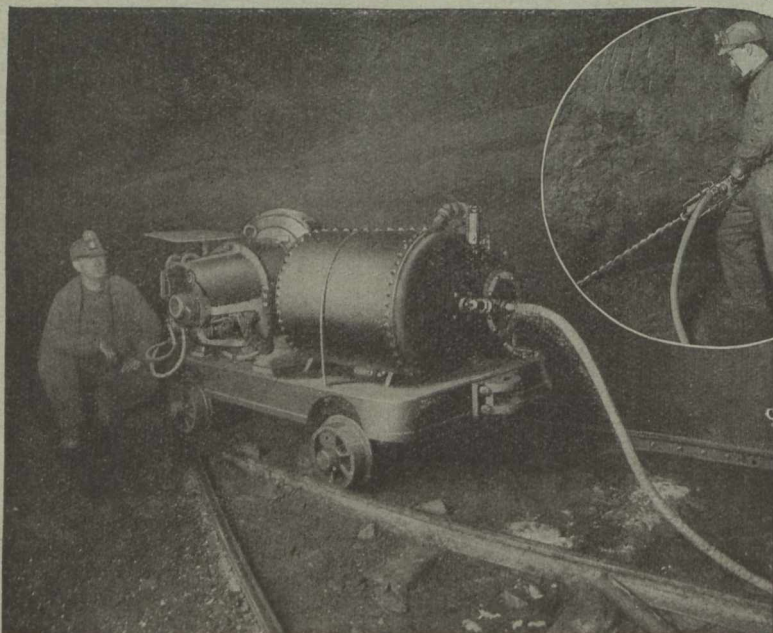
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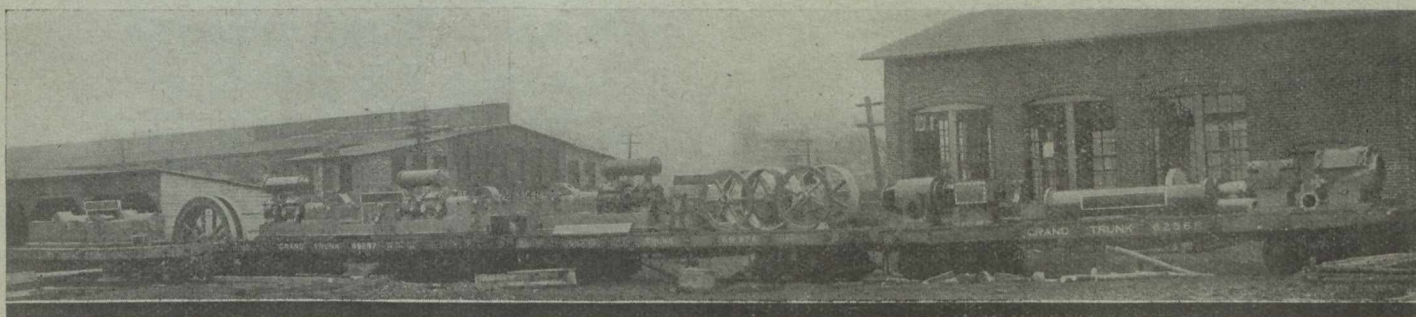
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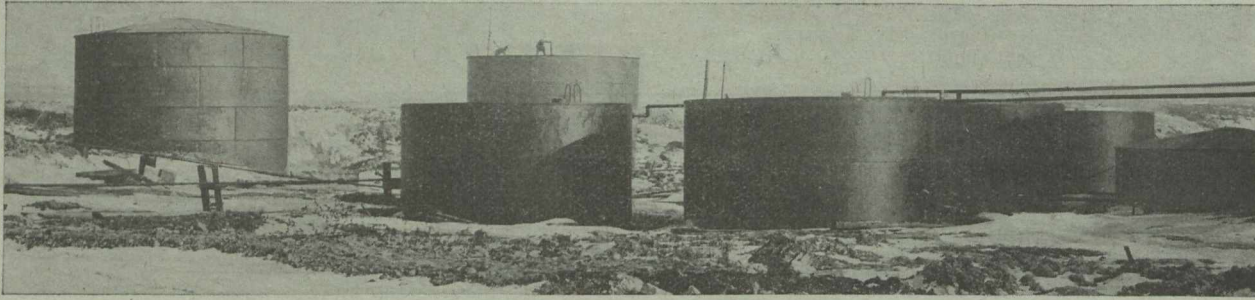
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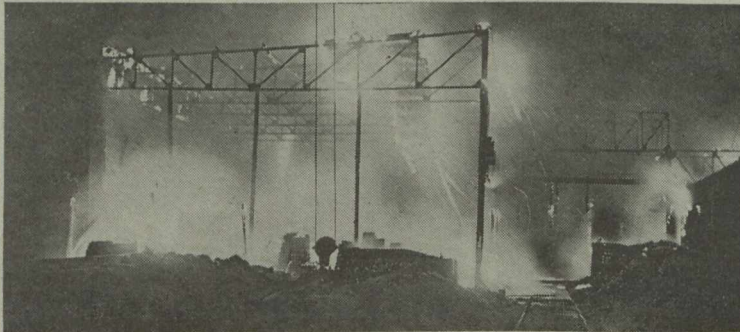
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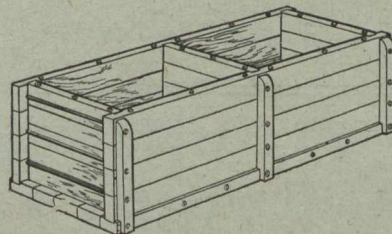
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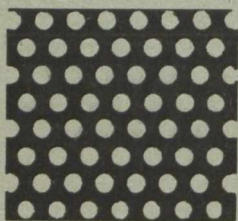
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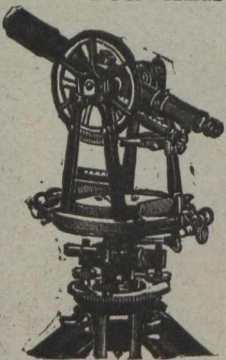
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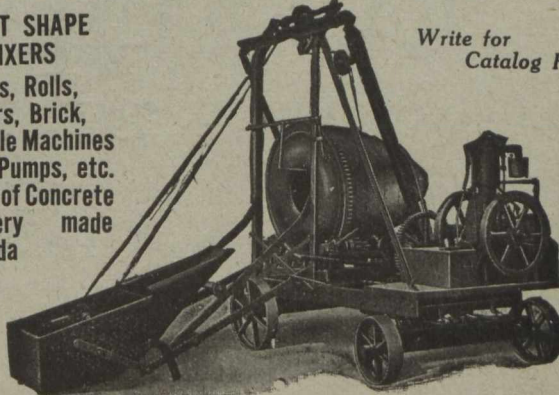
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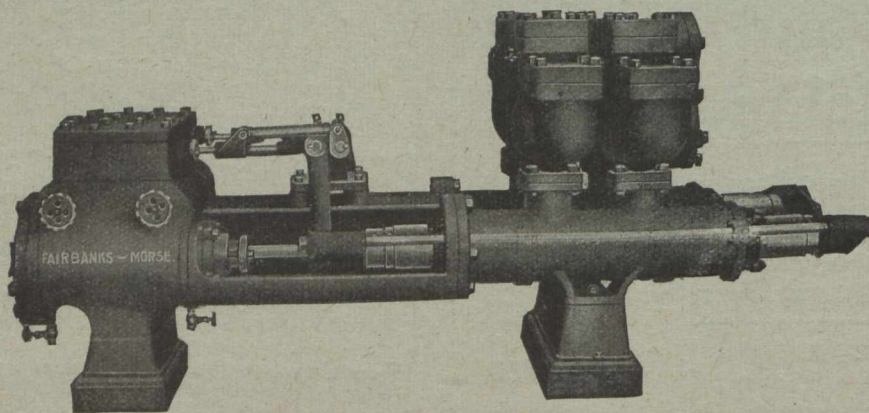
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THE CANADIAN MINING JOURNAL

VOL. XXXVIII.

TORONTO, July 1st, 1917.

No. 13

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Branch Office 600 Read Bldg., Montreal

Editor

REGINALD E. HORE

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THE RECOVERY OF POTASH FROM FELDSPAR.

The Department of Trade and Commerce, Ottawa, in a recent bulletin republishes the extravagant claim of the secretary of the Canadian Potash Corporation, printed originally in the "Canadian Chemical Journal," and at various times in the daily newspapers. Unfortunately the Department of Trade and Commerce seems to be under the impression that the statement of the case is in accordance with the facts, for it reprints the article without drawing attention to its absurdities. We would suggest that the Department would do well to investigate before printing more such stuff. It is unfortunate that a Government Trade Bulletin should be made a medium for the spreading of misinformation.

ESTIMATION OF ORE RESERVES.

As we have pointed out in these columns on previous occasions, the estimates of ore reserves presented to shareholders by some directors of mining companies are far from satisfactory. A regrettable case is that of the Dome Mines Company. It is no wonder that shareholders are confused by a comparison of the reports issued by the Dome directors. Those who have to depend on the official reports issued by the company must have a very hazy idea of the value of the Dome property.

INCREASED WAGES FOR MINERS.

Reports from Porcupine indicate that at last the miners are taking their grievances to their employers and in consequence are getting some satisfaction. Increased cost of living should be met as far as possible by increased wages and the mine managers may be expected to meet reasonable demands in a reasonable way.

The situation at Cobalt becomes easier with the rise in the price of silver. The miners should receive some benefit from the rise.

THE SMELTER SMOKE CASES.

The decision in the Sudbury smelter smoke test cases will be welcomed by those interested in the welfare of the Sudbury district. As pointed out by Judge Middleton, the mining industry is the source of the prosperity of the Sudbury district. It would be absurd to interfere with the production of necessary metals because of slight damages to crops.

The readiness of the nickel producing companies to satisfy any reasonable claims for damages to crops is well known, and there will be little sympathy for those who took advantage of small losses to make demands for amounts far in excess of the damage done.

CORRESPONDENCE

The Ferrier-Adams Episode.

Editor Canadian Mining Journal

Sir,—The Adams-Ferrier episode at the Ottawa meeting of the C. M. I. in 1916 was the most dramatic incident we have had at any of the meetings and it has always seemed to me unfortunate that an account of it was not published in the C. M. I. Bulletin and that Ferrier's statement should not have appeared until the issue of the annual volume, when the whole matter was to most minds as cold soup. There is much food for useful thought in the occurrence and in the details that led up to it.

You, Mr. Editor, have recently dealt with the wild-cattling methods accompanying the publication of the "discovery" of phosphate rock in B. C., and the only fault that we can find with your comments on this phase of the matter is that you did not perhaps bring it home sufficiently directly for the non-technical man to readily grasp the unpleasant facts. But with this, the wild-cattling-like publicity, neither Dr. Adams nor Dr. Ferrier had any direct part. Theirs is an altogether different episode, and it would not be without its usefulness to give some attention to their particular parts in the affair.

For some years past Dr. Ferrier has been chiefly concerned with commercial propositions; he has been acting as a professional man, in positions of trust, holding other men's affairs in his care and guard; he has been estimating risks, attempting to see things as they really are, more concerned with painful realities than with good stories, and so has gradually developed from the geologist to the Engineer. He used his geology to follow the phosphate rock over a wide area and located it in place ("mineral in place"—true discovery) in B. C. This is truly magnificent prospecting. I do not know of any better, and also real engineering; the utilization of the sciences to get results. He then systematically followed up his discovery—as an Engineer—with care and thoroughness, and then held his tongue—as an Engineer—until his clients gave him their long withheld permission to speak.

Now Ferrier's geological symptoms were developed at the impressionable period of his life and remain very firmly. No man enjoys telling a story more than does Ferrier. He still collects new incidents and continues to re-classify his older ones as assiduously as he does rare minerals or old editions, and the holding in of this story of the phosphate discovery for four succeeding long years must have been a continuous struggle and a continuous ache.

If (note the *if*) the phosphate had been there in commercially useful quantities, it would have been developed—by the engineer, an industry would have been established and there would have been tangible results; but in this case—for the engineer—there was not even a story. And this happens so frequently in engineering. The engineer's work may be of the highest order in effort, in skill, in patience and in loyalty and yet remain in obscurity.

How different are the conditions for the trained story-teller. Dr. Adams' whole expedition was a matter only of a few weeks, yet his "discovery" (not of "mineral in place") was heralded (by interested parties, not by the Doctor directly) over the whole world and like the story of the three black crows, grew in the telling. And the Doctor, presumably not a party to this wild telling, told later on his own story at the

meeting of the Canadian Mining Institute; told the story so exceedingly well that we all listened eagerly, as we should to good stories, and were so carried away by the story that I, for one, missed the point that the discovery was only of a bit of float.

For the accomplished story-teller a piece of float was sufficient for a very large result—in story telling—but for the engineer it was only one incident on the trail to results, it was only the beginning of further serious effort. This whole episode fits so many remarks in my paper* of four years ago that I trust I will be pardoned if I repeat its closing sentence. The engineer "given his own way will hold his peace and be unrecognized and to the geologist and to the story-teller will be the glory."

Yours, etc.,

H. E. T. HAULTAIN.

On the Origin of Sudbury Nickel Deposits.

