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November 1, 1917

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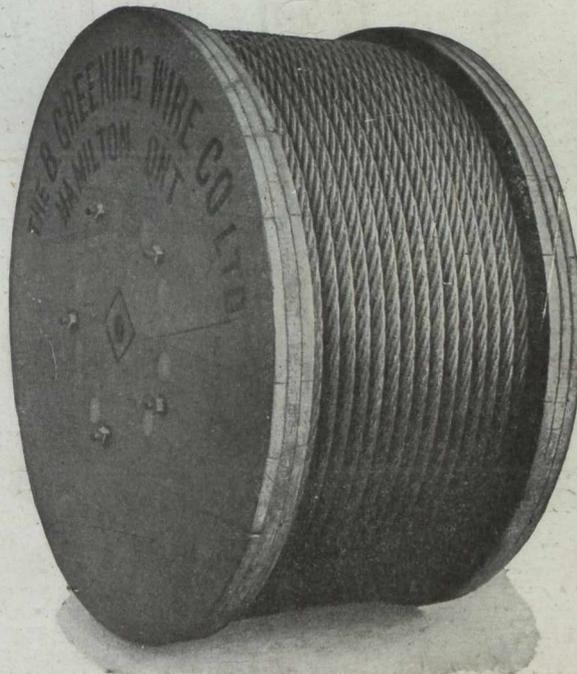
CANADIAN MINING JOURNAL

VOL. XXXVIII

TORONTO

No. 21

WIRE ROPES



HOISTING HAULAGE

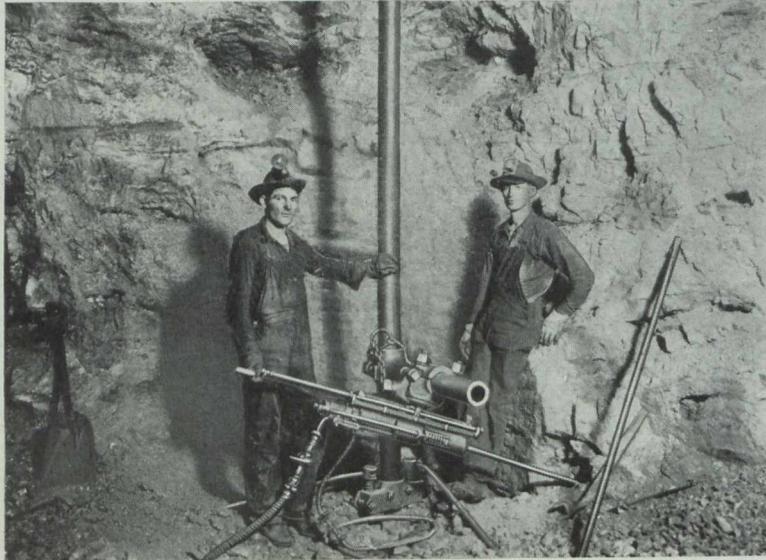
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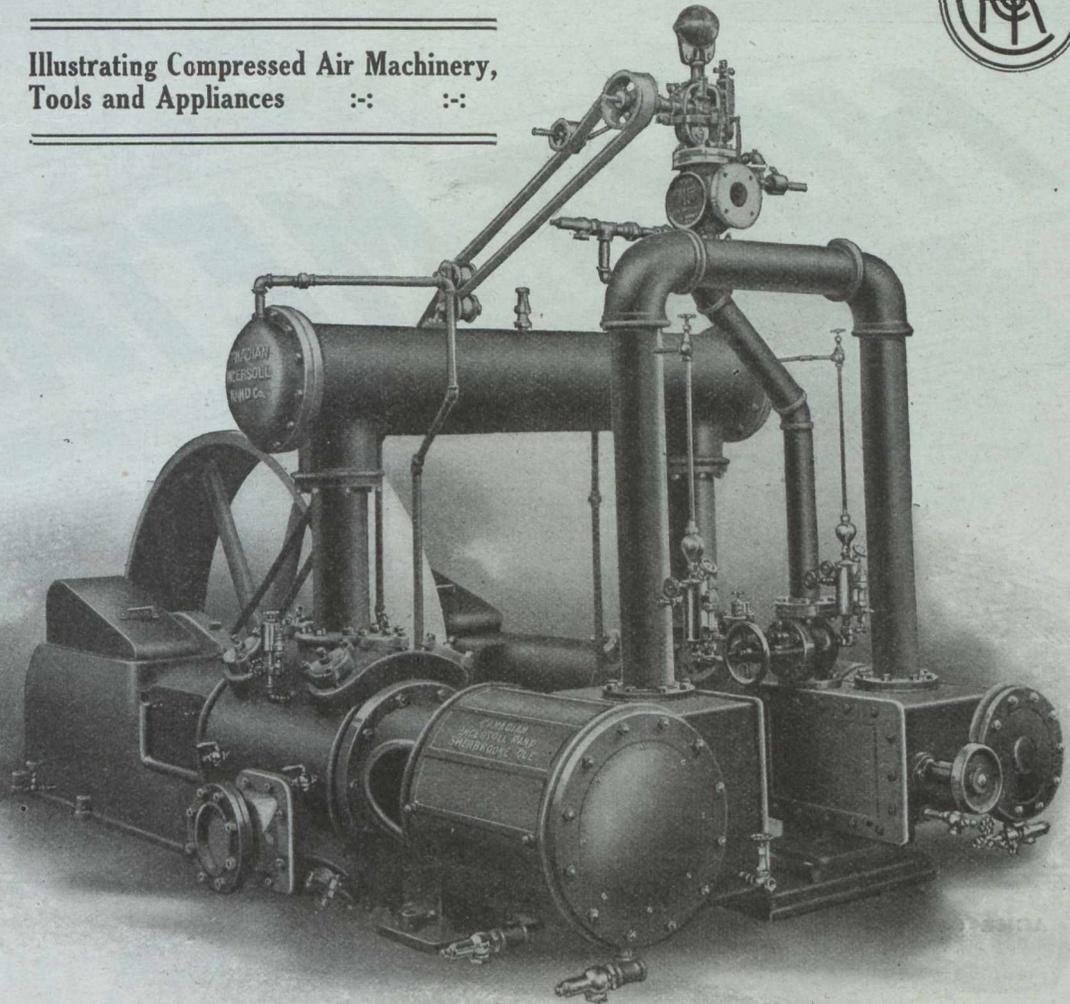
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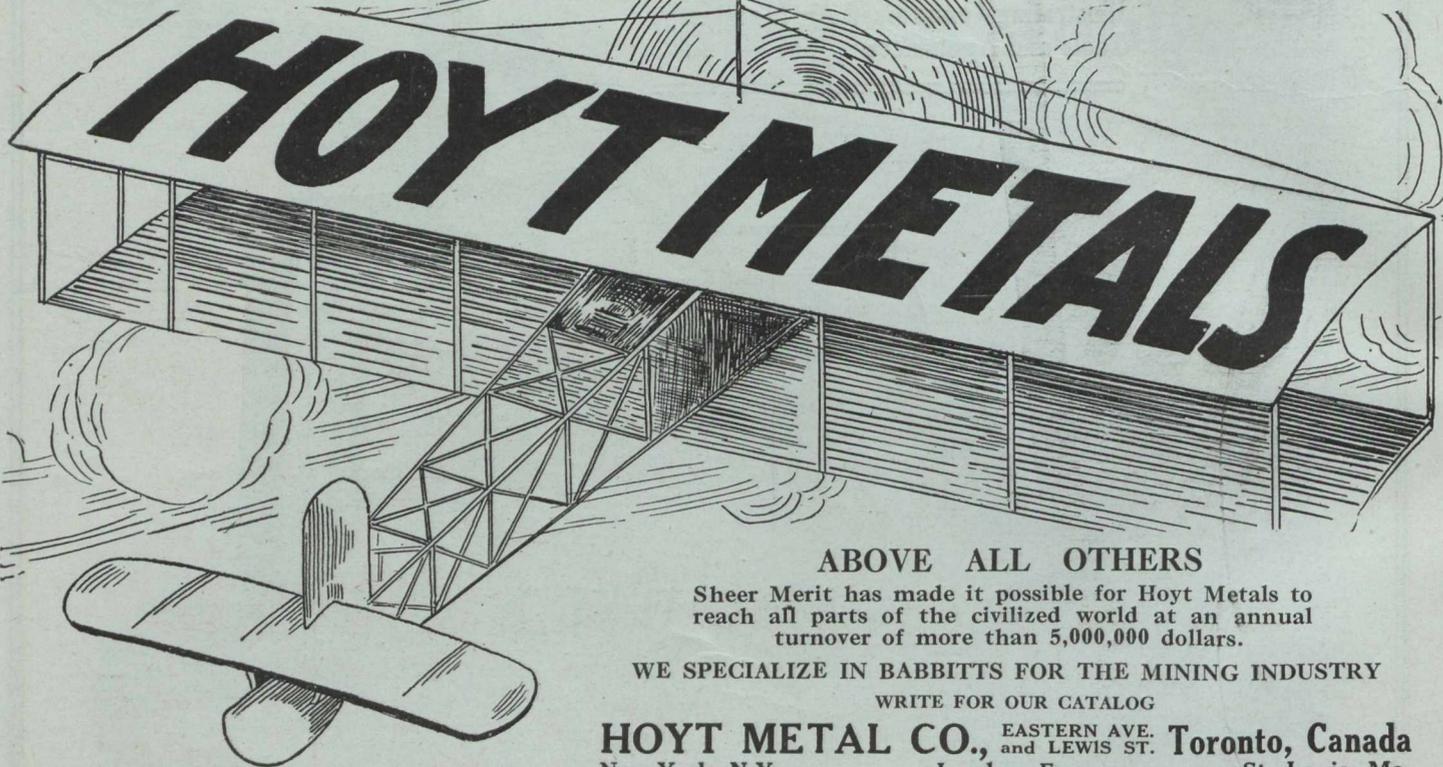
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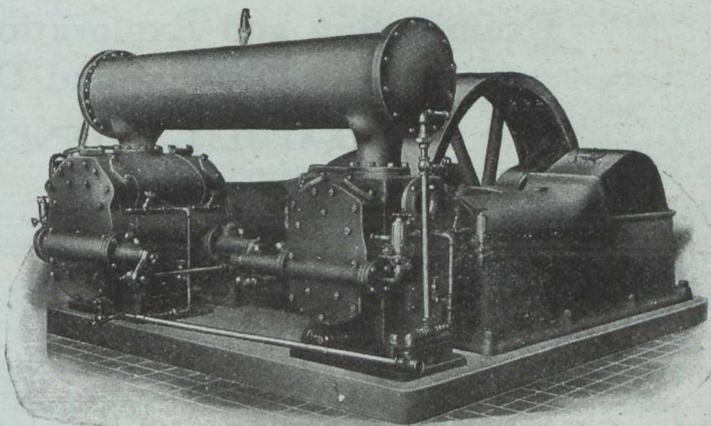
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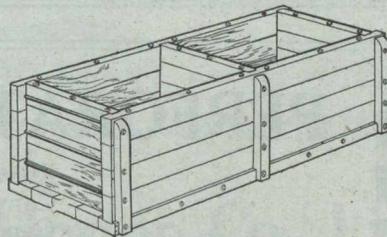
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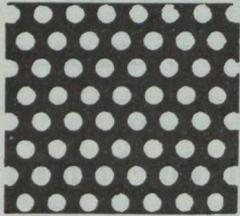
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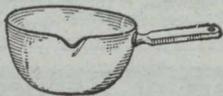
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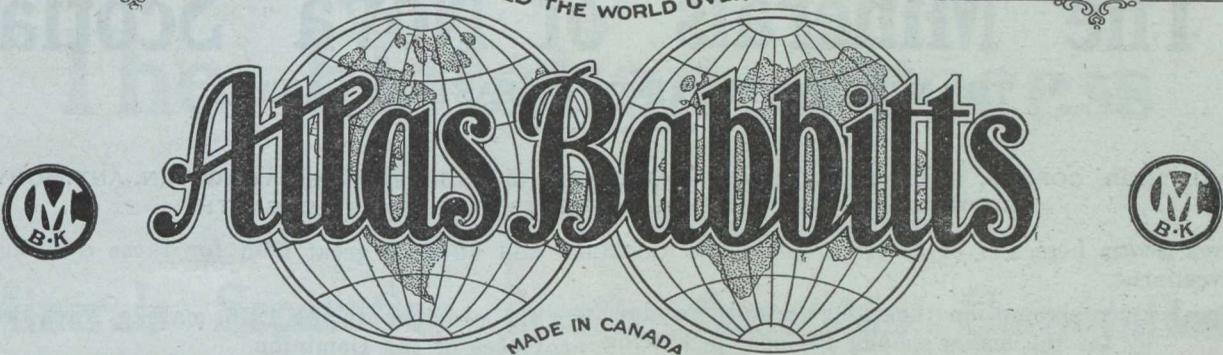
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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

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

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

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

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

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MINES BRANCH

Department of Colonization, Mines and Fisheries

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

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

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

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

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

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

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

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

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

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

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

HONOURABLE HONORÉ MERCIER,

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

The Flotation Process

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

Minerals Separation North American Corporation

who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

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

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

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

NOTICE

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

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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Aggregate Value of \$558,560,715