Editor Canadian Mining Journal:

Sir,—In your issue of June 1st is printed a letter, signed by "Geologist," criticizing a part of the Report of the Ontario Nickel Commission. The sarcasm in which "Geologist" indulges will hardly be regarded by your readers as fair criticism of the brief discussion on the origin of the orebodies of the Sudbury district, against which it is directed. Perhaps unintentionally, this apparent attempt to minimize the importance of this part of the Commission's excellent report, may cause a number of your readers, who might otherwise miss these valuable pages, to acquaint themselves with their contents. This part of the Commission's report serves a most useful purpose in briefly summarizing previous views and in bringing more nearly up to date the steadily increasing information, resulting from extended exploration and development of the mines, in the years that have elapsed since Dr. Coleman's report was written.

By seeking for an explanation of some of these later observations, which Dr. Knight has clearly set forth and which seem to some of us, who have been long in the district, not consistent with the theory of magmatic segregation, the author of the letter would have better served the cause of science, than by attempting to ridicule the hard, honest and keen-minded research of a fellow-worker in his own field. It is not desirable, nor is it in the interest of progress in scientific discovery, to consider any scientific theory or law as precluding criticism. The theory of natural selection, the law of conservation of energy and even the law of gravitation are open to further investigation and have been questioned. Science seeks only the truth. In this search there is no place for sarcasm. Humility is a foundation stone of true research.

In his second sentence, referring to Mr. Knight's discussion on the origin of Sudbury ore deposits, "Geologist" says: "He finds that all previous students of the geology of the region have been quite wrong in their interpretation of the ore deposits as formed by magmatic segregation, since they are really due to replacement by hot waters." Either this is an inadvertence, or it is a deliberate mis-statement, or "Geologist" is not conversant with the well-known work and views of a number of previous students of this subject. The last alternative is hardly tenable. Your readers may form different opinions as to which of the other two is correct.

* "The Geologist"—a paper read at the Annual Meeting C.M.I., 1913, and published in the Transactions of that year.

"Geologist" carefully evades important new observations made and published by Knight for the first time. He does not attempt to show how the intrusion of the granite foot-wall at Creighton mine at a later date than the norite hanging-wall, as evidenced by numerous off-set dykes of the former cutting the latter, comports with the theory of magmatic segregation. Nor does he attempt to explain the bearing on this theory, of the occurrence of the Levack orebody well within the granite-gneiss underlying the norite and not on the norite-gneiss contact. Neither did Dr. Coleman, in his discussion on Knight's article in the Engineering and Mining Journal a few months ago, attempt a satisfactory explanation of the bearing of the former of these two phenomena on the application of the theory of magmatic segregation to Creighton orebody. And yet these two orebodies (Creighton and Levack) have been regarded by supporters of this theory as typical.

Dr. Coleman, I believe, admits that Garson, Worthington and Victoria orebodies, with some others, probably originated from hot mineralizing solutions. General discussion is, therefore, of but little use. Progress can only be made by discussion of particular phenomena connected with individual deposits. The above statements regarding phenomena at Creighton and Levack orebodies have not been controverted. How are these phenomena explained by those who believe that the large bodies of sulphides at these two mines were segregated by gravity from the norite while molten? Is it conceivable that the great, compact, continuous orebody at Creighton would not have been disturbed, faulted, broken up and intersected by granite dykes, had it been formed before the intrusion of the huge granite mass that forms its foot-wall? And why did not the settling sulphides at Levack stop at the granite? How did they penetrate the granite-gneiss and form a large orebody from forty to over two hundred feet within the gneiss? To the mining engineer, whose scientific imagination has been trained qualitatively by his college course and reading in geology, and tempered quantitatively by dealing with the hard economic facts of lengths of drill-holes, drifts and "raises," how the magmatic segregation theory can meet these difficulties, is not apparent.

As a mining engineer, the writer is interested in any theory as to the origin of these deposits mainly because of the assistance it may render in the search for ore. When exploring the Levack property, had our engineers ceased drilling after the drills had entered the granite-gneiss by a few feet, this large body of ore would not have been discovered. The illustration on page 165 of the Commission's report, showing the occurrence of this important orebody well within the granite-gneiss, makes clear the main reason why this great body of ore, indicated on surface by only a small outcrop, lay undiscovered for so many years, in spite of the fact that the property had been examined under option a number of times, including a previous examination by The Mond Nickel Company. Mining engineers will, therefore, welcome a clear explanation of the bearing of these two phenomena, at Creighton and Levack Mines respectively, on the magmatic segregation theory. The ultimate purpose of the work of the economic geologist is the location of ore. The grandest test of an astronomer's theory is the location of a new star. The best test of a theory of origin of ore deposits in a given district will be the assistance it renders in finding a new orebody. Neither of the two theories advocated for this district would have assisted much

in the recent discovery of ore under the drift in Falconbridge Township. Observation as to where the ore generally occurs, with the aid of Dr. Coleman's excellent map, but without the aid of his theory, was the assistance rendered by the economic geologist in this instance. The discovery may fairly be credited to intelligent following up of an excellent map; but not of a theory.

But when a theory appears to have been a contributing cause in repeated failures to locate an important orebody, the mining engineer must feel justified in regarding it with suspicion, even though his doubt may not be regarded as having serious scientific weight by one who looks at the theory from a different standpoint. The engineer feels that he must discard the theory or ask its supporters for such an explanation as will appear rational.

The writer cordially joins "Geologist" in his final statement, if he will permit the substitution of the word "engineer" for "geologist" thus: "The mining engineer finds much of interest and much to ponder over in the report of the Royal Ontario Nickel Commission." But he would include the discussion on the origin of the Sudbury ore deposits as one of the most interesting, helpful and important parts of the report.

Yours, etc.,

C. V. CORLESS.

Coniston, Ont., June 23rd, 1917.

Origin of Sudbury Nickel Deposits.

Editor Canadian Mining Journal:

Sir,—In your issue of the 1st instant is a letter signed "Geologist," commenting on the report of the Royal Ontario Nickel Commission, against the tone of which I wish to protest.

There can be no objection whatever to criticism of this report, and that varying opinions are held by geologists as to the origin and relationships of the Sudbury orebodies is well known. Scientific discussion with the desire to arrive at facts, however, is one thing, and the willingness to strike from anonymous shelter is another.

Mr. C. W. Knight, who spent many months in studying the nickel orebodies underground, is well qualified to deal with the questions of structure and origin which arise in connection with these deposits, and is equally able to defend his views.

Mr. Knight has neither depreciated the work nor misrepresented the opinions of geologists who have preceded him in the field. In the Commission's report he has impartially set out the theories and conclusions of both predecessors and contemporaries, and I submit that any critic who may differ from him should do so over his own signature and in a similar spirit of fair play.

Yours, etc.,

THOS. W. GIBSON,

Secretary Ontario Nickel Commission.

Toronto, June 18, 1917.

GOVERNMENT TO OPERATE COAL MINES.

It is expected that the coal mines of the Crowsnest district will soon be in operation under Government control. It is regrettable that pending a settlement of their dispute employers and employees could not come to an agreement and keep up production when coal is so greatly needed. The action taken by the Government seems a wise one, for it should result in early resumption of work at the mines.

THE CONCENTRATION OF MOLYBDENITE ORES.

Notes by the Staff of the Department of Mining Engineering of the University of Toronto.*

The concentration of molybdenite ores is a special phase of the general problem of the separation of one sulphide mineral from another and with this general problem the staff of the Department of Mining Engineering of the University of Toronto has been conducting research work for several years past.

Something over a year ago the results were so satisfactory that it was practically decided to undertake custom work in the milling laboratory to assist owners in the early prospecting or developing of their deposits. The laboratory has crushing capacity of 10 to 15 tons per day, but considerable alterations would have been required to allow of the economical hand-

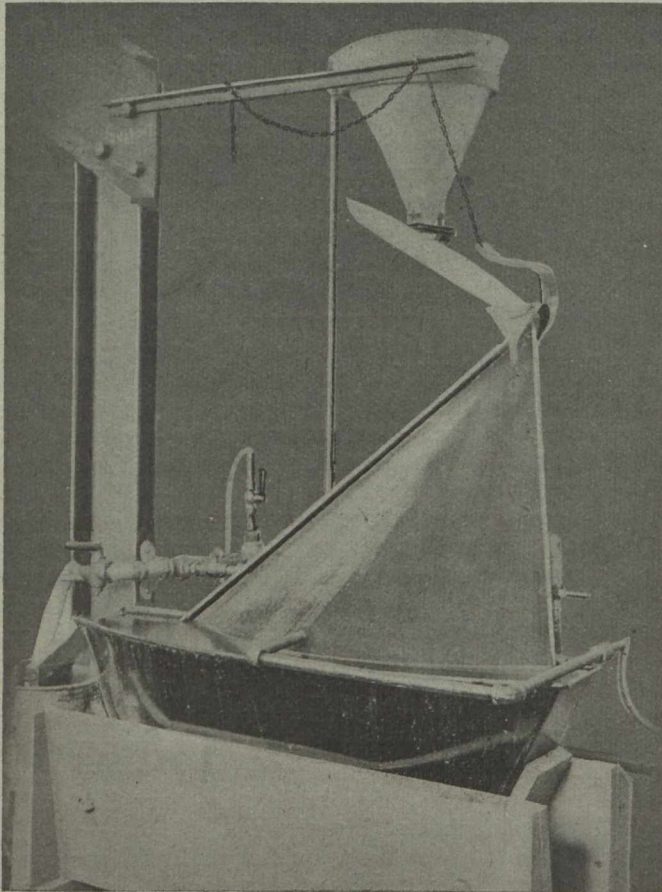


Fig. 1. Concentrating Machine.

ling of this amount. Before actual work was commenced on these alterations it was learnt that Mr. Geo. C. Mackenzie in the laboratories of the Mines Branch at Ottawa backed by financial assistance from the Munitions Board was prepared to do this work on a larger scale. A visit to his laboratories showed that he was getting results, and we discontinued our work on molybdenite.

During the summer three or four commercial concerns produced molybdenite concentrates. As each one of these was built up around a special process there was little or no use suggesting another process to the men concerned. Lately, however, there have been considerable changes in the affairs of the chief producers, and many new properties are being developed or exploited and it may be timely to indicate the line of work carried on in our laboratories.

* H. E. T. Haultain, F. C. Dyer, J. T. King.

One of the producing companies is crushing the ore wet and using the Elmore vacuum process of flotation but no information is available as to their results. The other producers crush the ore dry and drop it on the surface of water where the molybdenite and considerable pyrites and mica and other silicates float. Then different devices are used to cause some of these undesirable minerals to sink. Complete details have not been made public.

In one case the Wood machine is used. In this the floating film of mixed minerals travels down over a steeply inclined wire screen, part of the water with much of the silicates and some of the pyrites pass

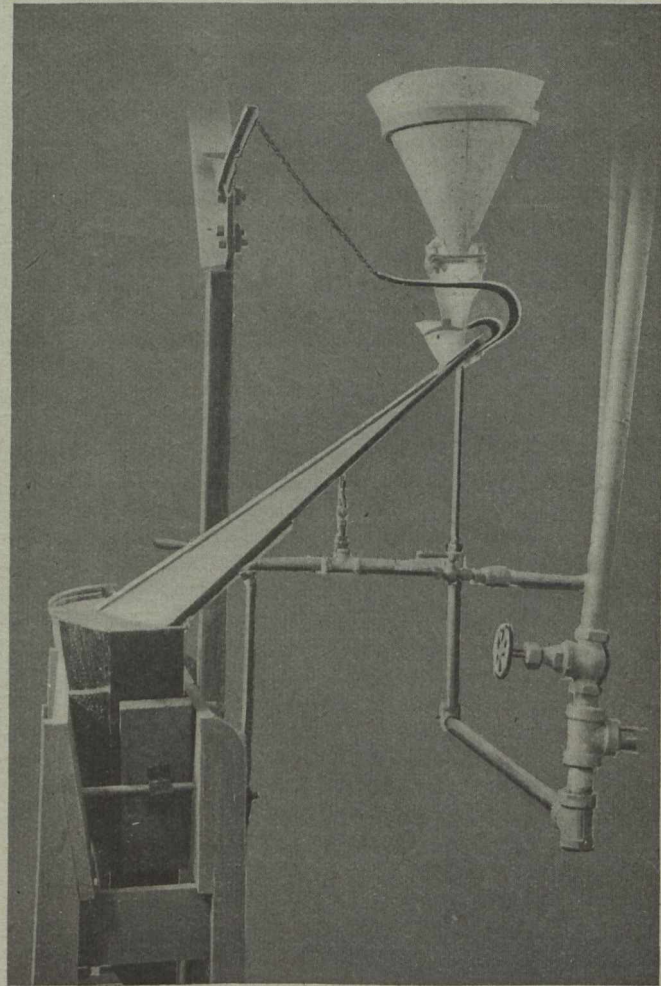


Fig. 2. Concentrating Machine.

through the screens while the molybdenite and some of the other minerals travel over the screen.

Another mill uses Behrend's idea of passing the floating film of minerals over several small dams so that the film is alternately stretched and compacted; which results in a sort of competitive drowning in which the molybdenite has the best staying power.

In every case there is much re-treating, re-drying, sizing, or roasting to get a sufficiently clean concentrate.

We also float the molybdenite on the surface of water; but we approach this result in a totally different way. We crush the ore *wet* and then by spreading the pulp out sufficiently thin, the molybdenite breaks through to the surface and floats.

Figs. 1 and 2 show one of the laboratory machines. The machine consists mainly of a piece of sheet iron

bent into a section of a cone. The lower edge dips into still water in a V-shaped tank. The pulp is fed from a small orifice onto the bent sheet iron and flows down and spreads out over it. The result is a gentle wave action.

Between the crests of the waves the pulp layer is very thin and the surface film very much stretched. The result is that the less wettable minerals break through, are picked up by the crest of the next wave and are carried down to the still water where they float. Here a gentle jet of air keeps them travelling towards the overflow and takes them out of the way of fresh comers.

The thickness of the pulp, the steepness of the plate, the surface tension of the water as affected by modifying agents, are all easily controllable means of affecting the cleanness of the float, and it is possible to make a very clean separation of different sulphides.

This method was developed to separate chalcopyrite from pyrrhotite and pentlandite and it works equally as well in separating molybdenite from pyrites, etc. Simple as both apparatus and process are in their present form many months were required to develop them. The human mind seems to travel from the complex to the simple when groping with new processes and we tried all kinds of schemes to aid or increase the action, only to find that the simplest was really the most effective as well as being the most easily controlled.

Concentrating Molybdenite in the Laboratory.

With molybdenite all sizes from 10-mesh to the finest slimes are effectively treated. In fact still coarser material can be handled; but it is not required in any ores that we have had. With the slimes it is not so easy to make clean concentrates and capacity and efficiency are sometimes both increased by aiding the wave action of the slimes by an intermittent feed. It appears advisable to split the pulp at about 60 mesh with a classifier, treating everything finer than this on one machine and everything coarser on another. One trip over the plate does not result in clean tailings; generally three or four are required. More than half the concentrates are caught on the first trip and smaller quantities in each succeeding trip. The proportion of pyrites caught with the molybdenite increases with each succeeding trip.

The concentrates from the third and fourth trip may have to be re-treated as in all other flotation processes, but the amount to be thus handled is very small. A test run on some Quyon ore illustrates this. It contained about 3 per cent. MoS_2 and over 25 per cent. pyrites. It was crushed through 14 mesh and put over a hindered settling classifier which took out everything finer than about 65 mesh. The coarse product on the first two trips yielded 80 per cent. of the molybdenite in a concentrate assaying 84.2 per cent. MoS_2 . The next two trips recovered the balance of the molybdenite in a product assaying 24.0 per cent. MoS_2 . The assay laboratory failed to find molybdenum in the tails and microscopic examination confirmed this.

Where especially clean concentrates are required a very slight roasting of these middlings causes a film of oxide to form over the pyrites without affecting the molybdenite and on re-floating this material a very clean separation results. On account of the sensitiveness of this wet flotation method no especial care

or accuracy is required in this roasting. In fact slow drying with occasional raking has been found sufficient to produce the infinitely thin film of oxide on the pyrites that is required to differentiate it from the molybdenite.

Generally the mica gives no trouble, a small quantity only remaining with the molybdenite; but this is not always the case. We had one ore in which there was more mica present than molybdenite, and it persisted on floating with it.

Some ores require no oil or other modifying agent; but in general the addition of a small amount is advisable. It is remarkable how small a quantity is necessary. One-tenth of a pound of oil to the ton of ore has a very marked effect. Experiments with this system have been conducted with satisfactory results on ores from the Wood mine, in Quyon, Quebec; from the Molly mine on Lost Creek, B.C.; from the Alice Arm mine, B.C., and others.

The laboratory machine is a full sized commercial unit and the commercial machine would simply be a multiplication of it. We have experimented with different sized plates and while these experiments are by no means final they point to a length of flow of about 30 inches as being generally suitable. In order to get capacity the plates should be superimposed with an inch or two between them and can be thus placed above a long V-shaped tank. Using flat plates and placing them radially above a cone tank and feeding them from rotating arms has some features to recommend it.

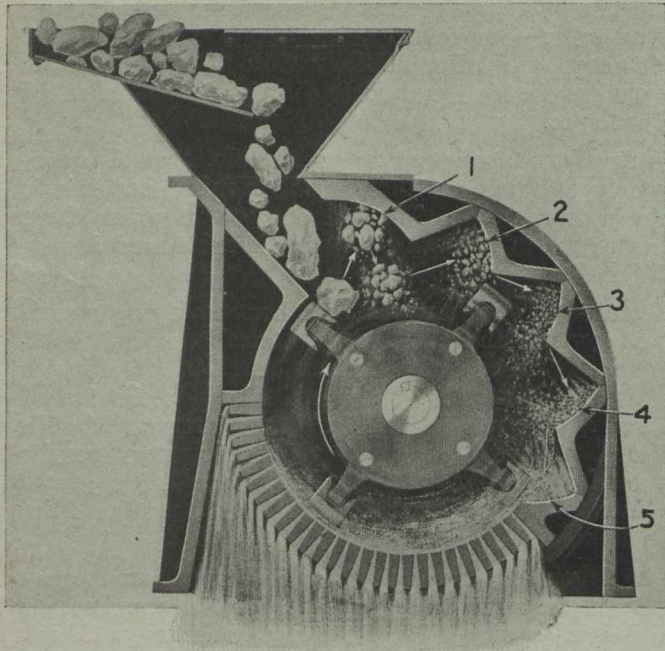
Advantages of the System.

The chief advantages of this system lie in its extreme simplicity and the high grade of concentrates produced. In many cases no re-treatment of concentrates or middlings will be required. When this is necessary the amount to be so treated is very small and the operation simple and effective. The ore can and should be crushed wet, and fine screening is eliminated, so that the mill would be of the simplest type. In dry crushing molybdenite is smeared on other particles causing them to float by reason of this partial coating. In wet crushing this apparently does not occur.

THE PROBLEM OF THE SMALL MOLYBDENITE DEPOSIT.

The work done by Mr. Mackenzie at the ore-dressing laboratories of the Mines Branch at Ottawa has provided the first essential for the development of molybdenite mining in Canada. Owners or leasers of prospects have not only been able to have their ores tested, but have been able to have small or large lots treated at very reasonable rates. On fairly rich ore this leaves the shipper a margin of profit wherewith to continue his prospecting or development.

On account of the extreme irregularity of the deposits very few can show sufficient ore in sight to justify the erection of a mill for the complete treatment of their ore. To pay freight and treatment rates on medium and low grade ores does not help the situation. Dry flotation as in the Wood machine, if used to produce only very low grade concentrates, is an extremely simple process that can be safely used by anybody that could run a small steam engine. The

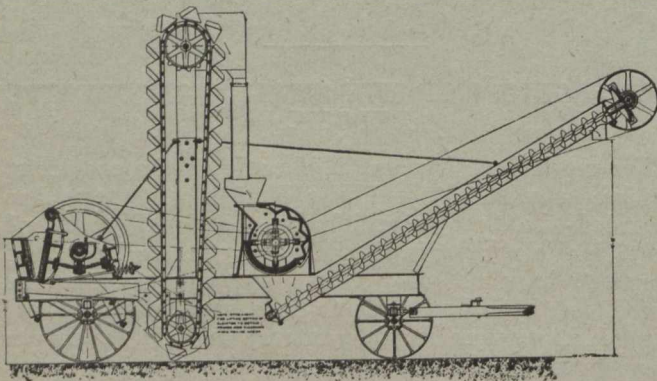


Ore Pulverizer.

only difficult essentials are that the ore be dry and crushed fairly fine.

In small tonnages ore can be dried on flat or curved boiler plate with a wood fire beneath. Recently manufacturers (Messrs. Allis-Chalmers) have put on the market modernized forms of an old pulverizer that should be the very thing for the fine crushing of the ore. The accompanying figures are taken from a catalogue. Figure 5 shows a complete crushing plant. We should prefer to have the discharge openings in the pulverizer itself larger and use a simple shaking screen to remove oversize and return it to the pulverizer.

A machine of this type, though not so well designed, has crushed a hundred thousand tons of the hard corundum and feldspar rock at Burgess, Ont., and this without any previous drying.



Complete Crushing Plant for Small Molybdenite Deposit.

Manufacturers could put out a simple, compact equipment of this kind, including a simple dry flotation machine, a pump to supply the water and the necessary boiler and engine that could be taken anywhere. The resulting concentrates would be low grade, probably from 15 to 30 per cent.; but they would stand freight and treatment charges to a central customs mill, while the ore itself would not.

COAL FIELDS AND COAL INDUSTRY OF EASTERN CANADA.

The Department of Mines, Ottawa, has just published a report by F. W. Gray on "the Coal-Fields and Coal Industry of Eastern Canada." The occurrences in Nova Scotia, including the Cape Breton, Cumberland and Pictou fields, and New Brunswick are described, and a history of their development given. A very interesting section of the report is that descriptive of submarine mining, preparation of coal, methods of working etc. Explosions and mine fires in Nova Scotia are dealt with at some length. General conditions of employment are discussed.

The report has been prepared by a man exceptionally well qualified for the task. It is, as might be expected, a careful presentation of the facts. Fortunately it has been written simply and will be easily read and understood by anyone.

The report is well illustrated by reproductions from photographs and is indexed. The bibliography has been compiled with exceptional care.

Economics of the Coal Mining Industry.

A study of economics of the coal mining industry leads Mr. Gray to observe:

"From the standpoint of the investor, the operation of coal mines in Nova Scotia in the past has not been encouraging. Some of the coal companies, during prosperous times, and in the earlier and less expensive operation of their collieries, paid regular and handsome dividends over many years.

"In very few instances, however, in the history of coal mining companies in Nova Scotia has there been any likelihood of a redemption of the original capital outlay, and a very moderate interest return is all the investor has been able to hope for. The majority of the companies now operating have been compelled to undergo financial reorganization. Several companies have suffered complete financial disaster, in some cases brought about by physical conditions beyond control, and in some cases by unskilful management, or the unjustifiable optimism of promoters.

"Generally speaking, however, the mines of Nova Scotia have been well managed from an engineering point of view, and the meagre financial return in the past has been due to alterations in the fiscal policies of Canada and the United States, resulting in temporary disorganization of markets, to the remoteness of the principal markets, the interference, or stoppage, of coast-wise shipments by ice in the winter, and the comparatively low selling price of coal in eastern Canada.

"Within the past twenty years the price of coal has varied very little, it being one of the few commodities that has not materially increased in selling value.

"It is doubtful whether the market for Nova Scotian coal has ever yielded the operators a greater price than \$2.50 per ton at the pit mouth, and the average price realized, after allowing for waste and slack coal, is very much less than this figure. A comparison with normal European pit mouth selling prices will show how moderate this figure is, if due consideration is accorded to the higher cost of labor and materials in Canada.

"The margin of profit has been too small to permit of the accumulation of proper reserves to provide against the troubles inseparable from mining coal, or to allow of adequate depreciation of reserves for the amortization of capital liabilities and the depletion of coal areas. Therefore, periods of financial depression or mining accidents, have too often forced the abandon-

ment of mining operations, and have involved investors in losses.

"The formation of the Dominion Coal Company was an evolution from these conditions, and whether it be a retrograde tendency or not, the logic of events has indicated the chief hope of settled prosperity in the Nova Scotian coal trade to lie in the further development of strong corporations, with adequate financial reserves. There is no reason to anticipate anything but a long and successful career for the coal companies of the Province if these essential qualifications are given the consideration they deserve.

"Whatever financial stability attaches to the coal companies of Nova Scotia to-day, is a testimonial benefit conferred by the General Mining Association; a monopoly that, with all its faults, rendered it possible to conceive mining operations on a comprehensive basis, eliminated suicidal competition in selling prices; and enabled mine workings to be laid out with the maximum of economy, with due regard to the conservation of the vast coal reserves which sporadic individual operations have tendered to endanger by unco-ordinated effort.

"The price of coal in eastern Canada has always been dependent on the selling prices in the United States, but it is candidly admitted, to-day, that coal has in the past been mined in the United States, and sold there and in Canada, at a price actually below the cost of production, when all the factors of that cost are taken into consideration.

Subsidiary Industries.

"Nova Scotia, as a province, has not reached the stage of industrial and manufacturing activity that should have accompanied a coal mining industry 100 years old; an industry that up to 1890 produced three-fourths of the coal mined in Canada, and, to-day, notwithstanding the vast coal resources of the west, is producing well over half the coal tonnage of Canada.

"A perusal of the pages of Dawson, Haliburton, and other great Nova Scotians, reveals a tremendous optimism concerning the commercial possibilities of Nova Scotia; and even to-day, it is not easy to find any flaw in the reasoning of these far-sighted men. Yet it must be confessed the potentialities of Nova Scotia have been but meagrely realized. Take away the steel industry from Nova Scotia, and what other manufacturing activity has the Province to show as a reflex of the production of 7,000,000 tons of coal annually?

"In the progressive communities of New Glasgow, Truro, and Amherst, there exists the nucleus of manufacturing, textile, wood-working, and leather trades, but how poorly they compare with the industries of Montreal and Toronto.

"The coal mined in Nova Scotia has, for generations, gone to provide the driving power for the industries of New England, Quebec, and Ontario, and has, in large part, been followed by the youth and energy of the Province. For almost a century, Nova Scotia has been exporting the raw material that lies at the base of all modern industry, and it is at least a legitimate subject for thought whether it would not have been possible to export manufactured articles, and to have utilized the raw material within the Province, to some extent at least, where safe and roomy harbors, and inexpensive water transportation give facilities for the assemblage of raw materials, and for the distribution of manufactured goods, in no way inferior to the other ports that border the North Atlantic coast.

"What combination of physical and political causes has brought about this condition of affairs cannot here be dealt with, but no consideration of the economic aspects of the coal industry of Nova Scotia would be just which did not point out the fact that the coal districts of Nova Scotia have not evinced the manufacturing enterprise that is a commonplace feature of coal-fields situated in civilized countries, as for example, Pennsylvania, the British Midlands, Westphalia, Silesia, and Belgium.