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

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

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

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

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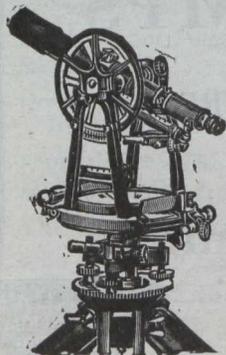
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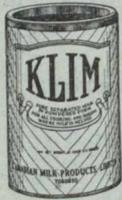
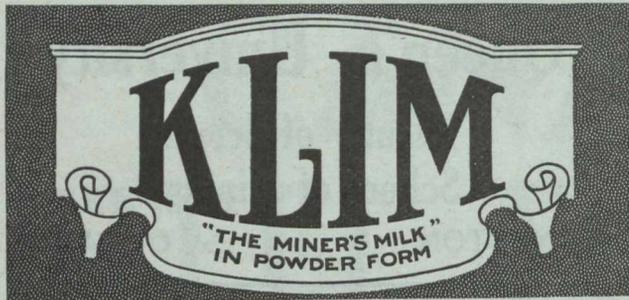
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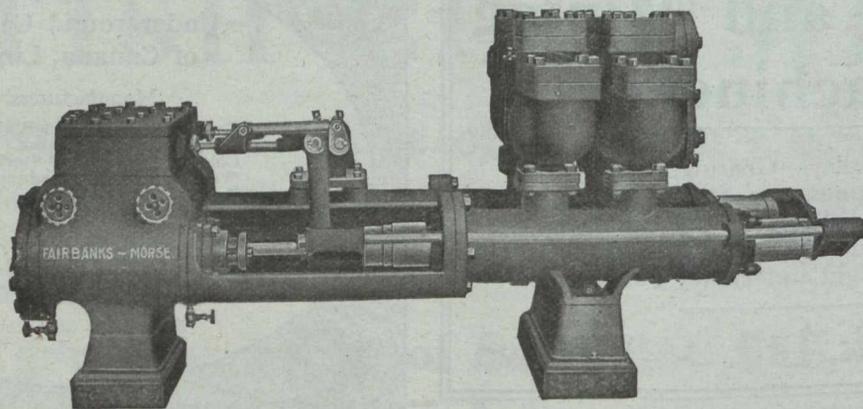
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THE CANADIAN MINING JOURNAL

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In its issue of October 20th the "Northern Miner" reprints several articles on the Minerals Separation corporations from "Mining and Scientific Press." These articles were read with much interest by those who desire to keep posted on flotation matters and the reprinting of them at this time in a Canadian paper should help to explain why mining men are always ready to fight the M. S. corporations. For unmitigated nerve there are few documents that class with the M. S. license.

THE RETURNED SOLDIER.

The problem of the returned soldier is one that must receive the best attention of those who, for one reason or another, have not shared in the stern work on the battlefields of Europe. These men fought for us. What are we doing and what can we do for them?

Already several thousand men, unfit for further work in the trenches, have been returned to Canada. A large percentage of these men will be able, and will wish, to resume their former occupations. Others are unable, and some unwilling, to take up their old tasks. The Military Hospitals Commission will doubtless be pleased to receive suggestions as to what should be done for these men.

The Commission has already accomplished much. Hospital accommodation in all parts of the country has been provided for, and the returned men are being cared for in the districts where they enlisted. Recently, the organization of the work of training the men while convalescent, and the providing for industrial re-education of those who want it, has been taken charge of by Mr. W. E. Segsworth, a Toronto mining engineer who is now devoting his well known abilities entirely to this work. With the co-operation of such men as Mr. F. H. Sexton, in the Maritime Provinces, and Mr. H. E. T. Haultain in Ontario, the Administrator of Vocational Training has begun his work in a manner which will meet with the approval of the mining profession. Mr. Segsworth is persistency personified. He is out to get a square deal for returned men and he'll get it.

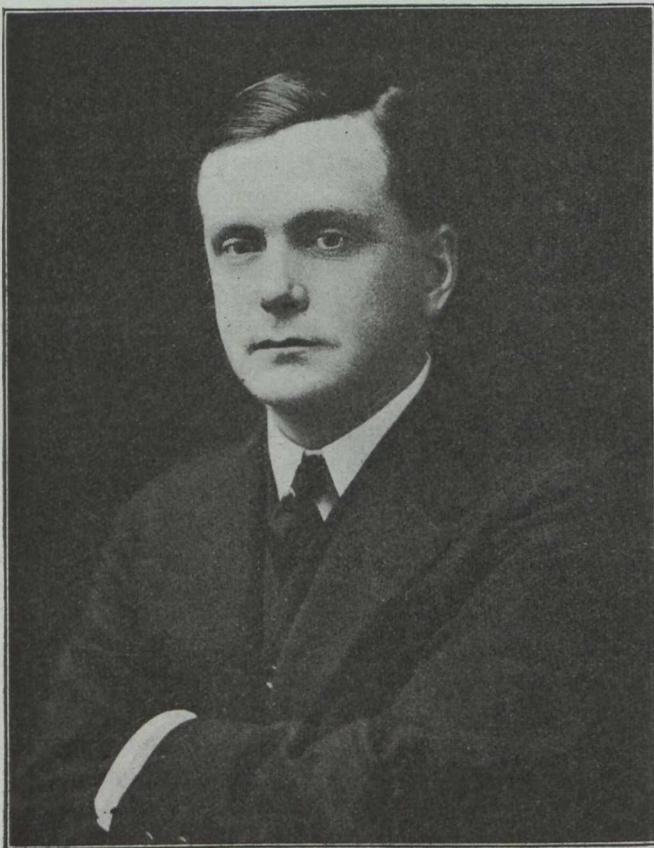
In this issue we publish an article, by Mr. H. M. Lamb, on the desirability of encouraging some of the returned soldiers to become prospectors. The suggestion is one which should be discussed. Obviously it would be a mistake to expect that many of the men who have already returned, will take up the prospector's work. These men have weakened constitutions. Their unfitness for further work in the trenches is an indication that the rough life of the prospector is not for them. There are exceptions, but we cannot fairly depend on disabled men for the pioneer work.

When the war is over, however, there will be many men among those who return who will be physically in splendid shape to undertake prospecting. Many of these men will be so "fed up" with trench life that camp life will have no attraction for them. Others who rather like the rough life will be not content with the loneliness of our northern forests; they will want to live where they will have many companions at work and play. There will fortunately be, among the re-

turned men, some who intend to search for minerals and others who might be persuaded to do so. To these we might well offer some inducements.

Mr. Lamb's suggestion, if carried out, would be a step towards the organized prospecting of the most promising parts of Canada. Provision would be made for training the men, for directing their efforts and for giving them financial assistance. It is a bold scheme that appeals to us, in spite of the difficulties that appear likely to be encountered in carrying it out.

The results of exploration in Canada during recent years are living proof that our mineral resources, when developed, will be a great source of revenue to the country. At the rate prospecting is now being carried on, it will be ages before our resources are properly utilized. Here is a chance to reward the returned soldier and at the same time speed up exploration. Why not seize the opportunity? Canada could well afford to be liberal to the returned soldier who is willing to face the hardships of life in the north.



W. E. SEGSWORTH
Administrator of Vocational Training.

The appointment of a Reconstruction and Development Committee is announced. This is an indication that problems affecting the welfare of the country are to be attacked systematically. The Committee is a strong one and its appointment will be welcomed. The War Cabinet has charge of the most pressing business of the country at present; but this Committee has also very important work to do.

INVESTIGATE THE MINERALS SEPARATION CORPORATIONS.

A correspondent, referring to the Minerals Separation controversy, says: "I am of the opinion that a thorough investigation of this company and all its antecedents, changes in directorate, stock held in trust, etc., is quite in order." With this opinion we entirely agree.

During the past few years there has been a growing suspicion among mining men in Canada and the United States that there was something rotten about the Minerals Separation activities in North America. For some reason, not yet satisfactorily explained, the American Syndicate continued to do business through Beer, Sondheimer & Co. This firm is, with reason, regarded as an alien enemy firm by Canadian mine managers. The directors of the American Syndicate must surely have been aware of this; but, until December, 1916, they did little towards acquiring for themselves a better odor. At that time a new corporation was formed in America and it was widely advertised that the Minerals Separation North American Corporation had acquired the M. S. rights for North America and that this American corporation had no agents. Strangely enough, at the same time that the New York office was sending out such announcements, the San Francisco branch was sending out letterheads on which it was printed that Beer, Sondheimer & Co. were agents. This, we have been advised, was an error in printing and was corrected as soon as it was noted by the head office, but it is an indication that the San Francisco branch was not, last January, of the opinion that the Beer, Sondheimer & Co. connection had been cut.

It is no secret that there was German influence in the Minerals Separation American Syndicate. Back in 1910 a syndicate formed to acquire an option to purchase within two years the rights of Minerals Separation, Ltd., for North America, and meanwhile to work the patents under license, included Albert Sondheimer, of Frankfurt-a-Main, Germany. In 1913, the Minerals Separation American Syndicate (1913), Ltd., was registered in London and one of the directors was N. M. T. Sondheimer, of Frankfurt.

That Germans should acquire stock in the British corporation is not surprising; but it is strange that a British corporation should, after the outbreak of war with Germany, continue to allow Beer, Sondheimer & Co. to represent it. This and other indications of German influence have led many to wonder whether the Germans put as many German directors on the board as their share ownership entitled them to. It leads us also to wonder who now owns the interest in the Minerals Separation corporations that was owned by the Germans a few years ago. We would like to know the

terms under which this property changed hands. Those who are asked to pay royalties have a right to insist on such matters being properly explained.

The Minerals Separation North American Corporation is an American corporation and under the survey of the American government. To accuse it of being German without first asking the American Government to investigate it, is hardly fair to that Government. We might as well accuse our American friends of being pro-German as accuse them of harboring a German controlled corporation whose object is to curtail production of minerals. The questionable behavior of the M. S. corporation before the United States joined the Allies is no excuse for lack of confidence in Americans now.

There are many reasons why Canadian mining companies should fight the claims of the Minerals Separation corporations. None of these reasons, however, warrants the publication of the charges made by the "Northern Miner" against the American corporation. Neither do they warrant the false charges made by the "Northern Miner" in reference to our part in the controversy.

In its issues of October 13th and October 20th, the "Cobalt Nugget" discusses the flotation patents in a manner that contrasts strongly with the false charges of the "Northern Miner." The "Nugget" presents some reliable information concerning the flotation process and patents and makes a good argument in favor of the companies which wish to use the process.

Owing to the fact that there was such a close connection between Minerals Separation American Syndicate, Ltd., and Beer, Sondheimer & Co., there is reason to ask for an investigation of the connection between these firms and the Minerals Separation North American Corporation. This American corporation is, we believe, entirely free from German control. We have, however, not been informed as to how the German interest was disposed of. We have not been assured that no German benefits in any way from royalties collected by the American corporation. Canadians will undoubtedly refuse to pay any royalty which directly or indirectly benefits a German. As there has been no satisfactory explanation of the disposal of the German interest in Minerals Separation American Syndicate, operators here have every right to ask the Canadian Government for an investigation. They have no right, on any evidence that has yet been presented, to accuse the American corporation of being German; but they can justly ask for some light on the transactions between Minerals Separation corporations and Beer, Sondheimer & Co.

MINERALS SEPARATION LICENSES.

The "Cobalt Nugget," on October 20th, published the following article on Minerals Separation methods. The claims of the M. S. corporations with regard to discoveries by users of the process seem ridiculous to Canadians and it is unlikely that support for them could be found under our laws. It would be foolish for anyone to subscribe to such a contract as this until it has been proved legal. If it has not been proved legal in Canada, and if the M. S. N. A. corporation insists on such a contract being signed before granting a license then the corporation is in effect refusing to grant licenses. The obvious penalty for such action should be demanded.

The controversy relative to the Minerals Separation North American Corporation has resolved itself largely into two questions, namely: (1) Is there alien-enemy ownership, control or influence in the affairs of the Minerals Separation North American Corporation. (2) Are the terms of royalty demanded excessive and out of proportion to what that corporation has done for making the process the success that it is and an attempt being made to monopolize one entire branch of science.

It is an undeniable fact that not only a few, but a great number of metallurgists have contributed fundamentally toward the successful development of the flotation process. What seems so unreasonable in the whole affair is that Minerals Separation endeavor to claim the rights of any further discoveries or improvements made whether by themselves or any person else. This is in part what they request a licensee to subscribe to: "The licensees shall during this license promptly communicate and explain to the licensors every invention or discovery made or used by them which may be an improvement, modification or addition to any of the inventions specified in the Letters Patent within this license or may be useful in carrying out any of the processes thereby protected or any addition thereto or modification thereof whether patentable or not which the said licensees may use or be or become possessed of. All such inventions and discoveries shall so be available for use by the licensees as if they were contained in the Letters Patent within this license and **subject thereto the licensors shall be entitled to have the full benefit of** and if obtainable to have Letters Patent for any such improvements or discoveries communicated to them by the licensees, which said Letters Patent **shall be and become the property of the licensors**, and the licensees shall render all assistance in their power for that purpose. . . ." (See section three of license.)

If this is not a deliberate attempt to monopolize one entire branch of science, for what purpose then was the word 'monopoly' coined. Minerals Separation own certain patents. Other individuals own somewhat similar patents. All have contributed fundamentally toward making the flotation process the success that it is. None have contributed wholly toward doing so. None should be permitted to monopolize a chain of discoveries evolved through years of toil and study by independent workers. In a measure, local enterprise solved the problem of the economic treatment of Cobalt ores. The problem was solved by an adherence to certain principles laid down by Frank Elmore, Minerals Separation and presumably many other metallurgists, coupled together with not a few separate and distinct new practical and scientific ideas developed by local ingenuity.

If the Minerals Separation or their subsidiary in America is British or American, it would be nothing short of a crime to annul a solitary right contained in their patents. But, if they elect to interpret liberty as "license" for profiteering, then just as surely as rights exist, they should be called to task and a curb applied. This curb would consist of the fixing of royalty terms by the Canadian Government.

In certain quarters it has been intimated that Minerals Separation North American Corporation affairs were influenced by alien enemies. However, the writer has not sufficient information at hand to support any such charge. But, no doubt those responsible for such charges are sincere, and if what they intimate can be proven to be correct, then there would be no course left open but to annul M.S.N.A. Corporation patents. This latter procedure would be made imperative, due to the fact that Canadian companies would not dare enter into any contract or dealings with such a corporation because of the severe penalties contingent upon "The Trading with the Enemy Act."

It, therefore, is plainly up to the Government. They must decide either that Minerals Separation North American Corporation is truly British and American, or is but a blanket personnel controlled by German influence. If the former, they must decide whether or not the rights conferred upon them in their patents are being paternally applied; but if controlled or influenced in any way by German brains, their patents should be annulled.

The writer has in the past, and will in the present as well as in the future endeavor to be fair to Minerals Separation, and wishes to reiterate the assertion that any question of nationality should be dealt with by the Government.

Our quarrel is against an apparently burdensome monopoly. Anything that tends to impede progress in the mining profession we will oppose. We directly charge Minerals Separation North American Corporation with an apparently deliberate attempt to mortgage the brains of the men who become their licensees. We directly charge that concern with retarding the progress of metallurgy.

Read the following Prussianized section 5 and 6 of the license a licensee or prospective licensee must subscribe to:

(5) The licensees shall not directly or indirectly during the continuance of this license nor at any time after the termination thereof dispute or object to the validity of the Letters Patent within this license or the novelty or utility of the inventions specified therein.

(6) The licensees shall not either directly or indirectly during the continuance of the Letters Patent within this license or any of them use the said inventions or processes or any improvement or modification thereof or addition thereto otherwise than in accordance with these presents, and the licensees hereby undertake and agree that they, their officials and agents, will not in any way directly or indirectly support or assist third or hostile parties in any litigation either against the licensors or any licensees of the licensors or against Minerals Separation, Limited, of London, Eng., or subsidiary or associated companies or successors owning patents in the British Empire or in any foreign countries for the inventions protected by the Letters Patent within this license, or its or their licensees, or by the licensors or said Minerals Separation, Limited, or said other companies, against others."

In other words the fruits of a licensee's intellect are not his own, they are Minerals Separation's, if that concern can enforce the lettering of their license. Surely such a pledge cannot be British. It would be difficult here to measure the embarrassment to which a licensee would be subjected during the future practice of his profession. He would always labor under the possibility of Minerals Separation contending that any stand relating to the subject matter of the agreement and brought forward by the licensee in his subsequent career, was a breach of his pledges. He would be honor bound to not even any time after the termination of the contract be permitted to utter adverse opinion regarding the validity, novelty or utility of the Letters Patent.

Has any set of individuals the Prussianized right to seal the future or muzzle the expanding or changing views of the budding intellect of Canada. Can Minerals Separation get support of the legality of such an attempt in this Dominion. Self respect of mining men of this country forms a barrier to their becoming a party to such a pledge. Self respect of the Government will surely not permit the continuation of the attempt. The discoveries resultant upon the intellect which flows through this particular branch of the channels of science must not be taken into impoundage by one set of individuals who, at their own discretion may permit them to become of use to the world or rule that they should stagnate in the pigeon hole of an obscure desk of New York's Broadway.

WAR CABINET AND RECONSTRUCTION AND DEVELOPMENT COMMITTEE.

Canada's War Cabinet is announced; also the committee of the Cabinet which will have charge of the domestic problems arising out of the war. The War Cabinet—technically known as the War Committee of the Cabinet Council—will have the Prime Minister as its president and Hon. N. W. Rowell as its vice-president. The other committee, which will be known as the chief reconstruction and development committee, will also have the Prime Minister as its president. Hon. A. K. MacLean, Minister without portfolio, will be vice-president.

The personnel of the two committees is as follows:

War Cabinet: Chairman, Sir Robert Borden; Vice-Chairman, Hon. N. W. Rowell, President of the Privy Council; Major-General Mewburn, Minister of Militia and Defence; Sir Thomas White, Minister of Finance; Hon. C. C. Ballantyne, Minister of Marine and Fisheries and Naval Service; Hon. C. J. Doherty, Minister of Justice; Hon. F. B. Carvell, Minister of Public Works; Hon. A. L. Sifton, Minister of Customs; Hon. P. E. Blondin, Postmaster-General, and Sir Edward Kemp, Minister of Overseas Militia Forces.

Reconstruction and Development Committee: Chairman, Sir Robert Borden; Vice-Chairman, Hon. A. K. MacLean; Sir George Foster, Minister of Trade and Commerce; Sir Thomas White, Minister of Finance; Hon. J. D. Reid, Minister of Railways and Canals; Hon. J. A. Calder, Minister of Immigration and Colonization; Hon. Arthur Meighen, Minister of the Interior; Hon. T. A. Crerar, Minister of Agriculture; Sir James Lougheed, Chairman of the Military Hospitals Commission, and Hon. Senator Robertson, Minister without portfolio.

RETURNED SOLDIERS AND PROSPECTING.

By H. M. Lamb.

The problem of suitably providing for the returned soldier, so that his past services may be rewarded while ensuring that in civil life he shall no less worthily serve the interests of the country, is being earnestly and energetically attacked. Various schemes have been proposed for encouraging and aiding him to settle on the land, and already plans have been well forwarded to carry these into effect. In the training of the disabled men for new vocations excellent work is being done by the Vocational Department of the Military Hospitals Commission, several of the chief officers of which, by-the-way, are members of the Canadian Mining Institute.

Among the occupations open to returned soldiers, and for which many would peculiarly be fitted after a course of training, and might readily embrace, is that of prospecting. In the training of men for this work our universities, the high schools in the mining districts, the Geological Survey and the Provincial Departments of Mines could also doubtless render effective assistance. Of course, the idea that after the war the soldier should be induced to turn his sword into a ploughshare is an admirable one. Many doubtless will take advantage of special opportunities that will be afforded them to settle on the land. To others, however, the routine of farm life will present few attractions. On the other hand prospecting as a career should appeal to the great number of the younger men who have a love of adventure and who desire to follow an active outdoor occupation, provided they be assured it will afford them a livelihood. The country, moreover, could expect to derive a distinct benefit from the experiment of fitting them for it.

After the war the utmost effort will require to be made to stimulate and increase production in order to offset or lighten the burden of debt the Dominion has voluntarily assumed in doing its part in the war. No other industry is potentially more capable of rapid expansion than is mining. During recent years prospecting has declined. The old-time prospector has, in fact, become extinct. The industry has greatly suffered on that account. The statement that vastly the greater part of the two great mineral-producing areas in Canada, namely, the northern extension of the Cordillera in the west, and that embraced within what is known as the pre-Cambrian shield in the east is practically unexplored, is a mere commonplace. The discovery of another "Klondyke," of other regions so uniquely rich as Sudbury or Cobalt or Porcupine would contribute materially towards the reduction of our heavy load of war indebtedness. Hence, it is surely worth while to devote some further effort and study to finding a satisfactory solution of the problem that some two or three years ago rather ineffectively engaged the attention of the Canadian Mining Institute of "How to Encourage Prospecting in Canada." Could not a solution be found in the present proposal?

It would seem that the Military Hospitals Commission have an opportunity here of initiating a service of the very greatest usefulness and importance. They could begin by training returned soldiers to become prospectors and they might even go a step further by appealing either directly, or through some other organization, for public support to give the men so trained a fair start. A special committee or commission might, for example, be appointed to organize through-

out the country small syndicates to grub stake parties of newly trained men to prospect in special areas as might be determined; or better results still might be obtained by the formation of a sort of National Exploration and Development Company directed by a board of competent engineers in whom the public would have implicit confidence. The appeal for funds could then be made not only on patriotic grounds, but on the inducement of future substantial profits to subscribers.

It will be objected, of course, that a necessarily perfunctory course of training will not make an efficient prospector of a man who has had no previous experience in this direction. This is probably true enough; but among the men who will return from overseas a fair proportion at any rate will have had some previous knowledge of bush life and there will be many, no doubt, who originally lived in mining camps and who will have done a certain amount of actual prospecting. Men of this stamp could be made first-class prospectors with very little schooling, followed by a season's field work under the direction of a qualified leader. Such leaders could be selected from among the young graduates of the Universities who have specialized in economic geology. This group is also well represented in the Canadian army. Thus by selection, in a comparatively short time a considerable class of professional prospectors could be graduated and their services turned directly to account in exploration. In the meanwhile the education of those requiring a longer course of instruction could be proceeded with, until eventually there would be produced an army of expert explorers to engage in this great and useful task of extending the boundaries of Canada's productive mineral areas and thereby helping to increase the general prosperity of the country. To carry out this programme to a successful final issue, however, it is essential that public interest be enlisted in the scheme from its inception.

AN "ENGINEER'S" ADVICE.

The following are extracts from a letter addressed to the superintendent of an Ontario mine. A copy of the letter was sent to us as an indication of the ability of a so-called engineer. The industry and the mining profession suffer from the activities of such men as this. His letter reads in part as follows:

"I have been shown some ore out of some stope in the property. Now, as a practical mining man, you must know that this ore has not been shot out of a gun or cannon, but has been fed in from some good ledge, and if you will closely examine the rock where this pocket came from, you will find a small stringer or vein that has fed the ore into its pocket. Closely follow this stringer by shooting, and you will find the ledge from which this pocket has come.

"There never was a pocket of ore found in solid rock that was not fed in by some stringer. It could not be otherwise. You may have to shoot all round to find this feeder; but find it you will. I have often found them with a candlestick, and merely found a little grit at first. Do your very best. You and I both want to make a great success of this mine, and I want you to be a success also. Never mind any men who worked there before. You and I of course know that you have to do exactly opposite to them, because they made an absolute failure of the property, whereas you must make a success."

FLIN FLON AND MANDY MINES, MANITOBA.

In the October 13th number of "Mining and Scientific Press," San Francisco, is an interesting article by Walter Karri-Davies on a visit to the Flin Flon and Mandy mines, Manitoba. We reprint some extracts here:

"We started from Winnipeg, Canada, by train for The Pas at 9 a.m. on the 6th of August and arrived at our destination at 8.30 next morning. The Pas is a frontier town, but it is clean and comfortable. Take a map of North America, find Lake Winnipeg, picture yourself standing on the northwest corner of the lake facing west. Walk 90 miles due west and you will come to the place where Sir John Franklin's sailors wintered. You may enter the little church and see the seats that his sailors carved, all of which are in good preservation. This is The Pas, in Manitoba, on the bank of the Saskatchewan river.

"At 1 p.m. on August 9th we started down the river on the 'Nipewin' of the Ross Navigation Co., Captain H. H. Ross in command. The Captain belongs to the cultured pioneer type. In normal times he spent part of his life shooting pheasants in England and the rest of the year shooting rapids on the Saskatchewan.

"Next day we arrived at Cumberland House, which is the oldest Hudson Bay trading-station in Manitoba, having been established in 1774 by Samuel Hearne. Crossing Cumberland lake and Namew lake we arrived at Sturgeon landing at the mouth of the Sturgeon river at 5.30 p.m. on the 11th. This trip can be done in 16 hours, but we were delayed owing to the necessity of tuning up the engines on a maiden voyage.

"The name Sturgeon landing expresses all there is to say about this spot. From here last winter the Mandy mine transported about 3,600 tons of high-grade copper ore over the ice from the mine on Schist lake, about 65 miles away, the ore being loaded on barges and towed to The Pas, whence it was sent by rail to the smelter at Trail, B.C., 1,200 miles away. I understand that the ore assays about 22 per cent. copper, 7 per cent. zinc, \$2 gold, and about 3 oz. silver per ton. A heap of about 1,500 tons of ore was still awaiting shipment. Messrs. H. C. Carlisle, D. M. Haynes and C. B. Morgan, together with 100 men and 92 teams of horses were responsible for this creditable piece of work of hauling the ore in the depth of winter over the ice.

"At 5.45 a.m. on August 12th we sailed forth from Sturgeon landing, our party consisting of Messrs. Jack F. Hammill, Henry C. Perkins, John H. Black, William Wallace Mein, the brothers Dan and John Mosher, myself, and four Indians, together with three canoes, tents, mosquito nets, eiderdowns, food, fishing tackle, guns, knapsacks, etc. The natives poled the canoes up the rapids with two of the party to help. The rest of us tramped for nine miles, the walking being over moss, which is called 'muskeg' in Canada. A two-horse wagon carried most of our equipment and one canoe, and we got on the wagon to cross Sturgeon river. Mr. Black took the opportunity of examining the bed of the river to see if it was suitable for a railway bridge. He decided it was, without delaying us. After walking another two miles, we came to Goose River, where we loaded everything into the canoes and sent the wagon back.

"On the way up the river we landed and lunched, and then crossed Goose lake, landing on Gooseberry island on the north side at 3.30, when we camped for the night,

having a swim in the lake before turning in. The island gets its name from the wild gooseberries growing on it. Starting at 5.45 on the 13th, we paddled most of the day, making several portages. Then we crossed Athapapuskow lake, a most beautiful sheet of water with many lovely islands, which look like botanical gardens. The formation in places was limestone, and in other places schist and quartzite. At 5.30 p.m. we arrived at the Mandy mine on Schist lake, a distance of about 65 miles from The Pas. We camped for the night on the mainland near the island on which the Mandy is situated. At the mine, which is owned by the Tonopah Mining Co., we found Messrs. Graham and Kennedy in charge, and they extended the courtesies that real mining men always offer each other the world over.