"Briefly, Nova Scotia has achieved the status of a mining camp, whereas its full stature should be that of a metropolis of industry."

CANADIAN ENGINEERS FOR RUSSIA.

London, June 22.—The American commission of engineers in London, a body of prominent engineers organized to render advisory and practical assistance to the United States Government and the entente allies during the war, has sent to Russia a committee of two military railway experts to offer advice and aid in reorganizing the railroads already built. The London committee also will give its assistance to the American railroad commission now in Russia.

The London committee's representatives are Lieut.-Col. J. W. Boyle, of the Canadian militia, and Lieut.-Col. J. A. MacDonnell, of the Canadian pioneer and railway battalions. They carry credentials to the British and American ambassadors and the Russian provisional government from members of the British Government and representatives of the United States and the Russian Governments in England.

Both Lieut.-Col. Boyle and MacDonnell have had wide experience since the war began in the construction of military railways in France, and prominent Russians in London express the belief that their advice and assistance will be of great value to the Russian Government. Lieut.-Col. Boyle probably is better known in America as a mining engineer, especially for his work in the Klondyke. He also is a transportation expert, and was instrumental in organizing the first Canadian pioneer battalion of railway troops. Canadian engineers, because of their efficiency, now are doing all the light railway work behind the British lines in France.

BILLION TONS COAL PROMISED.

Washington, June 15.—One billion tons of coal is the promised production for the nation next year under an agreement reached to-day between officials of the United Mine Workers of America and the Council of National Defense.

Equal recognition will be given by the Government henceforth to the mine workers and mine operators, and each will act as a check upon the other, it was decided at a conference held here to-day. At the close of the conference, John P. White, president of the United Mine Workers, said:

"With this new understanding reached, I repeat my former statement that free workers organized as free men, can cover this country a foot deep with coal and in the next year raise its production from the former record of 600,000,000 tons to 1,000,000,000.

COPPER AND GOLD IN MANITOBA.

By J. A. Campbell.*

The name of Manitoba has so long been associated with No. 1 hard wheat that it would seem a contradiction in terms to connect it with any other line of production and especially so with something so fundamentally different from its well-known staple product as the production of minerals. But with the golden grain must now be associated the golden metal. New Manitoba appears destined to occupy a similar place in the production of minerals to that which the older part of the Province now holds in the raising of wheat.

Northern Manitoba unquestionably has mining resources that only await development to yield immense returns. The known mining area is in the region of a chain or series of lakes and rivers stretching easterly from Lake Athapapuskow, Schist and Flin Flon, near Manitoba's western boundary to Herb or Wekusko Lake, a distance of approximately 90 miles. The former is reached from The Pas, via the Saskatchewan River, through Cumberland and Sturgeon Lakes, and the latter is 11 miles from the Hudson Bay Railway, at about Mile 82. In the former district have been discovered immense deposits of copper sulphide ore, and in the latter veins of gold-bearing quartz, which have produced remarkable assays and are now beginning to yield good returns.

As is quite natural, the discoveries were first made and development work is now taking place at each end of the mineral area, those portions of the district which are the easiest reached by water and rail.

The Great Sulphide Property—Flin Flon Lake.

This very important discovery was made in August, 1915, by Thomas Creighton, one of the prospectors for the Hammill-Currie-Fasken Syndicate, of Toronto. A large outcrop of oxidized ore was found on the south-east shore of Flin Flon Lake. Ten claims were staked and they now comprise the property. This was sampled, but owing to surface concentration the metallic content was extremely high, resampling, after shooting off the top of the orebody disclosed the fact that the ore would average about \$10 per ton in gold, copper and silver, the copper content averaging 1¼ per cent. The orebody has been trenched for 1,700 feet at different points, and it is thought that it will be over 2,000 feet long. It is narrowest at the north end and widest at the south end, where it enters the lake. Here it is nearly 300 feet wide. The orebody is broken up in some parts of the vein, but it is mainly a solid mass.

The extent of this discovery was soon known. The owners succeeded in interesting certain prominent New York and Boston mining men, and as a result a contract was let for diamond drilling the property.

The work started with two drills on March 26, 1916, and continued until July 15, 1916, during which time 18 holes were put down, and over 6,000 feet of drilling done. While the returns of this work have never been officially announced it has been learned on good authority that this drilling with only shallow holes proved up over 3,000,000 tons of sulphide ore which at the normal price of copper would be worth \$10 per ton. Besides, the drilling did not extend over 1,200 feet on the ore body. One can therefore only imagine what a stupendous quantity of ore is likely to be revealed by further drilling. The work done on this property in 1916 cost upwards of \$50,000.

Owing to a disagreement regarding terms, no deal was closed out with the New York and Boston people.

However, recently, an agreement for sale of this property was entered into by the owners with a Toronto syndicate, headed by David Fasken, president of the Nipissing Mining Company, and John H. Black, formerly superintendent of the Timiskaming and Northern Ontario Railway, several millions being involved in the deal. This syndicate has lost no time, and already diamond drills are again at work. Between \$100,000 and \$150,000 will be spent on this property, in drilling and development work this year.

Should the results of this work during the year realize anything like the expectations of those engaged therein, such a body of ore will have been proven up as to warrant proceeding forthwith with actual mining operations on a very large scale. This will involve, among other things, the construction of a railway from The Pas, a distance of 90 or 100 miles, and the erection of a smelter at or near the property. To facilitate these mining operations it is probable that one or more of the water powers of northern Manitoba will be developed. Straight north of the property there are several rapids, on the Churchill River, from which, according to Dominion Government engineers, can be developed over 50,000 horse power. Besides, there are plans under way for the erection of an immense power plant, to use at least part of the 80,000 horse power available at Grand Rapids, on the Saskatchewan River, for pulp mills and other purposes. Should this enterprise take shape in the near future, undoubtedly some of this power will be conveyed to this and other mining districts for use in mining operations.

The Mandy Mine—Schist Lake.

To the Tonopah Mining Company of Philadelphia and Nevada is accorded the unique distinction of being the first to ship out ore as a commercial commodity, and thus put Manitoba on the map as a mineral exporting Province. The mine from which this ore is taken is the Mandy mine, situated near the northern end of Schist Lake, and the ore is a marvellously rich copper sulphide.

Becoming interested in the north country and wishing a temporary change in occupation, Mr. F. C. Jackson, an engineer employed on Hudson Bay railway construction, decided to take a trip through some of northern Manitoba's lakes and rivers, with an off-chance of running across a mineral deposit of some kind. The result was a chance discovery, in October, 1915, of a mineral deposit, which, after allowing for the very exceptional expense of shipping the ore almost across a continent, will still pay magnificent returns. Mr. J. E. Spurr, one of the best known mining men in the United States, and vice-president of the Tonopah Mining Company, was then in the district, and on being shown a sample of the ore, he did not take long to close out a deal whereby his company took over the property on an agreement to properly develop and mine it, the original owner to receive a percentage of the profits. The Mandy Mining Company was forthwith formed, as a subsidiary, for the purpose of developing and operating the mine, and the work got under way as soon as possible.

From March to October, 1916, was occupied in surface trenching and diamond drilling, at an expense of \$40,000. Over 100,000 tons of ore were proved up, the larger part being copper and zinc mixture, but considerable percentage was shown to be clear copper sulphide, assaying over 20 per cent copper, with, in addition, gold and silver values of nearly \$5.00 per ton. This is all in one lens, but the formation is such

* Commissioner of Northern Manitoba.

that there is strong ground for the expectation and belief that further mining work will open up another lens or more.

A Unique and Successful Undertaking.

The working of the Mandy mine has already resulted in the successful consummation of an enterprise which is probably unique in the annals of mining in Canada. This was the getting out and hauling a distance of 40 miles in the dead of winter, without any previous preparation, of approximately 4,000 tons of ore, all ready for shipment, to a smelter 1,200 miles away.

Early last winter, on the strength of a report and recommendation by Mr. H. C. Carlisle, superintendent of the company, with headquarters at The Pas, it was decided to mine and let a contract for the teaming of at least 3,000 tons of ore, to be hauled across lakes and portages to the head of navigation at Sturgeon Landing. This contract was let to Mr. C. B. Morgan, of The Pas, and in the closing days of 1916, the work was commenced. In the course of two weeks camps were erected, and the work of hauling the ore had started. Considering the weather and the obstacles to be overcome, this is exceedingly quick action, for in that period three complete sets of camps had been built, equipped, provisioned and occupied by a force of 110 men and 92 teams, required for hauling the ore. In addition to this 35 men were engaged by the Mandy Mining Company, and Mr. D. M. Haynes, of Denver, consulting engineer for the company, came up to help the work along. In getting out the ore the equipment consisted simply of a boiler, two steam drills, and a derrick, worked by horses. At the end of the season 3,600 tons had been got out. All of this is now in the dump at Sturgeon Landing with the exception of 450 tons which have been hauled right through to The Pas, a distance of about 90 miles, and three carloads of this has already been shipped to British Columbia.

When navigation opens the ore now in the dump will be brought down by boat and barge and then trans-shipped by rail to a smelter. All this ore was got out by surface mining, and the open cut is now down a depth of about 25 feet.

The Government Road.

Anticipating to some extent the development of the district the provincial government, through the commissioner of Northern Manitoba, early in the Fall of 1916, let a contract for cutting out and clearing a roadway across the portage between Sturgeon Lake and Lake Athapapuskow, a distance of about 17 miles, and while the road has not been completed sufficient work was done thereon in the Fall to allow its being used as a Winter road. Thus, owing to this road being available for hauling ore the mine owners and contractors were able to carry out the above-mentioned enterprise. Had it not been for the work done by the government in this respect these mining operations would have had to stand over until a later period. The advantage of such a road is therefore apparent, and it is the intention to complete the work and put the road in reasonably good shape for Summer hauling as soon as possible.

In addition to the teams engaged in the work of hauling ore a considerable number were employed in hauling in supplies and taking out fish from Lake Athapapuskow. At least 120 teams were therefore continuously using this road during the Winter months.

Mining Operations During the Summer.

During the Winter the Mandy company have got in considerable machinery and a full line of supplies for the Summer work for they purpose going ahead with

the mining operations and the transportation of the ore to as great an extent as is possible during the Summer months. Last Winter a 52-foot tug was purchased and transported overland to Lake Athapapuskow. This was a notable piece of freighting—14 tons a distance of 65 miles. A stern wheeler and four barges are now being built at Schist Lake for work on that body of water. The Ross Navigation Company also have another stern wheeler under construction at The Pas in addition to several barges.

There were taken into the mine last Winter a hoisting engine, 150 horse power boiler and compressor with all necessary equipment for underground mining, also full equipment for a sawmill which has been set up and is now running. A gas tractor of the caterpillar type capable of hauling 20 tons is now on the ground and will be tried out over the portages.

All this work, supplies and equipment involved a big expenditure and when the machinery above mentioned has been set up and the bills paid to date the Mandy Mining Company will have expended close to a quarter of a million dollars.

Herb or Wekusko Lake Gold Mining District.

At the other end of the series or chains of lakes and rivers is Herb or Wekusko Lake where somewhat different conditions are found. The showings here are all in the nature of gold quartz, with slight traces of platinum and other metals. Within the last few months a camp has sprung up here and several groups of claims are now being actively developed. Mr. J. Burr Tyrrell, C. E., well known in connection with northern exploration some time ago outlined the geology of this lake district and reported favorably on the formations as a probable field for auriferous quartz. His report was read by Mr. M. J. Hackett, an experienced prospector and miner, who was sufficiently influenced thereby to make a prospecting trip into the district in question and in the Summer of 1914, accompanied by Mr. R. Woosey, spent some time at the lake and during the season discovered quartz bearing free gold in what is known at the present time as No. 1 vein of the Kiski claim. Before returning from the field Hackett and Woosey stripped and trenched this lode sufficiently to satisfy themselves that their discovery was valuable. They returned to the Pas and exhibited free gold specimens which resulted in other prospectors going into the field and staking claims.

Since that time considerable prospecting has been done, but it has been confined for the most part to a strip of territory 5 miles long by 2 miles wide, beginning at the Kiski claim at the south and ending with what is known as the McCafferty claims on the north. Various veins have been discovered within this area and several groups of claims have been disposed of to outside capitalists. During last Fall and Winter a great deal was done in the way of developing some of the most promising of the claims, culminating in the introduction of mining machinery and the shipment of a car of ore to Trail smelter. The following is a brief resume of existing conditions as to some of the well known claims:

Kiski-Wekusko Claims.

The original discoverers disposed of their interest in these claims and they are now in the hands of a Toronto syndicate headed by D. McLaren, a well-known capitalist. Since the change in ownership, a few months ago, development work is proceeding apace. A contract was immediately let for sinking a shaft which is now down to a depth of 30 feet. The average width of the vein is about 3 feet 6 inches. The

gangue is well mineralized with arseno-pyrite, chalcopyrite, and free gold is often visible to the naked eye. Mr. McLaren has a full equipment of machinery for this property, but shipment will be delayed until the wagon road from the Hudson Bay Railway to Herb Lake has been completed. In the meantime prospecting will be carried on by means of stripping, trenching and a thorough sampling of the property.

The Rex Group.