"The history of the Mandy mine is interesting. A discovery of copper had been made on the mainland, and at the point of the island, claims being staked by the Mosher brothers. Two other prospectors, F. C. Jackson and Sidney Reynolds, later paddled their canoe to the shore of the island. Reynolds went into the bush a short way and pulled up some muskeg, under which he found copper pyrite. Jackson had said to his mate Reynolds when they first went out prospecting, "Now, if we find anything worth while, I want it to be called the Mandy, as it is a name my wife fancies,"; so when Reynolds saw the copper ore he called out to Jackson, who was still in the canoe, "Well, here's your Mandy for you." The claim was pegged and registered in Jackson's name. He sold it to the Tonopah company for a 15 per cent. share in profits on condition that they develop it. Now he denies that Reynolds had any interest, and the case has been heard in court, but no decision has yet been given. I do not know what the legal position is, but what I do know is this, that when a man goes out prospecting, and discovers something of value, he should benefit by his discovery and it should not be in the power of any man to take this benefit away from him entirely.

"The Mandy is a glory-hole out of which 3,600 tons of ore has been taken. I understand about 20,000 tons of similar ore has been proved in the lode by diamond-drilling, besides 100,000 tons of disseminated ore that will require concentrating. In any case, there are some millions of dollars to be taken out of this property and I sincerely hope that those benefiting will recognize the moral, if not the legal responsibility to Reynolds, as I am satisfied that his story is substantially true.

"A trip in the canoe and a portage on the 14th brought us to Flin Flon lake, on which is situated the large copper, gold, silver and zinc deposits—now under option to David Fasken of Toronto. Several million tons of ore have been proved already by diamond-drilling. Here we found George Scarfe, of Nevada City, in charge. The name of Flin Flon was given to this property by one of the discoverers, who had read a book of this name, the hero having found a mine, a hole in the ground, out of which he eventually got untold wealth. The name will probably be changed, as it sounds a little too much like a gay lady robed in a modification of Highland costume, and it is thought that the name, like the costume, is not quite suitable to cover a proposition of such large dimensions. The North-Western Mining & Smelting Co. might be a more suitable name. It is too early to say what place this mine will take in the world; more boring is necessary. All that can be said at present is that it has held up to all that could be expected, and if it answers to its present promise it will be one of the big mines of Canada.

"The people of the Province of Manitoba and the Dominion Government will no doubt take steps to furnish the necessary transportation facilities. Power also will have to be developed. The new wheat railroad to Port Nelson will benefit if it has back freight from a thriving mining district.

"The orebody is about 200 ft. wide; it has been proved by diamond-drill for a distance of 2,000 ft. and to 600 ft. deep. The ore is wider southward where the last drill-hole went through it. Drill-holes show about 2 per cent. copper and 5 per cent. zinc, with \$2.50 in gold and 1¾ oz. silver per ton. It is recognized by those directing the enterprise that a larger tonnage of such an ore will have to be proved before it warrants the big expenditure necessary to develop a productive mine.

"Having spent a few days at the mine and enjoying the hospitality of Mr. and Mrs. Scarfe and Mr. and Mrs. Jack Callenham, we retraced our steps, carrying the impression that a new and important addition has been made to the mineral resources of Canada."

MINING IN NORTHERN MANITOBA.

Charles R. Miller, ex-governor of the State of Delaware, U.S.A., and vice-president of the Tonopah Mining and Subsidiary Companies, who is now making a tour to the companies' different properties, has just finished a visit to The Pas in connection with the Mandy Mining Company.

Mr. Miller expressed himself as being highly pleased with the progress that has been made and the results obtained by the company's operations in Northern Manitoba.

During Mr. Miller's stay here plans were made for the hauling of several thousand tons of ore from the Mandy Mine property at Schist Lake to the head of navigation during the coming winter, to be hauled to The Pas by boat next summer where it will be put on cars and shipped to the smelter at Trail, B.C.

Mr. Miller was particularly enthusiastic over the development of the many different enterprises being developed in connection with the mining industry of Northern Manitoba. He departed by Friday's train to British Columbia.—The Pas Herald.

A NEW USE FOR COBALT.

Widespread interest has been aroused by the announcement of the discovery of a tool steel stated to be equal in durability and hardness to high-speed steel, but of which tungsten, always difficult to obtain, is not a component. "Cobalterom," as the new steel is called, is made by adding cobalt to chromium-carbon steel. Thorough tests of the new alloy have been made in a large number of important works in England.

Cobalt was formerly used for its coloring properties, but in the past few years new uses have been found for it. It has advantages over nickel for electro-plating and is used to considerable advantage in the manufacture of high-speed tool steels. Stellite, an alloy of cobalt, chromium and tungsten, has proved to be superior to high-speed steel for many operations and it is claimed that it will allow of increasing the rate of cutting on the lathe from 20 to 50 per cent. and requires less time for sharpening the tools thus increasing the efficiency of shop production.

The increasing importance and use of this metal, in the production of which Canada has a monopoly, again emphasizes the importance of our mineral resources to Canada and the Empire.—W. J. D.

Hon. Frank Cochrane Understands That Flotation Patents Are Controlled by Germans in New York

The "Toronto Globe" quotes from Hon. Frank Cochrane's speech at Cobalt, October 24th, as follows:

"I understand that among other things in this country you have the flotation process, which is still controlled by Germans in New York, and they are putting such royalty on it that the mines in this country cannot use it. It will be my business to see Sir Robert Borden on the question, with a view to bringing them to their senses and for the benefit of the mining community to try to get him to cancel their patents.

"We must, however, be fair in the matter, for I believe in being fair even to an alien enemy, and the mines must therefore be prepared to pay a fair royalty. The best thing to do is for the mining men of the district to get together, with a view to getting a fair idea of the value of the patents and the royalty which would be considered fair."

The "Toronto World" quotes Mr. Cochrane as follows: "I understand that the flotation patents are still controlled by Germans in New York, and they are demanding such a royalty on the process that the mines in this country cannot use it. It will be my business to see Sir Robert Borden on this question, when I return to Ottawa, with a view to bringing the patent owners to their senses and try to get him to cancel these patents for the benefit of the mining community.

"We must, however, be fair in the matter, for I believe in being fair even to an alien enemy, and the mines must be prepared to pay a fair royalty if it is proven that the patent owners were not German controlled."

The "Northern Miner" sends us the following:

Hon. Frank Cochrane, who was Minister of Lands, Forests and Mines in Ontario before entering the Cabinet of the Dominion Government, stated at a "Win-the-War" convention in Cobalt on October 24th, regarding the patents on flotation held by Minerals Separation North American Corporation in Canada: "It will be my business to see Sir Robert Borden on the question with a view to bringing them to their senses, and for the benefit of the mining community try to get him to cancel their patents." He informed the meeting that if, after a thorough investigation, it were found that control was not vested in German alien enemies it would be the duty of the Government to see that the royalty imposed was so reasonable that it would in no way embarrass the industry or in any way retard the developments and production of Canada's metals. In this connection he suggested that the Government would appreciate the advice from mining operators in Canada as to what in their estimation would be considered a fair and reasonable royalty.

TORONTO BRANCH C. M. I.

At a meeting of the Toronto branch of the Canadian Mining Institute, held October 13th, the following committee for the coming year was elected: E. P. Mathewson, chairman, R. E. Hore, secretary, W. A. Carlyle, T. W. Gibson, H. E. T. Haultain, R. W. Leonard, G. G. S. Lindsey, Jas. McEvoy, W. G. Miller, W. E. Segsworth, C. E. Smith, J. B. Tyrrell.

The Origin of Sudbury Nickel-Copper Deposits*

By A. P. Coleman.

Oxygen and sulphur seem to play a somewhat similar part in their combinations with the metals, and compounds of both occur associated with eruptive rocks in ways which suggest that they were originally included in the molten magma; yet certain geologists make a wide distinction between oxides and sulphides in their interpretation of the field relations of these two types of ores. Every one accepts the role of oxides as highly basic portions of magmas which may be segregated when cooling takes place. No one disputes that the titaniferous magnetites and ilmenites associated with gabbros and anorthosites have been parts of the fluid magma from which these rocks were formed; and yet protests are raised against a similar interpretation of sulphides of iron, copper and nickel associated with pyroxenites, dunites and norites. The separation of oxide orebodies from a basic, or even somewhat acid magma, as in the case of the Kiruna magnetites, seems to arouse no hostility; but in some minds the suggestion that the Sudbury sulphide deposits have segregated from the norite with which they are everywhere connected seems to be instinctively objected to as if it were contrary to the laws of nature.

This prejudice against the magmatic origin of sulphide ore deposits is the more surprising when one recalls that the source of the sulphides themselves is always sought in eruptive rocks. For example, we are astonished that the zinc and lead sulphide ores of Missouri cannot be traced certainly and directly to some mass of eruptive. Even if we incline to account for them as derived from marine rocks, we assume that the sea obtained its sulphates from the leaching of former eruptive rocks. The great majority of metallic ores can be traced with certainty through the action of circulating waters to a source in some cooling eruptive mass; and yet some geologists cannot bring themselves to believe that sulphides may accumulate directly through gravity at the lower edge of a cooling magma. To them hot waters are a necessary intermediary.

Questions connected with the theory of magmatic segregation of sulphide ores have been discussed recently by several authorities, with conclusions that vary widely. Goodchild describes the Insizwa nickel ores of South Africa as undoubtedly due to gravitational segregation, and compares them with the nickel deposits of Sudbury. Tolman and Rogers also have made a very careful study of the subject, as far as this can be done by laboratory methods, and their plates give admirable illustrations of the final relations of the different minerals to one another in specimens from most of the known regions; but they seem to have been unfamiliar with the field geology of Sudbury, the most important of all. Their results are interesting as an attempt to harmonize the theory of magmatic segregation with that of replacement by hot solutions. The latest account of the Sudbury deposits, by Knight in the recently published report of the Royal Ontario Nickel Commission, inclines strongly to the aqueous theory. He evidently intended to present the matter impartially and summarizes the usual arguments for the magmatic origin of the ores, but his leaning toward

an aqueous origin is very evident. A little later in the same report the Alexo deposit of northern Ontario is unhesitatingly described by Baker as due to magmatic segregation, though his explanation differs somewhat from the one usually given for the Sudbury deposits. These writers express three entirely distinct and even contradictory views of the origin of sulphide nickel ores, two favoring the theory of magmatic segregation, two occupying an intermediate position, and the fifth favoring the theory of replacement by hot waters.

Knight discusses the matter extensively in a ponderous and on the whole excellent public report and may be supposed to have presented the strongest evidence possible for the theory of hydro-thermal replacement of rock forming minerals in the case of the Sudbury nickel deposits. It is proposed here to examine his evidence to see how conclusive it is.

So far as I am aware Knight's first published work on the Sudbury deposits had to do with the microscopic study of polished sections of the ores, in which a definite order of succession of the minerals was worked out and interpreted as due to circulating hot waters. The metallographic studies of Campbell and Knight were excellent, and their results are in many respects of permanent value; but it may be observed that most of the sections they examined were from offset nickel deposits, where there has been a great amount of faulting, weathering and rearrangement of the materials. That circulating water had much to do with the present condition of these offset ores no one doubts; and it is not surprising that Knight and others who approached the study of the deposits from the metallographic side were impressed by the evidence they presented of water action.

In the study of a complicated set of phenomena one naturally begins with the simplest and least changed examples and not with the more modified and complicated ones. Among the Sudbury ore deposits there are some which are relatively simple and unchanged, such as the Creighton and other great marginal mines, and the search for the origin of the nickel ores should begin with them. If the Creighton orebody was formed by magmatic segregation, all the others, no matter how much they have been modified since, must be accounted for in the same way.

In reading Knight's description of the Sudbury relationships one is struck by his defensive attitude. For instance the statements of T. L. Walker, Barlow and the present writer in regard to the magmatic segregation of the norite-micropegmatite sheet with which the ores are associated are accepted only with the complaint that "one is not able to say that there is a gradual transition from basic to acid rock as one goes from the outer to the inner edge." The idea seems to be that the admission of magmatic segregation in the rock hints at the segregation of the orebodies as well. The objection that the upper edge of the sheet is not quite so acid as the average micropegmatite leaves out of account the fact that much stoping and digestion of the overlying sediments has been proved, which must have modified the composition of the upper edge. In regard to the lower edge also there is a curious suggestion that the norite sometimes has a "gigantic dike-

*Reprinted from "Economic Geology," Vol. XII., No. 5.

like form," apparently another attempt to disarrange the magmatic machinery. This difficulty is easily met by the well-known proofs of faulting on a considerable scale along the southern nickel range. The objections to the segregation of norite from micropegmatite and to the sheet-like form of the eruptive are not pressed strongly; and to one who has worked in detail round the margin of the sheet have no weight whatever.

The arguments against the magmatic segregation of the orebodies in general are given more formally, and are somewhat surprising. For instance the statement is made that in marginal deposits "the commercial orebodies occur almost wholly in the rocks adjacent to the norite and not in the norite. The contact between commercial ore and norite is generally a comparatively abrupt one." Now the theory of magmatic segregation of ores by the aid of gravitation demands just this condition. The ores should be beneath the norite and in the hollows and fissures of the country rock. As to the second statement one finds a few pages later that at Creighton "some of the mineralized norite near the deposit contains from 1.5 to 2.5 per cent. of nickel and copper combined," showing that the gravitational separation was not complete.

To the statements of Barlow and myself that blebs of ore occur on a large scale in perfectly fresh norite where even the hypersthene is unchanged, the extraordinary objection is made that at some deposits "it is so badly decomposed and altered to a schist that it is difficult to distinguish it from other altered rocks." Surely the fact that some of the norite has been altered has nothing to do with the original condition of parts which are admitted to be "very fresh." This is an exact reversal of the correct line of argument. If large amounts of ore are scattered through perfectly fresh norite they must have been present in the magma before it cooled and crystallized.

The next objection is equally curious, namely, that quartz and calcite occur with the ores at several of the mines, such as the Garson and Crean Hill, indicating the action of water. These mines were proved by the present writer to have been greatly faulted and shattered after they were originally formed as marginal deposits. These later changes have naturally permitted the circulation of water, completely altering the character of the ores. In the case of the Crean Hill mine the deeper workings, below the planes of faulting, show an orebody of the ordinary marginal character.

Another singular argument against magmatic segregation at Creighton is this: "if the granite foot wall at Creighton is younger than the norite, then it was manifestly impossible for the sulphides to have settled from the norite upon this granite." But the granite has not been shown to be younger. Both Barlow and the present writer believed it to be older than the norite; but even if younger, of which Knight gives no proof, it is quite as possible for it to have pushed up beneath the orebody as anywhere else. In fact, as both Barlow and myself have shown, there are granites of more than one age in the region, some older and some younger, but they have no more bearing on the formation of the orebodies than the greenstones, older norites, and diabases found as country rocks at most of the mines.

The suggestion that there "are too many notable exceptions to the statement that the largest orebodies are found where bays of the norite project into the country rock" is quite incorrect. Of the two supposed

exceptions noted the Crean Hill deposit is shown by the plans of the mine to be in a small, well defined bay. It is only the surface parts of the ore, which have been faulted inwards for 200 feet or more, which suggest the opposite. As to the other supposed exception to the rule Knight himself explains the deposit as not alone below the norite but actually in the granite beneath it. On the other hand not a single deposit is found at an inward bend of the norite.

Another objection brought against the magmatic theory is the brecciated character of the country rocks enclosed in the ore. Surely there must have been enormous crushing and brecciation of the rocks beneath when the great norite-micropegmatite sheet forced its way between them and the overlying sediments. This brecciation is visible almost everywhere beneath the norite, both where ore occurs and where ore is absent, and evidently has nothing to do with replacement of rock by ore. Knight's own figures of brecciated rock fragments from the Creighton mine show exactly what might be expected when the hot molten ore enclosed them. They were expanded and shattered and one can see how they drifted apart in the ore. His account shows that these blocks are perfectly fresh, which could not have been the case if hot solutions had attacked them, replacing rock minerals by ore.

The magmatic theory explains the facts perfectly, and the aqueous theory is quite incredible for such deposits as the Creighton with perfectly fresh granite and older norite as fragments in the ore and forming the floor beneath, while the hanging wall consists of pyrrhotite-norite, often perfectly fresh also.

That hot water should replace millions of tons of norite and granite by ten million tons of sulphides, leaving even the smallest enclosed fragments fresh and unattacked, without depositing any of the usual gangue minerals, such as quartz or carbonates, and without a hint of banding or crustification is too much to claim. The facts are simply enough explained on the theory of magmatic segregation aided by gravity but impossible by any known hydro-thermal method.

The cubic miles of pyrrhotite-norite above the marginal deposits, often perfectly fresh, as Knight admits, and extending for 2,000 feet away from the hanging wall of the Creighton mine, as he also admits, are surely inexplicable by aqueous action. In reality isolated blebs of ore, sometimes scattered one in a square foot or in a square yard, extend away beyond this limit.

It is hard to see how anyone, after a careful study of the Creighton orebody and its surroundings, can deny the strong probability, if not the certainty, that it was formed by settling out of the norite magma as matte settles from slag; and if this is admitted for the great and scarcely changed marginal deposits it must be admitted also for faulted marginal deposits, like those of Crean Hill and Garson, where water has worked over and re-arranged the materials, and for the offset deposits as well, every one of which is accompanied by more or less pyrrhotite-norite, still recognizable by its "pock-marked" character, though such easily changed rock minerals as the pyroxenes are now replaced by hornblende.

The immense amount of ore scattered as small isolated spots or blebs through the norite above the marginal deposits seems unaccountable by the ingeniously worked out theory of Tolman and Rogers also. These separate spots of ore enclosed in fresh norite and often separated from one another by several inches or even feet of rock could not have been introduced "at a late

magmatic stage by a partial replacement of the silicate minerals." These sulphides must have been present when the rock itself cooled and consolidated, and no theory which does not account for the cubic miles of pyrrhotite-norite near the basic edge of the Sudbury eruptive sheet can be accepted as solving the problem of these greatest of all nickel deposits.

Most geologists who have studied the Sudbury region are satisfied to accept the theory of magmatic segregation aided by gravity, the ores settling down directly into the hollows and fissures of the rock beneath; but there is a possibility that the process was not quite so simple as this statement might suggest. Ernest Howe's idea that the ore of the Creighton mine came in as a later intrusive deserves consideration and is supported by Baker's conclusion that the solid ore of the Alexo mine arrived later than the ore disseminated through the serpentine. While this theory will not account for the pyrrhotite-norite and pyrrhotite-peridotite of the two regions it may well be added on to the usual theory to explain certain features of the deposits where solid sulphides come rather sharply in contact with the hanging wall. The sulphides fuse at a much lower point than norite and must have remained fluid long after it had become pasty or even solid. It is evident that there was much shifting and readjustment of the country rocks during and after the intrusion of the great sill, and one can imagine the jostling of the still liquid ore in one direction or another from time to time as the blocks shifted.

At a later stage, when the ore itself had solidified, further cooling would imply shrinkage and continued adjustments including some faulting, giving entrance in some places to hot waters producing chlorite, talc and other secondary minerals from basic rocks and depositing more or less calcite and quartz with occasional seams or masses of galena or sphalerite; features displayed in faulted marginal mines and also in most of the offsets. Under these circumstances the ores also would suffer some attack and the most susceptible of them, chalcopyrite, would be somewhat segregated along the sides of enclosed rock fragments or in the fissures due to fracturing or cooling of the country rock. Thus the faulted marginal deposits of Crean Hill and Garson, and the offset deposit of Copper Cliff are richer in copper than in nickel, unlike the scarcely modified marginal mines, such as the Creighton and Murray, which contain far more nickel than copper.

Last of all came fissures in both ore and rock filled with dikes of diabase which were rapidly chilled against the cold ore and have a glassy margin. These dikes have had no appreciable effects upon the orebodies except to interfere a little with mining operations.

The sequence of events briefly sketched above is in good agreement with the theory of magmatic segregation under the influence of gravity but quite unintelligible on the assumption that all the ore deposits are due to hot circulating waters.

WILL SINK SHAFT AT THE PAS MINES.

The Pas, Man., Oct. 12.—Hal. G. Kennedy, representing The Pas Mines Consolidated Company, on Tuesday, let a contract to Archie Close for the sinking of a fifty-foot shaft, 4 x 6, by eight feet in the clear. The contractor will furnish all the necessities required. Mr. Close went north to Herb Lake by last Muskeg, and expects to commence work on the 20th.

ASSOCIATE COMMITTEE ON MINING AND METALLURGY.

The Honorary Advisory Council for Scientific and Industrial Research announces the appointment of an Associate Committee on Mining and Metallurgy. The members are: Frank D. Adams, Ph.D., D.Sc. LL.D., F.R.S., Chairman, Dean of the Faculty of Applied Science, McGill University, Montreal; S. F. Kirkpatrick, M.Sc., Vice-Chairman, Professor of Metallurgy, Queen's University, Kingston, Ont.; Major Charles L. Cantley, B.Sc., Acting Works Manager, Nova Scotia Steel & Coal Co., New Glasgow, N.S.; A. A. Cole, B.Sc., M.A., Mining Engineer, T. & N. O. Railway Commission, Cobalt, Ont.; C. V. Corless, M.Sc., General Manager, Mond Nickel Co., Coniston, Ont.; Th. Denis, B.Sc., Superintendent of Mines for the Province of Quebec, Quebec, P.Q.; Charles Fergie, Esq., President, Intercolonial Coal & Coke Co., 413 Dominion Express Bldg., Montreal, P.Q.; A. R. Globe, Esq., Assistant General Manager, Hollinger Gold Mines, Ltd., Timmins, Ont.; George E. Guess, M.A., Professor of Metallurgy, University of Toronto, Toronto, Ont.; J. C. Gwillim, B.Sc., Professor of Mining Engineering, Queen's University, Kingston, Ont.; E. H. Hamilton, B.Sc., Consulting Metallurgist to the Consolidated Mining & Smelting Co., Trail, B.C.; H. E. T. Haultain, C.E., Professor of Mining Engineering, University of Toronto, Toronto, Ont.; A. Mailhot, B.Ap.Sc., Professor of Geology, L'Ecole Polytechnique, 228 St. Denis Street, Montreal, P.Q.; E. P. Mathewson, B.Sc., General Manager, British America Nickel Corporation, 8 King St. E., Toronto, Ont.; Lieut.-Col. D. H. McDougall, LL.D., General Manager, Dominion Steel Corporation, Sydney, N.S.; J. G. Morrow, Esq., Inspecting Engineer, Steel Company of Canada, Hamilton, Ont.; J. Bonsall Porter, Ph.D., D.Sc., Professor of Mining Engineering, McGill University, Montreal, P.Q.; Fraser D. Reid, B.Sc., Manager, Coniagas Mines, Ltd., Cobalt, Ont.; W. Fleet Robertson, B.Sc., Provincial Mineralogist, Victoria, B.C.; F. H. Sexton, S.B., President, Nova Scotia Technical College, Halifax, N.S.; A. Stansfield, D.Sc., Professor of Metallurgy, McGill University, Montreal, P.Q.; John T. Stirling, Esq., Chief Inspector of Mines for Alberta, Edmonton, Alta.; R. H. Stewart, B.Sc., Consulting Mining Engineer, 736 Granville Street, Vancouver, B.C.; J. B. Tyrrell, B.Sc., M.A., Consulting Mining Engineer & Geologist, 534 Confederation Life Bldg., Toronto, Ont.; O. E. S. Whiteside, M.Sc., General Manager, International Coal & Coke Co., Coleman, Alta.

TO RECOVER SULPHUR.

Many processes have been tried for the economic recovery of sulphur from smelting gases with greater or less success, but it is now reported that sulphur is to be produced by a new process from sulphur dioxide in smelter gases at from \$12.00 to \$13.00 per ton. The waste gases from Sudbury have been estimated to discharge into the air over 100 tons of sulphur per day. Canada possesses no known deposits of sulphur that are of economic importance but there are large reserves of pyrites which contain a high percentage of it.

The development of new processes for its recovery is of special interest to Canadian manufacturers of sulphite pulp and newsprint, now that supplies from Sicily are cut off by the scarcity of ocean tonnage, whilst those from the United States are restricted by the recent imposition of an export license by the United States government.—W. J. D.

CORRESPONDENCE.

WANTS LOWER FREIGHT RATES ON PYRITES.

To the Editor of the Canadian Mining Journal:

Sir,—In your article on the A. I. M. E. meeting at St. Louis, there is considerable space devoted to the increase of production of pyrites, which is essential in making munitions and as a fertilizer.

In publication No. 167 of the Mines Branch, "Pyrites in Canada, Its Occurrence, Exploitation, Etc.," on page 38 the following information is given:

"The consumer's requirements in the vicinity of the Great Lakes alone, including also some points that can be reached from lake ports, is in excess of two hundred thousand tons suitable for acid making. From the report of the Canadian Department of Customs we find that more than half the Canadian pyrites which is exported finds its way to the eastern market, hence the tonnage which reaches the Great Lake market is very small. On the other hand we find that Spanish ore is transported to lake points by rail from the Atlantic seaboard.

"Insomuch as freight rates to ports on the south shores of the Great Lakes are comparatively low from any Ontario points at which pyrite deposits occur, it would appear as if this section of the United States market offers great possibilities to owners of pyrite deposits in that province.

* "In the Lake market Canadian pyrites of suitable quality should command a price slightly higher than in the New York market, the difference being in freight rates."

This publication was printed in 1912, since which time there has been a bigger demand than ever for Lake pyrites.

Having spent two years in the vicinity of the Great Lakes and developing pyrites with good success, I have come to the conclusion that the only way to make the mining of pyrites a possibility is by reduction in freight rates on our transcontinental lines leading into Fort William. This seems to be the main drawback, and the one which seems to frighten the American chemical companies from purchasing pyrites in the vicinity of the Great Lakes, unless the pyrites is laid down at the dock at Fort William. There are very few mining companies in Canada who develop or will help to develop pyrites. The result is we must turn to American chemical companies, or American capital, or leave the properties idle. If one wished to contract for delivery of ore to American ports with absolutely reliable companies, he could sign up for anything from fifty thousand tons per year to five hundred thousand tons. This of course would be divided among three or four companies.

There is at present one pyrite property working in this vicinity. This property is shipping one hundred thousand tons of ore annually. Authentic information, received from those in charge, indicates that freight rates, delay in getting cars, etc., cut the profits to almost nothing, and if it were not for the profits made through production of sulphuric acid this company would cease to operate the property.

If we could get lower freight rates, there is no doubt several properties would open up in the near future.

Yours, etc.,

R. C. GAMBLE.

English, Ont., Oct. 22, 1917.

EXTRACTION OF POTASH FROM FELDSPAR.*

By Hoyt S. Gale.

Potash salts can be readily extracted from silicate or alumino-silicate minerals by any one of several processes. To-day, as 50 years ago, the difference between the cost of production and the market price of the product must determine the practicability of extracting it. Feldspar averaging 10 per cent or more of potash can be obtained, but as it is required in very large quantities and must be obtained by cheap methods of mining, which do not require hand sorting, it is somewhat doubtful whether even the most promising deposits will yield material that would average much more than 7 per cent K_2O . The expense of handling and treating large quantities of such rock in order to recover the small percentage of water-soluble potash it contains has seemed well-nigh prohibitive—at least it has not yet been possible to market any such product in competition with the foreign potash salts. A number of projects are on foot, however, to produce potash from silicate materials, and these projects should not yet be condemned because of their temporary failure to achieve commercial results.