This is probably the best known group at the lake. It consists of seven mineral claims adjoining one another. Most of these were located by Messrs. Campbell, Hassett and Moore, well-known prospectors. Claims owned by others were added to the group which was sold last Fall to McKeever Bros., New York. Their engineer, Walter Neal, spent considerable time starting operations on the property, and before he left, about the end of the year, camps had been erected, a steam plant consisting of drills, hoists, pump, etc., had been installed, and the men employed placed in charge of a capable overseer. A recent report is to the effect that shaft No. 1 is now to a depth of 80 feet, that the values at this depth are high, and that the vein is increasing in width. Work has been commenced on No. 2 shaft.

As a result of reports received, Mr. Neal has just written as follows: "There is not a shadow of a doubt but that we have a mine there and I believe there are a good many others similar in the same district. I am perfectly ready to send in an order for machinery for the mill right now on the showing we have, but I shall not do so till after my next visit there, which will be within about a month, as I have to consider the lay of the land in designing the mill."

Moose Horn—The Northern Manitoba Mining and Development Company.

The big feature of this company's operations was the shipping recently of a carload of 57,000 lbs. of gold-bearing quartz to a smelter at Trail, B. C. The returns from the car have just been received and were \$2,323.60 in gold, an average of \$81.53 per ton—some shipment! This was no hand-picked sample, but was taken from shaft No. 1 of the Moose Horn in the regular way. The above company is purely a local concern, the organizers being well-known engineers and mining men. It is the only company that has as yet put shares on the market. A few months ago a block of stock was sold to residents of The Pas and district at 25 cents per share in order to realize additional money required for development purposes. No stock is now on sale.

The work already done on this property consists of a shaft sunk to a 50-foot level. There is installed at the mine a 50-horsepower boiler, 5-drill air compressor, drills, hoists, pumps and other equipment, and Manager Longley expects to have the plant in shape for aggressive mining in a few days' time and will then continue sinking the shaft. At the 100-foot level drifts will be started both north and south. Channel samples at the bottom of the shaft have given assay returns of \$170 per ton, and the vein has widened from 15 inches to two feet.

The Elizabeth-Dauphin Group.

After disposing of their holdings in the Kiski and Rex properties, respectively, M. J. Hackett and J. R. Campbell, already mentioned, consolidated their interests in certain other claims with those of J. M. Wanless, resulting in the above group of four claims being formed. These were sold a month or so ago at

a nice figure, and a company, The Pas Consolidated Mines, is now being organized to develop and operate them. The property shows an exceedingly well-defined vein.

Other Claims and Discoveries.

In addition to what has already been mentioned, work of importance has been done on various individual claims. The McCafferty lode, to the extreme north of the staked area has produced some very rich surface specimens and the vein has been stripped for over 1,200 feet. There have been some good showings also from the Nemo, Trapper, Centre Star, Bingo, Le Roi and Ballard.

The fissure in this mineralized zone cuts several formations, namely, chlorite schists, gabbro, quartz-porphyrines and altered gneiss. The values do not seem to be confined to any particular formation.

Road From Railway to Lake.

The great need of this camp is a wagon road to connect with the Hudson Bay Railway. Early this year Mr. J. P. Gordon, C.E., formerly assistant chief engineer of the Hudson Bay Railway, who is thoroughly acquainted with the country made a reconnaissance and survey and marked out a road from Mile 82 to the lake which line is about 11 miles in length and can be built at a minimum of expense. In this stretch there is a little over one mile of corduroying required, and as it was important that this work should be done before Spring break-up a contract therefor was let a short time ago and the work is now progressing. The provincial government have since called for tenders for the completion of the whole road and it is expected the contract will be let and the work commenced in a very short time. The construction of this road will enable those interested to take in machinery, supplies and equipment throughout the Summer and thus the work of mining development can continue without interruption. This condition of affairs is very much appreciated by the many who are now engaged in active operations and others who contemplate starting work at an early date.

This whole mining district north of The Pas is and has been for some considerable time attracting very general attention among mining men both in United States and Canada. Many of the best known and capable men in connection with the mining business have personally investigated or sent their representatives into this territory.

Further discoveries have been made and claims staked in other parts of the above mentioned areas, between Athapapuskow and Herb Lake, but no development work has yet been done thereon. Also in different parts of the northern territory outside this area, "finds" have been made from time to time at Island Lake, Piquitona, Kettle Rapids, Cross Lake and other places. Just what these amount to remains to be seen. But anyone who is at all familiar with the rock formation of this territory and who knows about discoveries which have already been made feels quite confident that this great country contains vast wealth in its mineral resources which are only waiting to be developed. The need of the country, however, is prospectors. Compared with other mineral districts which have been exploited the discoveries already made have been marvellous when it is considered how few people have been engaged in real prospecting work.

Were it not for the great war with its direct effect on the supply of men and money there would undoubtedly long ere this have been a big rush into the mining and mineral region of Northern Manitoba.

RESOLUTIONS PASSED AT NELSON, B. C.

Among a number of resolutions passed at the International Mining Convention held at Nelson, British Columbia, on May 18-19, which was one of the most important and largely attended gatherings of mining men ever held in Kootenay district, were the following:

(1) "That the serious condition created by the coal miners' strike in Western Canada is having a most disastrous effect upon all industries, which will shortly be paralyzed.

"Resolved that the Dominion Government be asked to take immediate temporary possession of all coal mines, now idle, or which may be idle, and operate them to their full capacity to produce coal and coke; that a commission be appointed at once with full power to take evidence on oath, and that full investigation shall be made as to who is in the wrong in the dispute between capital and labor, and whoever it may be, that the wrongdoers shall be compelled to do their duty, if necessary, under the application of military law. This convention takes no attitude on the question between capital and labor, but it believes that the prosperity of the whole Dominion, and possibly the success of the Allies in the prosecution of the war transcends in importance a dispute that should be settled by a power greater than either labor or capital."

(2) "Whereas, the Provincial Government has brought in a bill containing radical changes in the mining laws, resolved that this convention believes that any changes at this time would tend to discourage investment of capital, and that, before making any changes at any time the responsible officials of the Government should consult fully with miners' and mine owners' associations of British Columbia to the end that the knowledge thus gained by practical experience be incorporated in such amendments.

(3) "Whereas, following an address made here by Mr. Thomas French concerning the French electrolytic process, this convention is convinced that in such a process the country possesses a potential factor for economical recovery of vast reserves of zinc in complex ores. Resolved, that this convention recommends that the Dominion Government thoroughly investigate this process through the best technical knowledge available, and that if it be found practical, it be aided and protected by Government subsidy, to the end that these great resources of the Dominion be developed forthwith."

(4) "Whereas there are some 4,400 Crown granted mineral claims in the Province not being operated or improved upon.

"Resolved, that the Provincial Government be requested to devise a scheme of taxation that will enforce the development of Crown-granted mineral claims within a reasonable time."

(Note—It is probable that the number of unworked Crown-granted mineral claims in the Province would be found, on investigation, to be very much larger than is stated in the foregoing resolution.—E. J.)

(5) "Resolved, that the Government be asked to amend Chapter 162, R.S.B.C., so as to allow any tributary mining claim to have ore or any other material transported through any tunnel, adit, shaft, or other mining development, and over any tramway used for mining purposes, now constructed, or hereafter to be constructed, upon equitable terms and conditions as now provided for in this chapter at any and all times, when the owners of such tramway, tunnel, adit, shaft, or other mining development are not using such for their own purposes to full capacity of same."

RECENT LEGISLATION CRITICIZED.

Speaking at a meeting held at Nelson on May 12, Dr. W. O. Rose, member for Nelson electoral district in the Provincial Legislative Assembly, a member in opposition to the present Government, said concerning the bill referred to in No. 2 resolution, printed above:

"If this measure had been passed as it was introduced it would have been disastrous to the mining industry and in the form in which the Government finally forced it through the House it is not going to be of much benefit to the industry nor the prospectors that it purports to assist.

"In the form in which the bill was placed before the House by the Government it contained some very objectionable features. One of the most dangerous—and it still remains in the bill—is that which permits one of the district engineers to walk on the property of a prospector without his permission, have diamond drilling carried out and charge the expense against the claim. And the expense charged is to be double the actual cost of the work, plus 6 per cent. interest per annum."

Dr. Rose pointed out that under such terms as this in many locations a mere matter of 1,000 feet of diamond drilling would pile up against a prospector's property a charge of possibly \$8,000, which would be a first charge. And this could be done, under the Act, without the consent of the claim owner. He believed that such legislation was unjust and that it would tend to frighten investors as well as working a hardship on any claim owner who happened to have his claims drilled under such conditions. To carry out diamond drilling without the claim owner's consent was an interference with the rights of the individual which could not be supported by any sound argument. Yet the Act had been passed with this provision in it.

Then the bill as introduced had contained a "blue sky" provision for the protection of investors, which would have placed a tremendous power in the hands of an unscrupulous or incompetent government engineer to block any deal he cared to interfere with. It would have given engineers power to give a black eye not only to individual properties but to whole mining districts. The Opposition had succeeded in having some changes made in this provision, which it was hoped would make it less dangerous than it was in the form in which the Government had proposed to put it through.

Another point the Opposition had taken up in connection with the mining bill had been the districts allocated to the Government engineers. In many cases they were far too large. East and West Kootenay, for example, the richest and most productive mining section of the province, had been formed into one district with the engineer's headquarters at Revelstoke, the far north-western corner of the district. Dr. Rose recalled that he had endeavored to have the headquarters changed to Nelson, the most central point, instead of Revelstoke, a district which did not contain one producing mine. The Minister had said that the engineers should be given latitude in selecting their own headquarters, but the bill had gone through with Revelstoke as the headquarters for the whole of East and West Kootenay.

Touching briefly on the Government's bill to give the Minister of Mines power to build smelters, concentrators, sampling plants and all sorts of other plants, Dr. Rose pointed out that the Act did not provide one cent to do all this with.

CORRESPONDENCE

The B. C. Mineral Survey Bill.

Editor Canadian Mining Journal:

Replying to your letter of the 15th ult., concerning the provisions of Bill No. 11 (B. C. Legislature) Mineral Survey and Development Act, I am not sure how far provisions of this bill overlap presently existing arrangements. No doubt, it is an attempt to develop the latter and, theoretically, any overlapping would be adjusted.

Part 1, Section 6.—The qualifications mentioned are not sufficient; several years (at least five) in the field and on the administration of mining companies should be required.

Part 2, Section 11 (b).—Judgment is vital for carrying on the work referred to. By exercising the most excellent judgment results may still prove unsatisfactory. It is not just that a man should be forcibly placed under the necessity of incurring a liability, even to the loss of his property, through the failure of judgment of another party, viz., the Resident Engineer.

Part 3, Section 14 (1) and (2).—Assuming that semi-monthly payments are not generally enforced, it should be left to the option of the employers, considering that security is given, to pay monthly or semi-monthly. It is often most inconvenient and costly to pay semi-monthly.

Yours, etc.,

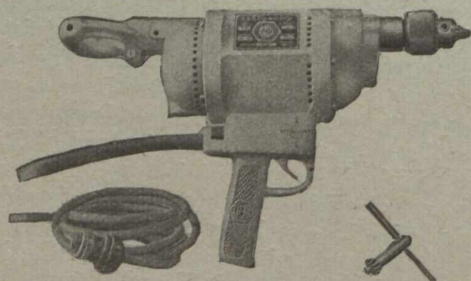
ERNEST LEVY.

Rossland, B. C., June 13, 1917.

ELECTRIC DRILL WITH SPECIAL CONTROL.

A special control which is designed to prevent the breakage of small drills when operating the close-corner electric drill is shown in the accompanying illustration. The operating scheme is similar to that of an automatic pistol, one finger doing the work. The grip need not be released to turn the switch or push in or pull out the handle at the moment the drill breaks through. The housings are cast from an aluminum alloy having a high tensile strength and resistance to distortion. The chuck is strong and rigid in design. The motor is of special design, and made by the Robbins & Myers Company of Springfield, Ohio.

The commutator and brushes are readily accessible by removing four screws, which enables the top cover to be slipped off. This cover does not carry the armature shaft bearing. This bearing and brushes are carried by an inner spider, which is protected from external injury or strains, tending to bind the bearing. Furthermore, this construction allows the drill to be run while the cover is removed for inspection of the



Drilling Machine that Protects Small Drills.

brushes and commutator, which is a great practical advantage to the upkeep of the tool. The Northern Electric Company, Limited, is the exclusive Canadian distributor of this outfit.

OBITUARY.

D. D. Cairnes.

The announcement of the death on June 14th, after a short illness, of DeLorme D. Cairnes of the Geological Survey, will come as a shock to many friends and acquaintances both in Ottawa and amongst the mining fraternity of Canada. Mr. Cairnes graduated in 1905 from Queen's University with the degrees of Bachelor of Science and Mining Engineer. Subsequently, he took post graduate work at the Royal School of Mines, Freiberg, Saxony, and at Yale University, from which he received the degree of Doctor of Philosophy in 1910. He was a life member of Freiberg Geologische Gesellschaft, a Fellow of the Geological Society of America, a member of the American Association of Science, a member of the Canadian Mining Institute, and also of various local associations. Mr. Cairnes was in his 38th year and was predeceased by his wife (nee Miss Florence Fenwick, of Kingston) who died in 1914.

Prior to 1905, when he joined the staff of the Geological Survey, Mr. Cairnes had already been engaged in mining and geological work in Canada and the United States. While a member of the Survey, with which he was still connected at the time of his death, his field of work lay in Western Canada, chiefly in Northern British Columbia and the Yukon Territory. He visited and reported on most of the mining centres of this important region and was ever active in endeavoring to aid and promote the mining industry. Besides numerous reports and maps published by the Geological Survey, Mr. Cairnes also contributed many important papers to the technical and scientific societies of which he was a member. His death at so early a stage of such a promising career is a great loss to the mining and scientific world and to the Geological Survey.