Potash in a form that is insoluble in water—the form in which it occurs in igneous rocks or is fixed in sedimentary rocks—is usually considered unavailable for use in the manufacturing industries or in agriculture. Doubtless much of the potash that is contained in soils has been liberated from insoluble form by slow mineral decomposition, but it seems that for immediate and practical use as fertilizer potash must be in water-soluble form, and this form is demanded by the fertilizer industry. Although there has been some controversy over the matter, it is now generally assumed that a potash-bearing rock, even if it contains more than 3 per cent of insoluble potash, is of very doubtful value as fertilizer until it has been so treated that the potash has been made soluble and so available for ready assimilation by plants. Neither are the insoluble forms of potash available for use in manufacturing industries. The problem of making insoluble potash soluble and thus available for use in agriculture and in manufactures has therefore been widely and carefully studied.

The statement has been repeatedly made that the supply of potash-rich silicate rocks, particularly feldspars, is inexhaustible. This statement is undoubtedly true if the stated content of potash is not set too high. Some bodies or areas of pegmatite might supply large quantities of feldspar, but careful investigation of developed deposits has shown that the rock worked contains a large proportion of quartz and soda-bearing feldspar and that the feldspar which carries 10 per cent of potash can usually be obtained only by careful hand sorting, which increases the cost of mining and puts a limit on the output from any particular deposit.

A critical examination of many known deposits of feldspar pegmatite indicates that not so much of that rock carries a high percentage of potash as has been commonly assumed, although much pure feldspar can undoubtedly be obtained by sorting the rock from certain large pegmatite dikes, some of which may afford material to support the commercial production of potash and alumina.

*Extracts from bulletin "potash in 1916," published by U. S. G. S., Washington.

THE ZINC ORE EMBARGO.

Nelson, B.C., Oct. 24.—Asked regarding the embargo on shipments to Trail smelter of lead ore which contains more than four per cent. zinc, S. G. Blaycock, assistant general manager of the Consolidated Company, stated today that the purpose of the embargo was not to force the mine owners to cut down the zinc contents of their ore to four per cent., but to reduce lead ore shipments. This was necessary, he explained, because the company had a great stock of lead ore piled up and the market for lead in Canada has decreased. Storage capacity was exhausted, and it was therefore absolutely necessary to reduce lead ore shipments.

Instead of refusing to take any lead ores, Mr. Blaycock continued, the company had offered to accept those which did not contain more than four per cent. zinc, the idea being that at least some of the mines could ship some of their higher grade ore and thus meet their payrolls. There was no intention to force the mine owners to cut all ore down to four per cent. zinc. The company realized that this could not be done. The idea, he repeated, was to curtail lead shipments, with the least possible injury to the country.

Curtailement of lead shipments had been the more necessary by the fact that the company was unable, owing to decrease in munitions orders, to sell its lead output in Canada. It had enough ore on hand to keep it busy until the first of the year.

Mr. Blaycock stated that J. J. Warren, managing director of the company, was now in the east and was attempting to find a market for lead. He expressed the hope that this might be accomplished.

Montreal, Oct. 18.—Some time ago the Consolidated Mining and Smelting Company advised outside British Columbia silver ore shippers that it could not accept any further shipments at the Trail smelter owing to the fact that the company was overstocked and did not expect accumulated supplies to be cleared off before December. The management did not consider that the suspension of their purchases would seriously affect the mining situation. Meantime, the receipts from the company's own mines have been growing, and according to the report for the first week of October the receipts amounted to 12,594 tons, an increase of 2,040 tons over the preceding week, and suggesting that the company is getting back to the swing in shipments which existed before the strike.

The suspension of customs purchases of ore has, however, evidently disturbed the independent mines in British Columbia. According to a Victoria, B.C., despatch today, urgent appeals by telegraph continue to reach Hon. Wm. Sloan, Minister of Mines, in connection with the situation arising over the refusal of the Trail smelter to accept any more silver ore carrying over four per cent. in zinc. From all the districts of the interior come the same story, that unless the position is relieved quickly the closing down of many of the silver-lead mines in British Columbia will be a certainty. The Minister despatched a telegram to Premier Brewster urging the necessity for representations to the Federal authorities, and suggesting that he take it up at Ottawa.

Three new Sullivan publications have made their appearance during the past month as follows:

Mine and Quarry for August. Bulletin 75-C, Sullivan WJ-3 and WN-4.

Angle Compound Compressors. Bulletin 75-F, Sullivan Class WC Tandem Compound Steam Driven Compressors.

LADYSMITH SMELTING WORKS' SALE TERMS.

Mr. Wm. Gardner, of London, England, secretary of the Tyee Copper Company, Ltd., spent several months of the latter part of last year on Vancouver Island, British Columbia, in connection, as it eventually transpired, with negotiations for the sale of the Tyee Copper Company's mining property and smelting works. He returned to England late in December and about two months afterward his report on what he had accomplished was submitted to a meeting of shareholders in the company held in London. This report has only become available to the British Columbia correspondent of The Canadian Mining Journal, who sends the following:

In calling upon Mr. Gardner to give particulars of his visit to British Columbia and the results achieved while in that province, the chairman of the company, Mr. T. H. Wilson, observed that the Board of Directors had every reason to believe that, provided the contract is fulfilled, Mr. Gardner had entered into it on the best terms obtainable in every respect.

Mr. W. Gardner's Report.

Mr. Gardner said: "Our smelting works at Ladysmith, Vancouver Island, B.C., has, as you know, been shut down for some years past, and the agreement with the Ptarmigan Mines Company, from which we expected such good results, has proved nugatory owing to the war, and left us stranded. In these circumstances and in view of the price of copper having greatly increased, owing to the demands caused by the war, the directors of this company decided to send me out to British Columbia to see whether in conjunction with Mr. W. J. Watson, our general manager, I could open up negotiations for the disposal of our property.

"I left England on August 11th last and arrived in Victoria on August 25th. Before leaving I had several interviews with Sir Richard McBride, the Agent General for British Columbia in this country, and he provided me with letters of introduction to the Hon. W. J. Bowser, the Prime Minister, and to Hon. Lorne Campbell, the Minister of Mines, beside writing direct to his Government asking them to do all they could to forward the object of my mission.

"As soon as possible after my arrival in Victoria I got into touch with the Government, but found that owing to an impending election for the Provincial Parliament, it was impossible to do anything, official or otherwise, until after the elections were decided—a fortnight later.

"A change of Government took place and our hopes of obtaining their active support disappeared as the new Government fell heir to an empty treasury and heavy liabilities, but they will do their best to help the mining industry, which is one of the chief assets of their Province.

"This enforced delay of more than a fortnight was not, however, wasted, as during that time I was successful in arranging the coke and water supplies for the smelting works, matters of great importance which eventually assisted very considerably in completing the negotiations with the purchaser, who will be greatly benefited thereby.

Negotiations for Sale of Property.

"Having got these matters satisfactorily straightened out, I applied myself to negotiations for either selling or leasing the company's plant. The custom of local newspapers of recording the arrival of a newcomer at any of the hotels, and stating the object of

his visit, soon dispels any degree of privacy one might desire to maintain. I was fortunate in getting in touch with the representatives of two strong groups, one proposing to buy outright and the other to lease the smeltery, and eventually I decided to negotiate with the one desirous of purchasing. After long and anxious negotiations, during which the interests of our company were carefully safeguarded, I finally accepted and signed on behalf of the company and the mortgagee the agreement which the chairman will ask the company's solicitor to explain to you, and which was drawn up in the form of an 'Option to Purchase.' In an agreement of this kind it is most desirable that the purchaser should be strong financially, and this desideratum, I believe, I have secured. The purchaser is Mr. Seiberling, the president of the Goodyear Tire and Rubber Company, of Akron, Ohio. He is reputed to be a man of considerable wealth, and having gone into the purchase of mining properties, must have his own smelting works to treat his ores.

"I am glad to say that my policy of retaining Mr. Watson's services for another six months was more than justified by events, as I can say with confidence that it was his enthusiasm as a manager that sold the smelting works, and the purchaser's representatives made it a condition that Mr. Watson would take the management of the plant, at least until such time as it was put into active operation.

"I may here state that a commission of five per cent. on the purchase price was agreed with the gentleman who introduced the purchaser. This commission is to be paid as and when payments are received by the company.

"As soon as the agreement to purchase was ready, I signed it, having previously obtained the Directors' general approval by cable, and having completed the business for which I was sent out, I returned to England.

"In conclusion, I have no hesitation in saying that we have obtained a good price for our property. If we had not sold our smeltery, the purchaser and his friends would in all probability have erected an entirely new plant, which would have considerably depreciated the value of our property."

Purchase Price is \$310,000.

Mr. William Morris, of Messrs. Ashurst, Morris, Crisp & Co., solicitors for the Tyee Copper Company, said: "The agreement for the sale of the company's assets in British Columbia is dated December 2nd, 1916, and the parties to it are the Tyee Copper Company, Ltd., of the first part; Mr. Loeffler, the mortgagee, of the second part, and Mr. Seiberling (referred to as 'the purchaser'), of the third part. It provides as follows:

"The purchaser undertakes to put the company's plant in good repair and working condition, as soon as possible, commencing the work within thirty days from the date of the contract and, within six months, to instal a converter plant on the company's smeltery site.

"The company gives the purchaser the option to purchase all the company's property in British Columbia (except money, books, shares and accounts and bills receivable) at the price of \$310,000.

"The option is to continue until December 31st, 1920."

Details follow, including terms of payment, \$10,000 having been paid on the signing of the contract, and

the remainder to be paid in stated instalments.

The chairman afterward stated that Mr. W. J. Watson had been appointed the company's technical representative in British Columbia while the contract for sale and purchase is being carried out; that the directors propose that Mr. Wm. Gardner, who has been associated with the company ever since its formation in 1900, shall be elected a director of the company; that the Ptarmigan Mines, Ltd., owes the Tyee Copper Company money under a contract between the two companies, but that this matter is to remain in abeyance until after the war, and that the amount of Mr. Loeffler's mortgage on the Tyee Copper Company's property is £20,000 and there is also due accrued interest £600.

KEORA MINES AGAIN DIAMOND DRILLING.

J. W. Reed of Timmins, Ontario, has the contract for one thousand feet diamond drilling on the Keora mine in Whitney township, Porcupine district, Ontario. Mr. A. J. Brant, manager of the property, furnishes the following statement:

The diamond drilling last spring opened up four paying veins in the 1,000-ft. hole. Three of these were blind veins; one was cut at about 300 ft., giving \$18 to the ton in gold; another was cut at about 400 ft., running \$33 in gold; another was cut at a depth of about 600 ft., 4½ ft. wide, running \$4.20 in gold. The big or main vein, from twenty to forty feet wide, and proven for a length of 100 ft. on the high ground on the surface, was cut at about 800 ft., the drill hole showing it to be 16 ft. wide. Average values across the whole width were \$6.26 in gold, 8 ft. over \$12. The management has decided on exploring these veins thoroughly, as to the width, length and values, before real aggressive development be proceeded with on the property.

WANT ROAD TO SHININGTREE IMPROVED.

Sudbury.—Steps are being taken to have the water route and the road to Wasaubika and Shiningtree gold camps put into a passable condition. While Charles McCrea, M.P.P., had taken the matter up with the government, a letter from J. F. Black, mine owner, Sudbury, asking that the Board of Trade use its influence in having the work done, was before that body at a recent meeting. A resolution was carried authorizing the forwarding of Mr. Black's letter to Mr. McCrea, accompanied by the board's recommendation that the government do the necessary work.

Owing to it being impossible to repair the roadway this year, due to the lateness of the season, Mr. Black urged that the dams on the water route to the camps be repaired this fall as this route only was available. The leakage of the dams was responsible for the water route being in a very poor condition. At many points of the route there was scarcely enough water to float a canoe.

As an incentive to the Board to take some action to have the necessary work done, Mr. Black pointed out that there would be four or five companies operating in the camps this year, which would mean considerable business for Sudbury. It has been estimated that it will take between \$2,000 and \$2,500 to repair four or five dams and to build a low dam at the foot of Okowakenda lake. When the work has been done the cost of handling supplies at the camps will be reduced from \$2 to \$1 per hundred pounds, it is estimated.

USES OF FLUORSPAR

Fluorspar is one of the non-metallic minerals of moderate intrinsic value the demand for which has increased greatly since the beginning of the European war, on account of its usefulness in the metallurgic, ceramic and chemical industries, especially in the manufacture of open-hearth steel, enameled ware, and hydrofluoric acid. Some interesting notes on fluorspar are presented in a bulletin prepared by E. F. Burchard for the United States Geological Survey.

The uses of fluorspar depend on its chemical composition, fluxing properties, and phosphorescence when heated and on its optical and gemlike properties. Its preparation involves separation from other minerals with which it is associated, the treatment including such processes as hand-sorting, crushing, washing, screening, jigging, and flotation, depending on the nature of the ore and the extent to which concentration is practicable. Part of the high-grade ore is ground and shipped in barrels and sacks; the rest is sold in lump form. Where fluorspar is associated with sphalerite, or zinc blende, complete separation of the two minerals has been difficult on account of their nearness in specific gravity. Although fluorspar is useful in smelting iron ores it is harmful to zinc, and the sulphur in the sphalerite cannot be permitted in the iron and steel furnaces, therefore zinc-fluorspar concentrates are of little value unless the fluorite and sphalerite can be cleanly separated. A process for separating these minerals by means of flotation in a dilute solution of aluminum sulphate has been developed, it is reported, at Marion, Ky., the flotation being performed in shallow pans, in which mechanical stirrers are operated.

The three principal industries in which fluorspar is utilized in the United States are, in order of importance: (1) metallurgic work, (2) the manufacture of opalescent glass and sanitary and enameled ware, and (3) chemical manufacture. The highest grade, "American lump No. 1," which runs less than 1 per cent. silica and is white or clear pale blue or green, is sold either ground or in lumps for use in the glass, enameling, and chemical industries, including the manufacture of hydrofluoric acid. Grinding of the pure, clear spar is unnecessary for some purposes, as the lumps readily decrepitate to a powder when heated. The second grade, "American lump No. 2," is used in blast furnaces in the production of ferrosilicon and ferromanganese and in basic open-hearth steel furnaces to give fluidity to the slag without increasing its temperature and to reduce the contents of phosphorus and sulphur. This grade includes colored spar and may run as high as 4 per cent. silica, though most of it is sold with a 3 per cent. guaranty. The lowest grade, "gravel spar," including all that contains more than 4 per cent. silica as well as spar mixed with calcite, is also largely used in basic open-hearth steel furnaces, where it is added to fluxing limestone, and in iron and brass foundries, where it is of value in making the metal more fluid, in permitting the use of greater quantities of lower grades and scrap, and because it tends to carry phosphorus, sulphur and other impurities into the slag. It is estimated that about 80 per cent. of the United States output of fluorspar, mainly in the form of gravel spar, and practically all the imported spar is now consumed

as a flux in the basic open-hearth steel furnaces. In the Bessemer process it has been used in the form of artificial fluorides of iron and manganese.

Fluorspar possesses a considerably higher quantitative efficiency as a flux than limestone, especially in smelting refractory ores; but in all metallurgic operations the proportions of the spar that can be used are limited, as its favorable effects do not increase indefinitely as the quantity is increased. In England and on the Continent the metallurgic use of fluorspar has heretofore been more common than in America, probably because its value has been better understood by European metallurgists.

Other minor metallurgic uses of fluorspar are in the extraction of aluminum from bauxite, in smelting gold, silver, and copper ores, in refining copper, in the electrolytic refining of antimony and lead, and in refining lead bullion. In the last-named process the spar is first converted into hydro fluoric acid. In the extraction of aluminum fluorspar is reported to be fused with bauxite and soda ash into a product resembling an artificial cryolite (sodium-aluminum fluoride), to which more bauxite is added, and from this mixture aluminum is extracted in the electric furnace. Miscellaneous uses that have been reported are as a bond for constituents of emery wheels, for carbon electrodes to increase their lighting efficiency while also decreasing the amount of current required, in the extraction of potash from feldspar, and in the manufacture of Portland cement.

Fluorspar for iron and steel making should carry at least 85 per cent. calcium fluoride and preferably more, and it should be free from sulphides and sulphates. For most other chemical uses it should contain 95 to 98 per cent. or more of calcium fluoride.

Mr. Ambrose H. Monell has resigned as president of International Nickel Co., to join the staff of Gen. Foulois, who is in charge of aviation in France. Mr. Monell is succeeded by Mr. W. A. Bostwick, who for some years has acted as assistant to the president of International Nickel Co.

GROCH MACHINE TO PORTUGAL.

A few days ago there was shipped from Cobalt a full size flotation testing machine, consigned to the Lloyd Geoffrey Company, New York City, for shipment to Portugal. The machine is to be used for the treatment of ore containing tungsten.

It might be of interest to know that it is being exported to a European country as the direct result of its having been used on flotation demonstration at the National Exhibition held this fall in Toronto, and at the Exposition of Chemical Industries, New York City.

The Groch Machine was described in the Sept. 15th issue of the Canadian Mining Journal.

When the Minerals Separation North American Corporation collects royalties, who gets the money? Some people believe that part of it goes to the credit of Germans; not directly perhaps, but ultimately. It is a matter that needs investigation.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.**Prospecting in Eby Township.**

Quite a number of prospectors have gone into the townships of Eby and Otto and a large number of claims have been staked on the strength of a new discovery of gold made in Eby township. It is said the discovery has the appearance of being of more than usual importance, having been made in a quartz vein about thirty feet in width, in which a considerable quantity of free gold is showing. The scene of this new discovery is about four miles west of Swastika and about one and a half miles straight south from the Lucky Baldwin at Kenogami Station. William Adair of Haileybury made the discovery.

Silver Bird.

The old Silver Bird property is being pumped out in preparation for sampling by the O'Brien mining company at Cobalt. The property consists of approximately twenty acres, all more or less heavily covered with overburden. The location of the property gives good reasons for believing that ore of a commercial value will be located, at any rate it is likely the property will receive a thorough test at the hands of the O'Brien mining company.

Mapes-Johnston.

A reorganization of the Mapes-Johnston mining company of Elk Lake has recently been made, and the name of the company has been changed to that of the Brant Mining Company. For several years the Mapes-Johnston was actively developed and a small amount of silver ore was shipped. This property has been the most persistently worked of any in the Elk Lake camp and it was closed down chiefly owing to the lack of labor. Men are now being hired and arrangements made for the operation of the property on a comprehensive scale. Were one property in this district to develop into a profit-yielder it would greatly stimulate the mining activities of this section of the north country, where there are a number of properties that appear to warrant further development.

Work at Taylor Property Resumed.

Operations were resumed last week on the Taylor property in the Mackenzie lake district on the Montreal river. This property suspended operations a few months ago due to the lack of money. A force of men and supplies went down the river to start work last week.

Boston-Hollinger.

Machinery has been installed, camps built and a road cut into the Patricia Syndicate property in Boston Creek district, preparatory to the extensive development of the property. This property was formerly known as the Boston-Hollinger. It is expected that sinking will begin about the end of the present month. The gold showings on this property were among the best ever discovered in the north country, and the preparations being made for the development of the property is evidence of the faith the new owners have that they will find good values at depth. The property is owned by Montreal and Boston interests, who made the purchase after Mr. Charles O'Connell of the Tough-Oakes mine reported on it. A force of about thirty men are employed.

White Reserve.

Operations at the White Reserve property in the Maple Mountain district are said to be very encouraging. A number of good veins have been opened up

on the surface and some good grade ore is being bagged ready for shipment. At depth the ore has not occurred as consistently as might be desired; but there is still room for a good deal of optimism. A force of upwards of thirty men are employed at mining, and cutting roads and wood.

Lake Shore.

The new eighty-ton mill at the Lake Shore mine at Kirkland Lake should be in operation by the first of the coming year and development work to meet the requirements of the mill is being carried on at the 200-foot level. Deeper levels will not be developed until the mill is in operation, after which the policy of deep mining will be resumed. The mine should be producing sufficient bullion by next spring to make it self-supporting, and it would appear to be not too much to predict that within another year the company will be in a position to disburse dividends.

Beaver.

Development work on the 1,600-ft. level of the Beaver Consolidated is understood to be highly satisfactory. Already stoping to the height of 100 ft. has been accomplished on the high-grade vein encountered in the early part of the current year, and it is now the intention of the management to sink a winze on this vein. The main shaft for the time being will not be driven below its present depth.

Waldman.

The Mining Corporation of Canada has acquired control of the Waldman property, in Gillies Limit, and development work will be commenced at once. The Waldman adjoins the Savage property of the McKinley-Darragh-Savage mine. The conglomerate in the region of the Waldman is about 150 ft. thick. Three shafts have been sunk on the property, approximately a depth of one hundred feet each. In the early days of the camp a little high grade ore was mined. Now that it is under control of one of the leading Cobalt mines its development will be watched with a good deal of interest.

Kirkland Porphyry.

A complete and up-to-date electrically driven mining plant will be installed on the Kirkland-Porphyry property by the end of next month, and the development of the known orebodies will be carried on energetically. Rich ore is being encountered in the shaft at the present time and the development of the property up to the present time has come up to the expectations of the owners.

Kerr Lake.

During the month of September the Kerr Lake mining company of Cobalt produced 210,388 oz. of silver, which was about 10,000 oz. above the previous record of the past two months. For the twelve months ended September 30th the average production for the mine has been 216,102 oz. per month. The development of the orebodies at the mine is said to be exceeding the original estimates.

Mining Corporation.

Silver production from the Mining Corporation of Canada is being maintained at rate of upwards of 400,000 oz. per month and for the current year it is expected that the production will approximate five million ounces. The ore reserves at the end of 1916 were estimated at three and a quarter million ounces, as compared with four million ounces the preceding year. It is not considered improbable that the Mining Corporation of Canada will close the present year with an increase in its ore reserves.

Pittsburgh-Lorrain.

The Pittsburgh-Lorrain mining company is treating approximately twenty-five tons of ore per day in the old Wettlaufer mill at South Lorrain, which was taken under lease by the former company about a month ago. The mill is working to capacity and giving satisfaction.

Hollinger.

The minimum underground wage at the Hollinger mine in Porcupine is four dollars per day, and a good many of the men are receiving even more than this amount. Development of the mine is proceeding at a rapid rate and it is estimated that this mine is adding to its ore reserves at a rate of more than half a million dollars per month.

Nipissing.

During the month of September the Nipissing Mining Company of Cobalt broke all previous records for the current year in producing \$349,258. Most of the underground work during the month consisted of cross-cutting in the search for new veins, preparing others for stoping and determining the value of other small veins by means of stoping. No new veins were found during the month, but all stopes continued to produce satisfactorily, and nearly all of them are extending their previously known limits. The total production of the mine for the past nine months is estimated at \$2,406,541.

McKinley-Darragh.

About forty feet of drifting has been done on the Cobalt Lake Fault vein at the 400-ft. level of the McKinley-Darragh mine and while the vein is about six feet in width the values are fairly high, thus adding materially to the intrinsic value of the mine. With the new oil flotation plant in operation the output of the McKinley-Darragh should be considerably increased in the near future.

Minaker-Kirkland.

Plans are under way for the installation of a small mining plant at the Minaker-Kirkland property at Kirkland Lake, after which the development of the property will be carried on much more aggressively. At the present time the shaft has reached a depth of forty feet and the vein at this point is highly mineralized, with considerable quartz appearing, and while results of assays have not been made public they are said to be encouraging.

Canadian-Kirkland.

Results obtained to date on the Canadian-Kirkland property are exceedingly encouraging. In one shaft which has been sunk to a depth of 25 ft. the vein shows a width of 12 ft., and is said to give an average assay of eight dollars per ton. It is the intention of the company to sink to the 100 ft. level and run a crosscut to cut the adjoining vein which lies about 100 ft. south, running parallel to the No. 1 vein on which the shaft is being sunk. There are upwards of a dozen strong veins on the surface at this property and the outlook is exceedingly promising. A good road has been built into the property and this will greatly facilitate the installation of the mining plant, which it is intended to instal in the near future.

Munro.

A number of mining companies are now opening up their properties in the Munro district. The most important development in the township, of course, is the Croesus mine, which has reached a depth of 400 ft. where the high grade ore still persists. The new mill is in full operation and the heads are said to be running about fifty dollars to the ton. The next im-

portant development is the Burton Munro, where the main shaft has reached a depth of 265 ft., and excellent ore is being encountered. Considerable visible gold is in evidence in the quartz and the vein possesses many characteristics peculiar to the Croesus. About 40 men are employed at the Burton Munro. The Buff-Munro, Colossus and other smaller properties are also proving up well under development.

Elliot-Kirkland.

The Elliot-Kirkland has encountered the vein on the property at a depth of 300 ft., where it was found to be about 11 ft. in width and carried average values of \$12.60 per ton. The sinking of the shaft and cross-cut has taken just about a year, and the company has spent to date approximately \$100,000. The results obtaining are highly gratifying both to the Elliot-Kirkland and also to the Kirkland Lake Gold, as it is reasonable to assume that the intervening 600 ft. between these two working points on the vein will carry equally valuable ore. This is considered as one of the most important developments in the Kirkland Lake camp for several weeks.

Rickard.

Development work on the discovery made in Rickard township some six weeks ago is proving very satisfactory. A test pit has been put down about ten feet and free gold is in evidence, and there are excellent indications of the discovery proving to be of more than ordinary importance.

Adanac.

Recent developments on the 310-ft. level of the Adanac at Cobalt are proving highly satisfactory. A new vein came into the main vein and after a few rounds of shots were put in it widened out to about three inches and contains some very high grade ore. Ore is being bagged daily and a shipment should go forward this fall.

CENSUS OF U. S. MINING ENGINEERS AND CHEMISTS.

The U. S. Bureau of Mines, Department of the Interior, at the request of the Council of National Defense, has just completed a census of mining engineers, metallurgists, and chemists, with the result that 7,500 men engaged in mining and 15,000 men engaged in various chemical industries have been classified according to the character of work in which each one claims proficiency. The classification includes not only specialists in various branches of chemistry and mining, but includes as well a classified list of men who have had experience in foreign countries. It is not the purpose of this census to enable the bureau to act as a clearing house for technical men in obtaining commercial positions.

Van. H. Manning, Director of the Bureau of Mines, in explaining why this census was taken, makes the following statement:

The Bureau of Mines, at the request of the Council of National Defense, has taken a census of mining engineers, metallurgists, and chemists. The reasons for conducting this census are obvious. The war of to-day is one in which chemists and engineers play a far greater role than ever before. The products of the mines, furnaces, factories, and chemical plants are being so rapidly consumed that the highest possible skill is required to keep pace with the destruction everywhere apparent. In the organization of a great army, many classes of specialists are needed, and the

problem is to get the best qualified men for each place. Men with a knowledge of sanitation are essential to the health of the soldiers at the various training camps. Men with an intimate knowledge of pyrotechnics find a place in the manufacture and use of certain signal devices; telephone and telegraph operators are essential for systems of rapid communication, without which valuable time may be lost; coal and iron are absolute necessities for the manufacture of arms and munitions, and many naval vessels cannot be operated without the use of petroleum as a fuel, and motor trucks are useless without gasoline, or spirits obtained with greater difficulty.