THE MINERALS SEPARATION SUIT.

The announcement of the decision of the Court of Appeals in Philadelphia in the case of Minerals Separation against Miami Copper is of considerable interest to users of the flotation process. As stated in the Canadian Mining Journal of June 1, the majority opinion was in favor of the plaintiff.

There seems to be a disposition on the part of some of our readers to accept this decision as one against the rights of users of the Callow cell. The decision in the suit against Miami Copper does not, however, mean that the Callow machine is an infringement. On this point Judge Wooley said:

"If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure, and constituted infringement; but in the process we are considering, and upon which the decree we are reviewing was based, the Callow cells were not the whole process, but were merely the last of four distinct parts of the process, the other three being the process of the patent or its fair equivalent. Having used the process of the patent in the first three steps in developing the potentiality of the critical quantity of oil and air, and bringing the pulp to a point where, if permitted, it would produce the result of the patent, we feel that the defendant cannot escape infringement by taking an additional step, even though that step, if taken alone, voids the patent."

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Hollinger.

The recent decision of the president of the Hollinger Consolidated to discontinue for the time being the payment of dividends on the outstanding capital stock of the company came somewhat as a surprise to many mining men and investors throughout the north country. It had been generally supposed that the reduced rate could be easily met and a tidy surplus built up.

It is the consensus of opinion now, however, that the policy is to build up a surplus as rapidly as possible so that in the event of still further labor shortage to the extent perhaps of forcing curtailment of production, development work could be gone ahead with and financed by the cash surplus on hand. The ore reserves of the mine are now understood to be upwards of \$35,000,000, and in a general way the physical conditions of the mine are better than ever before in its history.

Dome.

It is generally feared that the Dome Mines Company will at an early date follow the lead set by Hollinger in the matter of discontinuing the regular rate of dividend disbursement. The mill is running far below capacity and the grade of ore is not up to average. This latter fact is due to the inability of the present reduced forces to mine and raise ore from the lower levels of the mine where the grade of ore is comparatively high and which would ordinarily be used to sweeten the lower grade coming from the "glory hole." However, no official announcement with regard to dividends has been made.

Relief from Assessment Work.

The recent order-in-Council exempting for one year owners of mining claims from the compulsory performance of assessment work on all claims recorded prior to May 26, of the current year and on which work falls due prior to April 16th, 1918, has met with favor in this district. The measure is expected to result in more than the usual number of prospectors remaining at work at the producing mines instead of hitting the trail as is the usual custom at this season of the year.

Owing to the successful results being met with on the Anchorite property in Deloro Township, the Welsh claims are now being opened up. A small force of men are at work and arrangements are being made for the carrying on of diamond drilling operations to prove the property at depth.

Hollinger Reserve.

The shaft on the Hollinger Reserve property is nearing the 500-ft. level, to which depth it will be continued without delay. It is the intention of the company to do considerable exploration and drifting at this level. If the grade of ore warrants it, a small ball mill will be installed next fall. A considerable tonnage of fair grade milling ore has been placed on the dump from the 2,000 feet of underground work already accomplished. At the present time the vein is the full width of the shaft and free gold is of comparatively common occurrence in the working.

Coniagas.

It is now considered probable the Coniagas Mining Company will exercise their option on the Anchorite property at Porcupine. Two large veins have been opened up to a considerable extent. These veins are close together and it was also found that the rock intervening would prove of commercial value and could be profitably treated. It has been decided to move

the mining plant of the Agaunico Mines Development Company to the Anchorite. The plant consists of a six-drill compressor, pumps, hoists and other machinery.

Hayden.

The main shaft of the Hayden property is nearing the 400-ft. level. At the 300-ft. level a considerable amount of crosscutting was done with fair results. It is intended to do considerable lateral work when the 400-ft. level is reached. The property is equipped with a plant of sufficient capacity to carry development work to the 600-ft. level. Arrangements are being made to diamond drill the property. A new cage has recently been installed and is working smoothly.

Scottish Ontario.

A Montreal syndicate is understood to have purchased a controlling interest in the Scottish Ontario, which is situated in Whitney Township, about one mile north of Porcupine Lake and was one of the pioneer properties of the Porcupine camp. It adjoins the Bannerman on which some of the first gold in the district was discovered.

Wright-Hargraves.

At the 100-ft. level in the two shafts of the Wright-Hargraves property at Kirkland Lake, stations have been cut and the vein proven to be twelve feet wide at No. 3 shaft and twenty feet wide at No. 2 shaft. It is stated that values of \$30 per ton were found across the width of the orebody. No. 2 shaft, prior to machinery troubles, had been driven a depth of 150 ft. and the No. 3 shaft has reached a depth of 108 ft. The main vein has been opened up for a distance of 3,000 ft., along the zone in which is found the ore which is making the Kirkland Lake camp famous.

Schumacher.

Ore reserves at the Schumacher mines have increased nearly \$300,000 since the previous report was issued nine months ago. Nine months ago the ore reserves were estimated at \$396,700, whereas the latest report shows \$674,240. The operating statement showed that gross production amounted to \$169,186, as against \$153,777 in the last report. Development costs absorbed the greater portion of this amount, leaving \$15,747 net profit. \$10,000 was allowed for depreciation and other adjustments, and \$3,079 was carried forward to the surplus, against \$31,932 in the previous report. The balance sheet shows current assets amounting to \$85,016 as against current liabilities of \$21,820. Cash on hand is given as \$47,100. Total assets are \$1,948,719, as against \$1,557,532. The milling record shows the average grade of ore to have been \$5.24 per ton, and 35,271 tons of ore were treated. It is anticipated that by July the mill will be treating 180 tons per day, and, if developments warrant, this will be further augmented to 300 tons. The shortage of labor has had a deterrent effect on operations recently, but conditions are somewhat improved now.

Huronian.

The Huronia Mine, located in the Larder Lake district, has been taken under option by Montreal financial interests, and arrangements are being made for active development. The career of the property has been of a very checkered character. A mill was installed which never gave entire satisfaction and at times considerable high grade ore was encountered and a number of small gold bars have been turned out. The Timmins interests held an option on the Huronia at one time and considerable diamond drilling was done. A number of commercially valuable orebodies were encountered; but for various reasons the option

was not taken up, and the property has remained idle for some time. The holders of the present option will commence work immediately and hope to place the mine on a profit-earning basis.

Porcupine Miracle.

It is reported that the Porcupine Miracle Mining Company will resume operations before the end of June. A mill with a capacity of 150 tons per day was erected about two years ago and ran for about three weeks, when operations were discontinued. Two shafts have been sunk on the property. No. 2 shaft was put down a depth of 200 ft. and upwards of 600 ft. of lateral work was done. No. 4 shaft reached the 76-ft. level before the mine closed. In both these workings results were said to be very satisfactory. Altogether thirty-eight veins have been uncovered, the majority of which have only been explored on the surface. A saw-mill with a capacity of 6,000 ft. per day was also installed, as also was an electric lighting plant which supplies the mine with light. The mining equipment is complete in every department, including an assay office and laboratory, two 100-h.p. boilers and four-drill compressor, hoists, etc. The property is situated on the west branch of the Night Hawk river in the Township of Langmuir, and consists of approximately 480 acres. It is owned by a closed corporation.

Aurum.

Plans for more aggressive development work on the Aurum property in Munro Township close to the famous Croesus mine are now being arranged. A vein about four feet in width has been uncovered for a distance of over 200 ft. and is said to contain very good values.

Lucky Baldwin.

The shaft at the Lucky Baldwin property has now reached a depth of about 50 ft. The vein dipped out of the shaft at the depth of 40 ft. It is intended to sink the shaft to 300 ft. and establish a station at each 100 ft., from which lateral work will be carried on. The small steam plant recently installed is giving good satisfaction. The formation of this section is similar to that of the Kirkland Lake district and is thought to be an extension of the auriferous zone beginning in Lebel, crossing Teek Township, the north-east corner of Eby and the southwest corner of Grenfell. In the latter township the belt is comparatively narrow, but in places is found to be two miles in width in the other townships. Should the Lucky Baldwin prove a success, the intervening distance between the big Kirkland Lake properties and this one will be considered very promising, and it would not be surprising if a number of good properties were located between the two points.

Kenabeek.

The outlook at the Kenabeek Consolidated property in Auld Township is considered promising. In the crosscut about forty-six feet from the shaft a vein about two inches in width carrying leaf silver, cobalt and niccolite was cut. Within a few days it is expected the No. 3 vein, which is in evidence on the surface will be encountered. The crosscut is now about sixty feet from the bottom of the shaft. The No. 1 vein at the bottom of the main shaft was found to have cut off and faulted about forty feet towards the last vein encountered. Where picked up, however, the vein continues downward and is considered very promising.

Gowganda.

A new company, known as the T. C. 177 Mining Company, controlled by New York mining interests, and owning forty-two acres in the Gowganda district, adjoining the Miller Lake-O'Brien, has installed a

small plant and sinking operations are under way. A gang of ten men are employed on the property and a contract has been let to sink the shaft to the 300-ft. level, where lateral work will be undertaken. Already five veins which contain native leaf silver, have been uncovered, and a number of others showing cobalt and niccolite have been located.

Davidson.

Favorable results are being met with in the diamond drilling being done on the Davidson property in Porcupine. A drill working at the 300-ft. level of the mine is said to have encountered a body of ore upwards of twenty-five feet in width, in the walls of which free gold occurs. The average assay of the whole body however, has not been officially given out. The vein was located 186 feet from the 300-ft. level of the property.

Porcupine-Penn.

A new company, known as the Porcupine-Penn Mining Company has been formed to work the group of claims known as the Clerihue claims, in Ogden Township. The property consists of fifteen claims embracing approximately 600 acres.

Murray-Mogridge.

The machinery has arrived at the Murray-Mogridge and the shaft is being sunk at the rate of about four feet per day. At present the shaft is down about 80 ft. It is intended to establish a station at each 100 ft. and prosecute lateral work. The shaft will be sunk to the 300-ft. level as quickly as possible. The vein on the surface has been traced for a distance of 3,000 ft. and at the narrowest point is several feet in width. This is one of the largest veins uncovered so far in the north country.

Tough-Oakes.

The Tough-Oakes Mining Company, the pioneer mine of the Kirkland Lake district, is now understood to be producing at the rate of upwards of \$2,000 per day in gold bullion. The mill is running at a capacity of 120 tons per day and the recovery is averaging around 97 per cent. The tailings from the original mill are re-treated, and are being fed direct to the tube mill without going through the crusher or ball mill. The Tough-Oakes mine is considered to be one of the most completely equipped in the country. From two to four men are all the staff required in the mill. The present vein system consists of about fourteen veins running parallel, and the ore reserves approximate over a million dollars. A shaft is now being sunk on the No. 1 vein, and has reached a depth of nearly one hundred feet. About two hundred men are on the company's pay-roll, at the present time. About fifty more men could be used, and machines and equipment for this number are at the property; but owing to the scarcity of labor exploration work is being retarded. The power plant consists of two 250-h.p. compressors driven by electricity.

Kirkland Townsite.

A vein containing molybdenite has been uncovered on the Kirkland Townsite property, and although no free gold or high values have yet been encountered, the surface indications on the property are very promising. A shaft is being sunk and a number of good veins are in evidence, and the property has the appearance of developing into an important one. A large force of men are engaged.

Gold Reef.

Mining operations at the Porcupine Gold Reef property are being carried on under unique conditions for the North Country. The property has been under lease on a royalty basis for the past year and the men

who have been working it have been practically carrying on placer mining, the only difference being that the quartz was first blasted out of the veins. The main vein on which the bulk of the work was done is three inches in width and carried values as high as \$5,000 to the ton, while throughout this vein was very rich. T. J. Wright and four practical miners were able to make very good wages from their operations. The ore when blasted out of the rock is crushed by hand in a mortar, the resulting fines are then passed through a rocker, the waste removed and the gold is finally collected by amalgamation.

About 100-ft. south of this working is a vein five feet in width which can be traced for a considerable distance. A test pit has been sunk on this vein, and while it is well mineralized, it was found to contain very low gold values.

Wright Claims.

Results of recent test shipments from the Wright claims in the Township of Whitney, near Bobs Lake, have been so encouraging as to give encouragement for the installation of a small mill, which it is understood will take place in the very near future. A large dike of pyrites on the property will be more thoroughly explored.

McLean Claims.

A small gang of men are at work sinking a test pit on the McLean claims in the Township of Turnbull. Exploration work to the present time has proven very favorable. A test pit is being sunk on a well mineralized vein in which a little free gold is found at times. The vein cuts through the quartz porphyry formation. The McLean claims are owned by a syndicate of Pembroke men.

Sylvanite.

Operations on the Sylvanite property at Kirkland Lake have been suspended for the time being. The main shaft which had reached a depth of close to 100 feet was sunk between two veins. At the bottom of the shaft a crosscut was driven both north and south and the north vein where encountered about thirty-five feet from the shaft was found to be about eighteen inches in width and carried free gold and molybdenite. The other vein was located about the same distance to the south of the shaft, but was not quite so wide as the south vein. The formation and values encountered in the two veins were very similar to that found on the Tough-Oakes, containing free gold and molybdenite. No announcement has been made as to when operations will likely be resumed.

Miniker-Kirkland.

Up to the present some fifteen veins have been uncovered in development work on the Miniker-Kirkland property, and a small amount of free gold is showing in a number of the veins, which are well mineralized and characteristic of the Kirkland Lake producing area. The Miniker is south of and adjacent to the Lake Shore mines and as the veins on this property have a northeast by southwest drift it is considered highly probable that they will extend into the ground owned by the former company. A shaft is now being sunk on a promising vein. A number of men are also employed in clearing the land and already a large amount of the claims have been cleaned up. The main road from Swastika passes within a hundred feet of the north boundary of the property, and the camp buildings are located within a hundred yards of this road.

Lake Shore.

The Lake Shore Mine at Kirkland Lake is fast developing towards the producing stage. A large portion

of the machinery for the mill has been transported to the mine. The new installation will be similar to the mill now in operation at the Schumacher mine in Porcupine and will handle between 75 and 100 tons of ore per day. The process will be continuous counter current decantation.

Upwards of 3,000 feet of development work has been done and more than a thousand tons of ore between \$12 and \$14 per ton has been placed on the dumps. The main workings have reached the 300-ft. level of the mine and at this point the values were found to be higher than at the preceding level of 200 ft. At the 200-ft. level a crosscut has been driven north underneath the lake and two large veins were encountered. A drift has been driven 520 ft. on this vein and an ore shoot about four feet in width and 300 ft. in length has been opened up. At the 300-ft. level about 900-ft. of drifting has been done and the grade of ore has been determined to be of a higher grade than that on the 200-ft. level. At times the ore in the Lake Shore is very rich and a short time ago a sample which was considered to be the richest piece of ore ever found in the North Country was taken from this property.

Development work is proceeding rapidly and the results being met with are highly satisfactory. The Lake Shore is located between the Teck-Hughes and the Wright-Hargraves, and will benefit to a certain extent by the developments on these properties.

Chambers-Ferland.

Values obtaining on No. 18 vein of the Chambers-Ferland property of the Cobalt Aladdin Mining Company, about thirty feet above the contact in places run upwards of two and three thousand oz. of silver to the ton. The wall rock on both sides of the vein for a considerable distance also carries good milling values. This vein has every appearance of becoming one of the most important so far discovered on the property, and at the present time is showing up exceedingly well.

Belle Ellen.

The main workings of the Belle Ellen Mine in South Lorraine have now reached a depth of approximately 500 ft., and the shaft will be continued to the contact, which it is expected will be encountered at about 580 ft. The main vein which dipped out of the shaft some distance above the present depth is thought to be paralleling the shaft at a distance of about ten to fifteen feet. After reaching the contact a crosscut will be run to encounter this vein and determine the values at the new level. Work at the Belle Ellen is proceeding in a very satisfactory manner.

The Labor Situation.

Since the last issue of the Mining Journal the labor situation in the North Country is showing some signs of improvement and while there is very little scarcity of skilled mechanics, there is still plenty of room for a large number of muckers and rough laborers. The cry for men comes chiefly from the Porcupine and Kirkland Lake districts, and while energetic steps have been undertaken to get the required number it is only within the past couple of weeks that the results have been at all encouraging. The McIntyre Mine is about the only mine in the Porcupine district that has a full complement of men.

A meeting of the Miners' Unions throughout the North Country was held on the 17th and the demands for the adoption of the new schedule of wages recently submitted to the Mine Managers' Association was the subject for discussion.

Gold in Boston Township.

Recent important discoveries of gold in Boston Township augur well for the future of the district as a whole. Three important new discoveries have been made since the snow left the ground. The first of these new finds was on the Boston-Hollinger, which was a remarkably rich vein and is being developed at the present time. The second discovery was in the northeast corner of Pacaud Township close to the Boston line and was made on the Charleboise claims. This find also is reported to be very rich, carrying heavy in free gold. The third discovery followed closely on the other two, was made on the Charette claims a little east of the centre of Boston Township, and is reported to be very rich. A considerable amount of work has been done on these claims from time to time and a large number of test pits have been sunk on the property, but this is the first find of importance that has been made.

A large number of small operations are under way at the present time and before the snow flies again the camp will undoubtedly have become considerably advanced.

Silverado.

The installation of the plant at the Silverado is well under way and before the summer is much further advanced a large force of men will be employed here.

BRITISH COLUMBIA.

At the time of writing there is no change for the better in the situation so far as the strike of mine employees in the Crowsnest district of British Columbia is concerned. Mr. R. F. Green, M.P. for Kootenay electoral district, acting under authority from the Dominion Government, has been endeavoring to bring about a settlement of the matters in dispute between the United Mine Workers of America and the coal-mine operators, but no favorable result has yet been announced. Meanwhile work is being continued at mines in Ainsworth, Slocan, and Nelson districts, but there has not yet been a resumption of ore-production at Rossland mines, nor at the Granby Consolidated Company's big copper mines in Boundary district.

A review of mining sent out by the Spokane News Bureau, gives some information concerning dividends paid during the first half of 1917 by metalliferous mining companies operating in British Columbia. This assumes that the Hedley Gold Mining Company will at the end of June pay its customary quarterly dividend amounting to \$60,000, which it very probably will do.

The dividend payments during the expired portion of the current year are shown to have been as under:

Mining Company.	First Quarter.	Second Quarter.
Consolidated M. & S. Co.....	\$210,695	\$260,447
Granby Consolidated Co.....	374,962	374,962
Hedley Gold Mining Co.	60,000	60,000
Rambler-Cariboo Mines, Ltd... ..		17,500
Standard Silver-Lead Co.....		100,000
Utica Mines, Ltd.		32,000
	\$645,657	\$844,909

The total for the half-year is, therefore, \$1,490,566, according to the foregoing statement, but there is at least one omission, namely, that of the Le Roi No. 2, Limited, which on March 31 paid an interim dividend of one shilling a share, less income tax, the equivalent of which has in other years been shown as having been \$29,220, which would bring the half year's total to \$1,519,786. This compares with \$2,800,946 for the whole of 1916, and with \$1,586,820 for 1915, these two yearly totals being those printed in the official "Preliminary Review" for 1916, issued by the Provincial Bureau of Mines last February.

PERSONAL.

Col. Thomas Cantley has resigned as president of Nova Scotia Steel and assumed the office of chairman of the board of directors.

Mr. Frank H. Crockard, vice-president of Tennessee Coal, Iron and Railway Co., has been elected president and general manager of Nova Scotia Steel Co.

Mr. W. F. Jahn, mill superintendent at Tough-Oakes gold mine, has resigned to join the U. S. army. He is succeeded by Mr. A. H. Swanson, formerly of the McIntyre.

Mr. Vic Emery of the Hollinger staff, has resigned to enlist in the C. E. F.

Mr. Percy Hopkins of the Ontario Bureau of Mines, is at Tashota examining gold properties.

Mr. A. G. Burrows of the Ontario Bureau of Mines, is examining properties in Powell Township.

Mr. Edward Holgate, who has been chief draftsman with the Structural Steel Company of Montreal for the past seven years, has accepted a position as chief engineer with MacKinnon, Holmes & Company, Limited, of Sherbrooke, Que.

Mr. J. B. Tyrrell has been appointed Canadian representative for the Consolidated Mines Selection Co. of London, Eng.

Mr. Douglas A. Mutch, manager of the Hudson Bay Mines, Ltd., at Cobalt, has been appointed consulting engineer for the Dome Lake Mining & Milling Co., South Porcupine.

Mr. W. M. Brewer, of Victoria, has been appointed resident engineer in charge of one of the new mining districts under the Mineral Survey and Development Act of British Columbia.

Mr. Thos. Kiddie, a well-known metallurgist for years actively associated with smelting works in British Columbia, is on a visit to Vancouver. His home is now at Alhambra, California.

Mr. Thos. R. Stockett, of Nanaimo, B.C., has resigned as manager of the Western Fuel Company, owning big coal mines at and near Nanaimo, Vancouver Island.

Mr. F. S. Falconer, of the Topographical Division of the Geological Survey of Canada, is this season doing field work about Hazelton, Skeena region of British Columbia.

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Recent Publications

- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Quebec). Vol. III. Report on, by W. A. Parks, Ph.D.
- The Bituminous Sands of Northern Alberta. Report on, by S. C. Ells, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of the Mineral Production of Canada During the Calendar Year 1914 by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Salt Industry of Canada. Report on, by L. H. Cole, B.Sc.
- Electro-plating with Cobalt. Report on, by H. T. Kalmus, Ph.D.
- Electro-thermic Smelting of iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

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

- Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

GEOLOGICAL SURVEY

Recent Publications

- Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.
- Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.
- Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.
- Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.
- Memoir 84. An Exploration of the Tazin and Taltson Rivers, Northwest Territory, by Charles Camsell.
- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 88. Geology of Graham Island, British Columbia, by J. D. Mackenzie.
- Memoir 89. Wood Mountain-Willowbunch Coal Area, Saskatchewan, by Bruce Rose.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Map 59A. Wheaton, Yukon Territory.
- Map 60A. Wheaton, Yukon.
- Map 67A. Kirkfield Sheet, Victoria County, Ontario.
- Map 150A. Ponhook Lake Sheet, Nova Scotia.
- Map 175A. Ymir, Kootenay, British Columbia.
- Map 176A. Graham Island, Queen Charlotte Islands, British Columbia.
- Map 177A. Southern Portion of Graham Island, Queen Charlotte Islands, British Columbia.
- Map 180A. Espanola Area, Sudbury District, Ontario.
- Map 184A. Roberval, Lake St. John County, Quebec.
- Map 187A. Southern Plains of Alberta.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.
- Communications should be addressed to **The Director, Geological Survey, Ottawa.**

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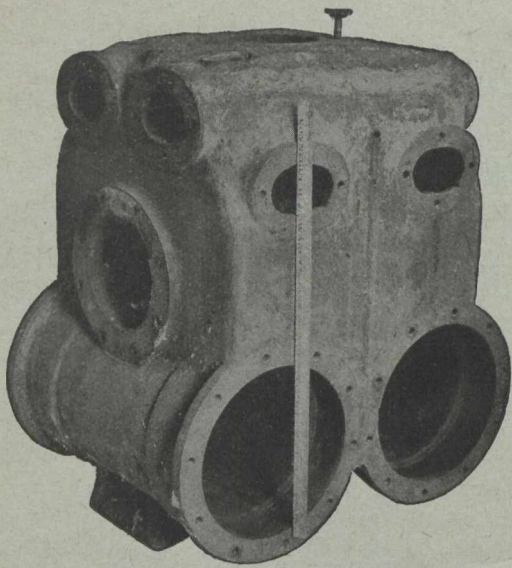
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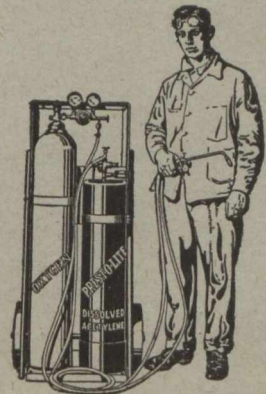
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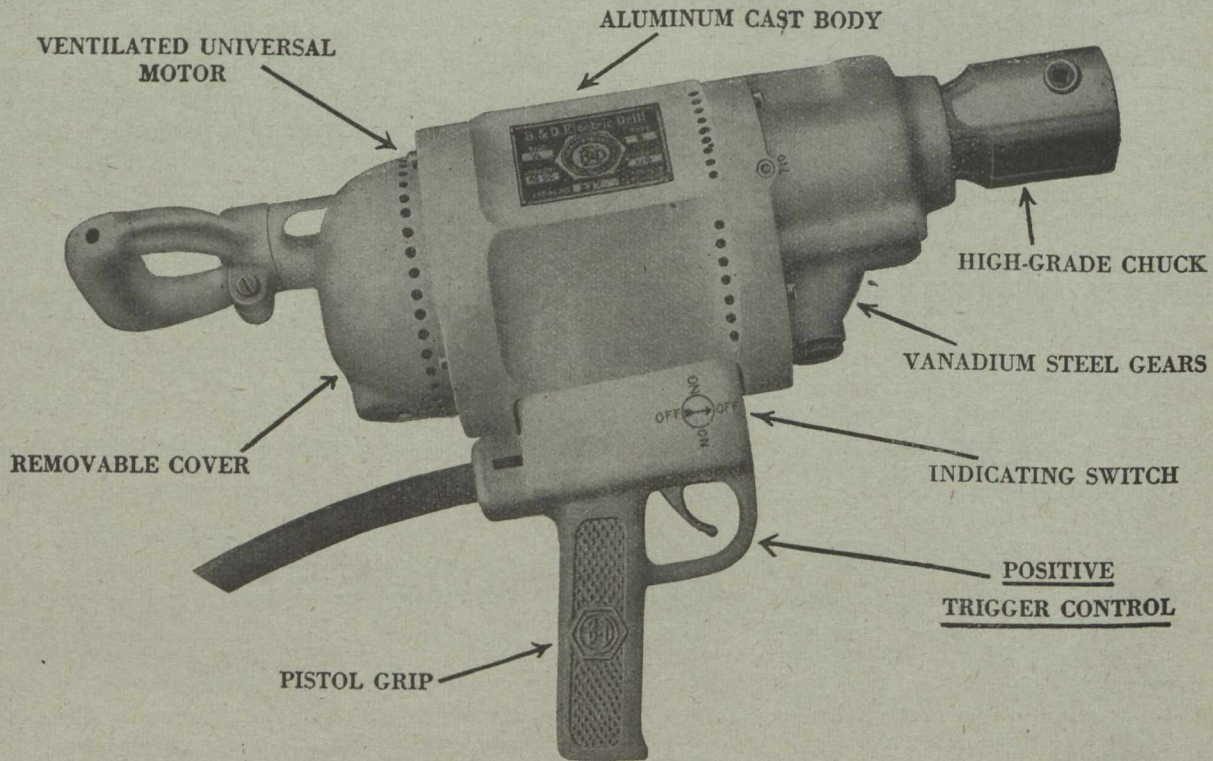
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On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for **air-froth flotation** to be valid, holding that this patent covers any process of froth flotation wherein the **results obtained** are secured by the use of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

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

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

NOTICE

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

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico.