Mining engineers, under military control, may be of the greatest assistance in a military way in planning and directing sapping operations; in the digging of trenches; in the erection of special supports such as concrete and steel for trenches, dugouts, and tunnels behind the lines, and in planning systems of ventilation and drainage for such excavations; in rehabilitating or redeveloping wrecked coal and iron mines taken from the enemy; and in increasing the output of minerals for military uses in other districts. Further, the experience of some mining engineers in the use of oxygen mine-rescue apparatus might be invaluable in the exploration of underground saps or dugouts filled with poisonous gases. It is on the theory of being able to place the right man in the right place at the right time that this census has been conducted.

The work of conducting this census was carried out in co-operation with the American Institute of Mining Engineers, and the American Chemical Society. A circular letter was addressed to approximately 5,000 members of the American Institute of Mining Engineers and 9,000 members of the American Chemical Society. This letter requested that each recipient fill out and return a card accompanying the letter, and make himself a committee of one to see that every chemist and engineer of his acquaintance likewise filled out a card. The letter contained the statement that additional cards would be furnished on request. The number of replies received by the bureau was approximately 7,500 men engaged in the mining industry and 15,000 in the chemical industry.

:-: Markets :-:

NEW YORK MARKETS.

- Connellsville Coke—Spot or contract *\$6.00.
- * Fixed under Lever Act.
- Straits Tin, spot, f.o.b., nominal, 61.50 cents.
- Copper (Government price), 23.50 cents.
- Prime Lake, no market.
- Electrolytic, no market.
- Casting, no market.
- Lead, Trust price, 6.50 cents.
- Lead, outside, nominal, 6.50 cents.
- Spelter, prompt western shipment, 8.17½ cents.
- Antimony—
- Chinese and Japanese, nominal, 14.62½ cents.
- Aluminum, nominal—
- No. 1, Virgin, 98-99 per cent., 37.00 to 39.00 cents.
- Pure, 98-99 per cent. remelt, 35.00 to 37.00 cents.
- No. 12 alloy remelt, 27.00 to 29.00 cents.
- Powdered aluminum, 75.00 to 85.00 cents.
- Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.
- Nickel—Shot and ingot, 50.00 cents.
- Electrolytic, 55.00 cents.

- Cadmium, nominal, \$1.45 to \$1.50.
- Palladium, \$115.00.
- Quicksilver (Oct. shipment from California), \$100.00.
- Platinum—Pure, \$105.00.
- 10 per cent. Iridium, \$111.00.
- Cobalt (metallic), \$2.70.
- Tungsten—
- Wolframite, \$23.00 to \$25.00.
- Scheelite, \$26.00.
- Gravel Fluorspar: f.o.b. mines—
- Prompt, \$28.00 to \$30.00.
- Contract, year 1918, \$25.00.
- Silver (official), 83⅞ cents.

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

- Sheet Copper—
- Hot rolled, *35.00 to 37.00 cents.
- Cold rolled, *36.00 to 38.00 cents.
- (Shipments from stock 2c per pound extra.)
- Copper bottoms, *49.00 cents.
- Copper in rods (round), *38.00 cents.
- (Square and rectangular), *39.00 cents.
- Copper wire, nominal, Oct., 30.00 to 32.00 cents.
- Copper wire, Nov.-Dec., 29.00 to 31.00 cents.
- High brass—
- Sheets, *31.25 to 33.25 cents.
- Wire and light rods, *31.25 to 33.25 cents.
- Heavy rods, *28.25 to 30.25 cents.
- Low brass—sheet, wire and rods, *36.75 cents.
- Tubing—
- Brazed bronze, *48.25 to 48.50 cents.
- Brazed brass, *44.75 to 45.75 cents.
- Seamless copper, *42.50 to 45.50 cents.
- Seamless brass, *39.00 to 43.00 cents.
- Seamless bronze, *52.00 cents.
- Full lead sheets, 11.75 cents.
- Cut lead sheets, 12.00 cents.
- Sheet zinc, f.o.b., smelter, 19.00 cents.
- *For delivery at mill convenience.

STANDARD EXCHANGE.

(J. P. Bickell & Co. report the following quotations as of close October 23rd, 1917.)

	Gold.	
	Bid	Ask
Apex . . . . .	.07¼	.07¾
Dome Extension . . . . .	.11½	.12
Dome Lake . . . . .	.15½	.16½
Dome Mines	7.90	8.10
Imperial . . . . .	.02	.02½
McIntyre	1.38	1.39
Hollinger	4.95	5.05
New Ray . . . . .	.43	.45
Porcupine Crown . . . . .	.33	.35½
Vipond . . . . .	.23	.23½
Preston . . . . .	.03½	.03¾
Teck-Hughes . . . . .	.41	.42½
West Dome . . . . .	.16¾	.17½
	Silver.	
	Bid	Ask
Adanac . . . . .	.15	.16
Bailey . . . . .	.05¼	.06
Beaver . . . . .	.34½	.36
Buffalo . . . . .	.70	. . . .
Chambers Ferland . . . . .	.12	.12½
Coniagas	3.50	3.60
Crown Reserve . . . . .	.23	.25
Gifford . . . . .	.04	.04¾
Great Northern . . . . .	.05	.06

Hargraves .....	.08¾	.09¼
Hudson Bay	35.00	40.00
Kerr Lake	4.80	5.00
La Rose .....	.39	.44
McKinley .....	.60¼	.61¼
Nipissing	8.30	8.55
Peterson Lake .....	.11¼	.11¾
Right of Way .....	.04¾	.05¼
Seneca Superior .....	.01½	.02½
Silver Leaf .....	.01	.02
Temiskaming .....	.27½	.28
Tretheway .....	.13	.15
Wettlaufer .....	.05¼	.06½
Mining Corporation	4.00	4.20
Provincial .....	.36¾	.37½

SILVER PRICES.

	New York. cents.	London pence.
October 9	89¾	45½
" 10	88¾	45½
" 11	88¼	44¾
" 12	86¾	44¼
" 13	86¾	44
" 15	86¼	43¾
" 16	85¾	43¾
" 17	84¾	43¼
" 18	84¾	42¾
" 19	83¾	42¾

TORONTO MARKETS.

- Cobalt oxide, black, \$1.50 per lb.
- Cobalt oxide, grey, \$1.65 per lb.
- Cobalt metal, \$2.25 per lb.
- Nickel metal, 45 to 50 cents per lb.
- White arsenic, 15 cents per lb.
- Oct. 23, 1917—(Quotations from Canada Metal Co., Toronto)
- Spelter, 10½ cents per lb.
- Lead, 9½ cents per lb.
- Tin, 63 cents per lb.
- Antimony, 18 cents per lb.
- Copper, casting, 32 cents per lb.
- Electrolytic, 33 cents per lb.
- Ingot brass, yellow, 20 cents; red, 25½ cents per lb.
- Oct. 23, 1917—(Quotations from Elias Rogers Co., Toronto)
- Coal, anthracite, \$9.50 per ton.
- Coal, bituminous, nominal, \$9.00 per ton.

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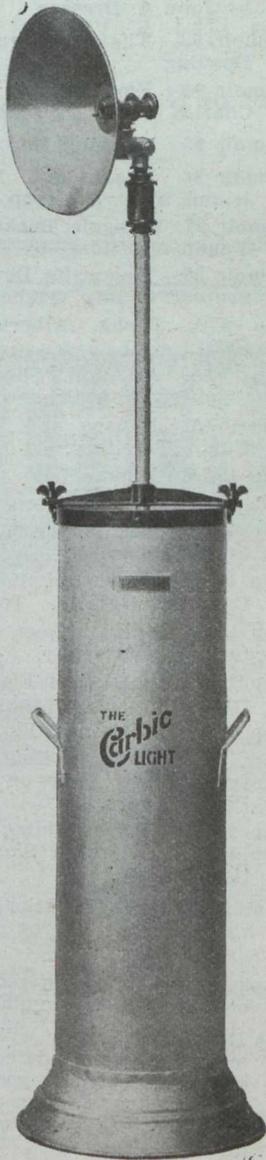
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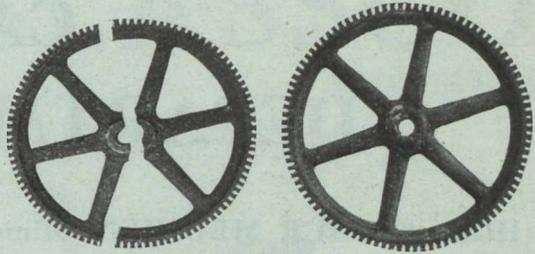
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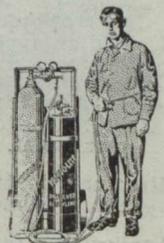
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- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizzard, B.Sc.
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- 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.
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GEOLOGICAL SURVEY

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- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
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- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
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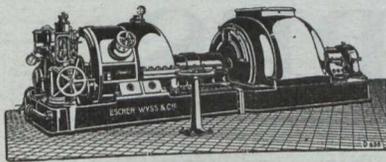
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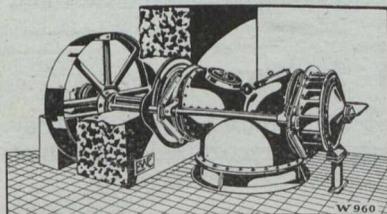
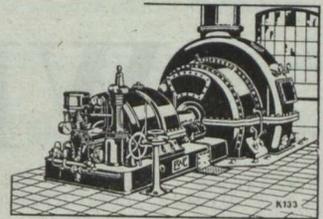
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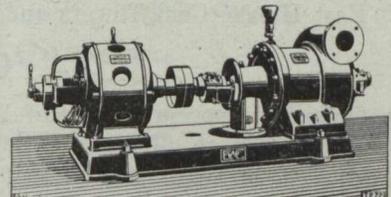
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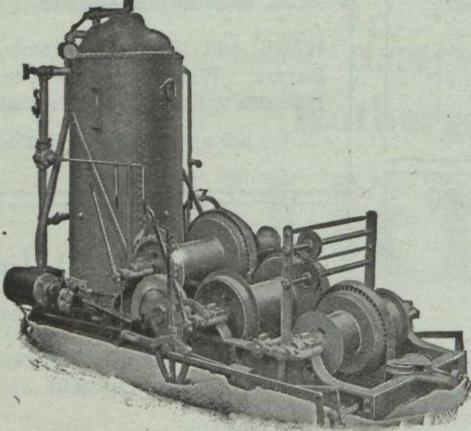
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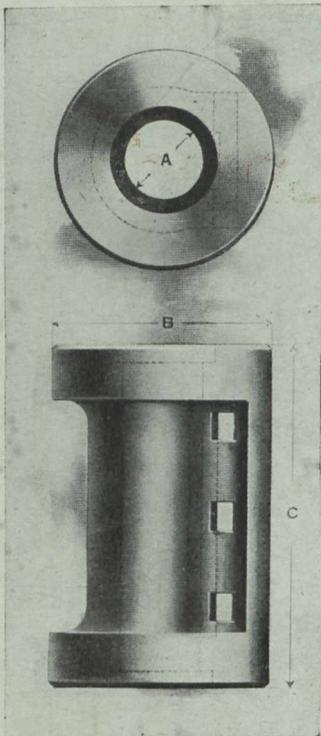
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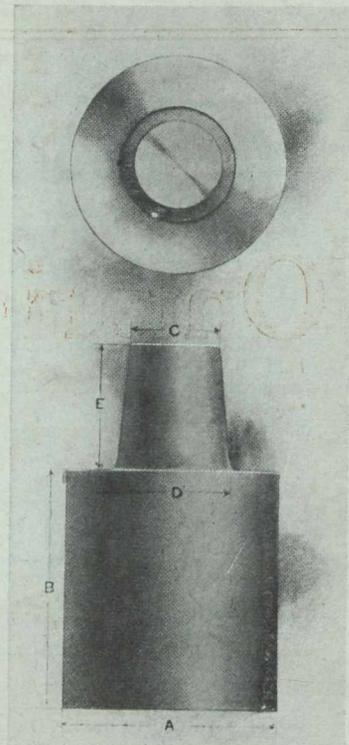
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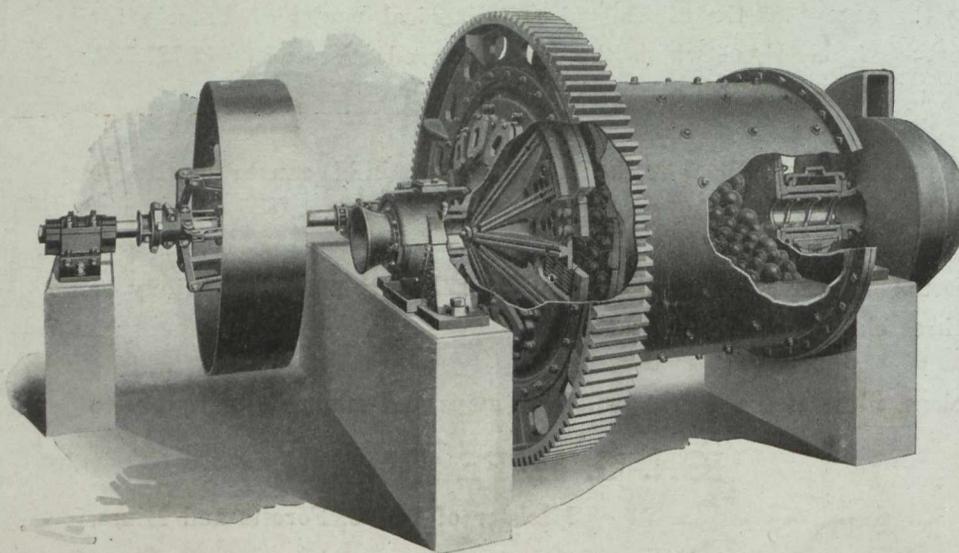
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