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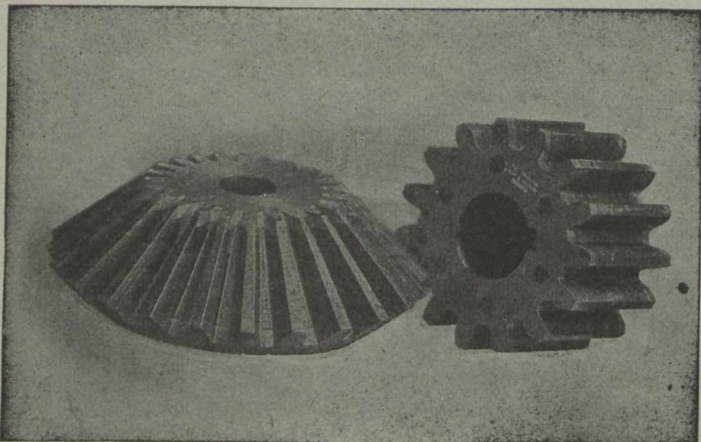
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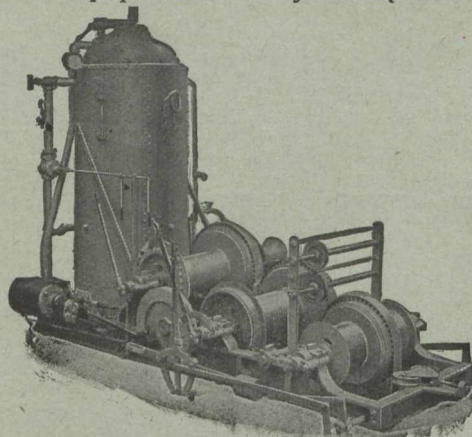


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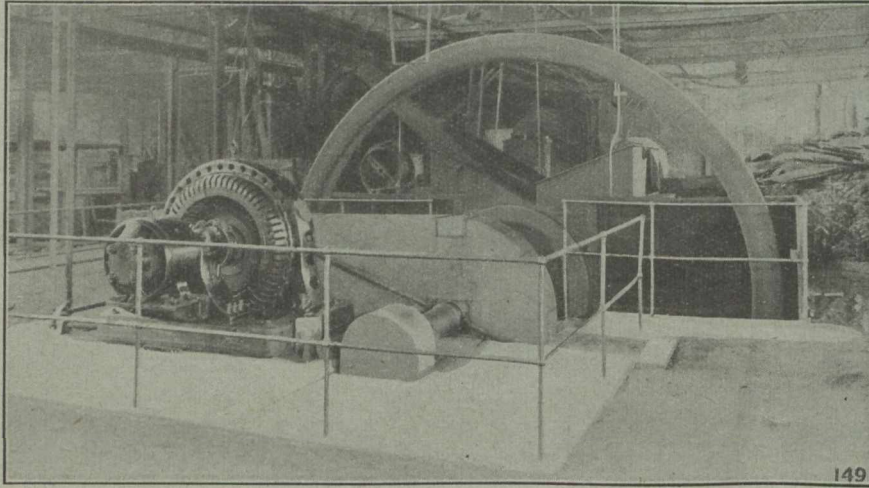
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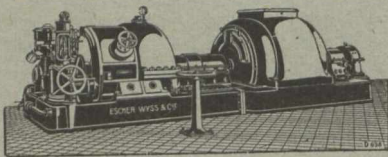
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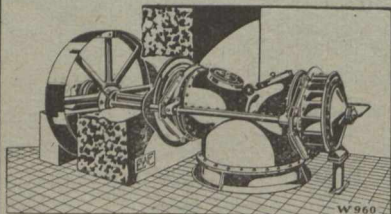
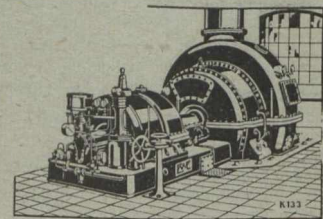
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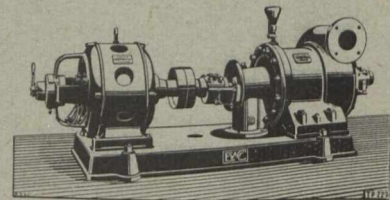
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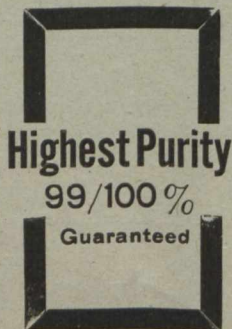
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Armstrong, Whitworth of Can., Ltd.
- Drill Steel Sharpeners—**
Can. Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
- Drills—Electric—**
Can. Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
- Drills—High Speed and Carbon—**
Armstrong, Whitworth of Can., Ltd.
Can. Fairbanks-Morse Co.
- Dynamite—**
Curtis & Harvey (Canada), Ltd.
Canadian Explosives.
Northern Canada Supply Co.
- Ejectors—**
Can. Fairbanks-Morse Co.
Darling Bros., Ltd.
Can. Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
- Elevators—**
Darling Bros., Ltd.
Jeffrey Mfg. Co.
M. Beatty & Sons.
Sullivan Machinery Co.
Northern Canada Supply Co.
Wettlaufer Bros.
- Engineering Instruments—**
C. L. Berger & Sons.
- Engineers and Contractors—**
Fraser & Chalmers of Canada, Limited.
Roberts & Schaefer Co.
Foundation Co., Ltd. of Montreal
- Engines—Automatic—**
Can. Fairbanks-Morse Co.
Smart-Turner Machine Co.
- Engines—Gas and Gasoline**
Can. Fairbanks-Morse Co.
Fraser & Chalmers of Canada, Limited.
Alex. Fleck.
Sullivan Machinery Co.
Smart-Turner Machine Co.
- Engines—Haulage—**
Can. Fairbanks-Morse Co.
Fraser & Chalmers of Canada, Limited.
Can. Ingersoll-Rand Co., Ltd
- Engines—Marine—**
Can. Fairbanks-Morse Co.
Smart-Turner Machine Co.
- Engines—Steam—**
Fraser & Chalmers of Canada, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
- Fans—Ventilating—**
Can. Fairbanks-Morse Co.
Fraser & Chalmers of Canada, Limited.
Jeffrey Mfg. Co.
- Feeders—Ore—**
Fraser & Chalmers of Canada, Limited.
- Flights—**
Hendrick Mfg. Co.
- Forges—**
Can. Fairbanks-Morse Co.
Northern Canada Supply Co., Ltd.
- Forging—**
M. Beatty & Sons.
Smart-Turner Machine Co.
- Furnaces—Assay—**
Lymans, Ltd.
- Fuse—**
Curtis & Harvey (Canada), Ltd.
Canadian Explosives.
Northern Canada Supply Co.
- Gears—**
Can. Fairbanks-Morse Co.
Smart-Turner Machine Co.
Northern Canada Supply Co.
Hull Iron & Steel Foundries, Ltd.
- Hammer Rock Drills—**
Mussens, Limited.
- Hangers—Cable—**
Standard Underground Cable Co. of Canada, Ltd.
- Hand Hoists—**
Darling Bros., Ltd.
Fraser & Chalmers of Canada, Limited
- High Speed Steel—**
Armstrong, Whitworth of Can., Ltd.
- High Speed Steel Twist Drills—**
Northern Canada Supply Co.
Armstrong, Whitworth of Can., Ltd.
- Hoists—Air, Electric and Steam—**
Can. Fairbanks-Morse Co.
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
M. Beatty & Sons
Fraser & Chalmers of Canada, Limited
Northern Canada Supply Co.
Wettlaufer Bros.
- Hoisting Engines—**
Can. Fairbanks-Morse Co.
Mussens, Limited.
Sullivan Machinery Co.
Fraser & Chalmers of Canada, Limited
Can. Ingersoll-Rand Co.
M. Beatty & Sons.
- Hose—**
Can. Fairbanks-Morse Co.
Northern Canada Supply Co.
- Ingot Copper—**
Canada Metal Co., Ltd.
- Insulating Compounds—**
Standard Underground Cable Co. of Can., Ltd.
- Jacks—**
Can. Fairbanks-Morse Co.
Can. Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
- Kiln Linings—**
Hull Iron & Steel Foundries, Ltd.
- Kominuters—**
Hull Iron & Steel Foundries, Ltd.
- Lamps—Safety—**
Canadian Explosives.
- Link Belt—**
Can. Fairbanks-Morse Co.
Northern Canada Supply Co.
Jones & Glassco.
- Locomotives—**
W. Fraser.
- Machinists and Founders—**
Hull Iron & Steel Foundries, Ltd.
- Metal Merchants—**
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.
Consolidated Mining and Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant Co.
- Monel Metal—**
International Nickel Co.
- Nickel—**
International Nickel Co.
- Ore Sacks—**
Northern Canada Supply Co.
- Ore Testing Works**
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.
- Ores and Metals—Buyers and Sellers of—**
C. L. Constant Co.
Geo. G. Blackwell.
Consolidated Mining and Smelting Co. of Canada.
Orford Copper Co.
Canada Metal Co.
- Perforated Metals—**
B. Greening Wire Co., Ltd.
Fraser & Chalmers of Canada, Limited
Northern Canada Supply Co.
Hendrick Mfg. Co.
- Pig Tin—**
Canada Metal Co., Ltd
- Pig Lead—**
Canada Metal Co., Ltd.
- Pipes—**
Can. Fairbanks-Morse Co.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Pacific Coast Pipe Co., Ltd.
Northern Canada Supply Co.
Smart-Turner Machine Co.
- Pipe Fittings—**
Can. Fairbanks-Morse Co.
Northern Canada Supply Co.
- Piston Rock Drills—**
Mussens, Limited.
- Pneumatic Tools—**
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
- Prospecting Mills and Machinery—**
Standard Diamond Drill Co.
Fraser & Chalmers of Canada, Limited

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Pumps—Boiler Feed— Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Northern Canada Supply Co. Canadian Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited Wettlaufer Bros.	Pumps—Vacuum— Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co.	Screens— B. Greening Wire Co., Ltd. Jeffrey Mfg. Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited Roberts & Schaefer Co.	Steel—Tool— N. S. Steel & Coal Co. Armstrong, Whitworth of Can., Ltd.
Pumps—Centrifugal— Can. Fairbanks-Morse Co. Darling Bros., Ltd. Escher Wyss & Co. Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd.	Screens—Cross Patent Flanged Lip— Hendrick Mfg Co.	Surveying Instruments— W. F. Stanley. C. L. Berger.
Pumps—Electric— Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Canadian Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited	Rails— W. Fraser.	Separators— Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co.	Tanks—Cyanide, Etc.— Fraser & Chalmers of Canada, Limited Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon, Holmes & Co.
Pumps—Pneumatic— Can. Fairbanks-Morse Co. Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.	Roasting Plants— Fraser & Chalmers of Canada, Limited	Sheet Lead— Canada Metal Co., Ltd.	Tipplers— Roberts & Schaefer Co.
Pumps—Steam— Can. Fairbanks-Morse Co. Can. Ingersoll-Rand Co., Ltd. Darling Bros., Ltd. Mussens, Limited. Northern Canada Supply Co. Smart-Turner Machine Co.	Rolls—Crushing— Fraser & Chalmers of Canada, Limited	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Transits— C. L. Berger & Sons.
Pumps—Turbine— Can. Fairbanks-Morse Co.	Roofing— Can. Fairbanks-Morse Co. Northern Canada Supply Co.	Shovels—Steam— M. Beatty & Sons. W. Fraser.	Tube Mills— Fraser & Chalmers of Canada, Limited
	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Smelting Machinery— Fraser & Chalmers of Canada, Limited	Turbines— Escher Wyss & Co. Fraser & Chalmers of Canada, Limited
	Rope—Wire— B. Greening Wire Co., Ltd. Allan, Whyte & Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited	Stacks—Smoke Stacks— Can. Fairbanks-Morse Co. Hendrick Mfg. Co. MacKinnon, Holmes & Co.	Valves— Can. Fairbanks-Morse Co.
	Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	Stamp Mills— Fraser & Chalmers of Canada, Limited	Winding Engines— Canadian Ingersoll-Rand Co., Ltd.
		Steel Barrels— Smart-Turner Machine Co.	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
		Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd.	Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.
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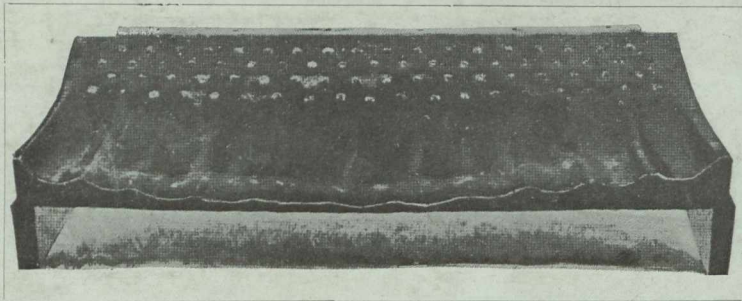
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