

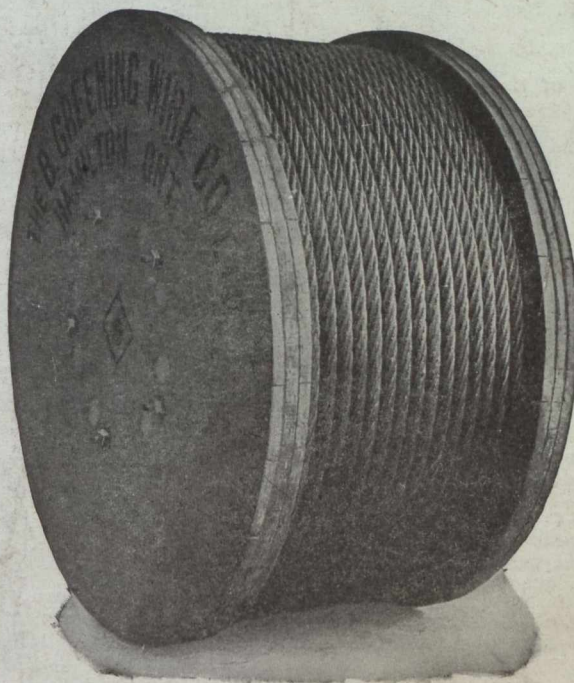
 **CANADIAN** 
MINING JOURNAL

VOL. XL.

August 6, 1919.

No. 31

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MINES BRANCH

Recent Publications

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

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

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

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

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

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

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

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

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

Summary Report of the Mines Branch, 1917.

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

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

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

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

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

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

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

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

GEOLOGICAL SURVEY

Recent Publications

Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should therefore, state what particular geologist's report is required, or what subjects they are interested in.

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

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

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

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

Memoir 106. Road materials in a portion of Vaudreuil county, Quebec, and along the St. Lawrence river from Quebec boundary to Cardinal, Ontario, by R. H. Pieher.

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

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

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

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

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

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

Map 174A. Blairmore, Alberta. Topography.

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

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

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

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

Map 1702. Klotassin, Yukon Territory. Geology.

Map 1710. Bothwell-Thamesville oil region, Kent county, Ontario.

Map 1712. Foothills of Southern Alberta, St. Mary river to Highwood river. Geology.

Map 1714. The Niagara peninsula, Ontario. Geology.

Map 1715. The Ontario peninsula. Geology.

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

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

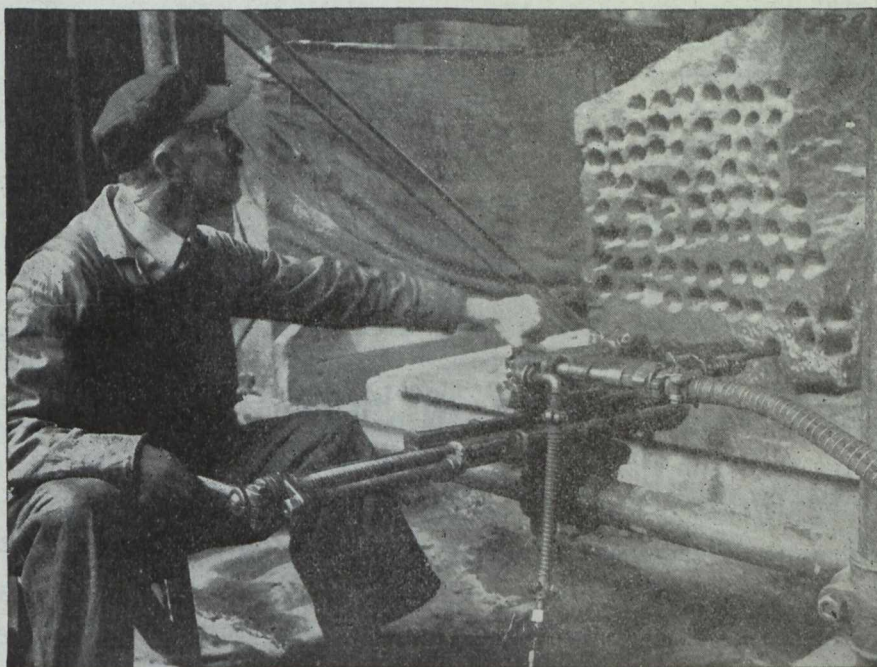
The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

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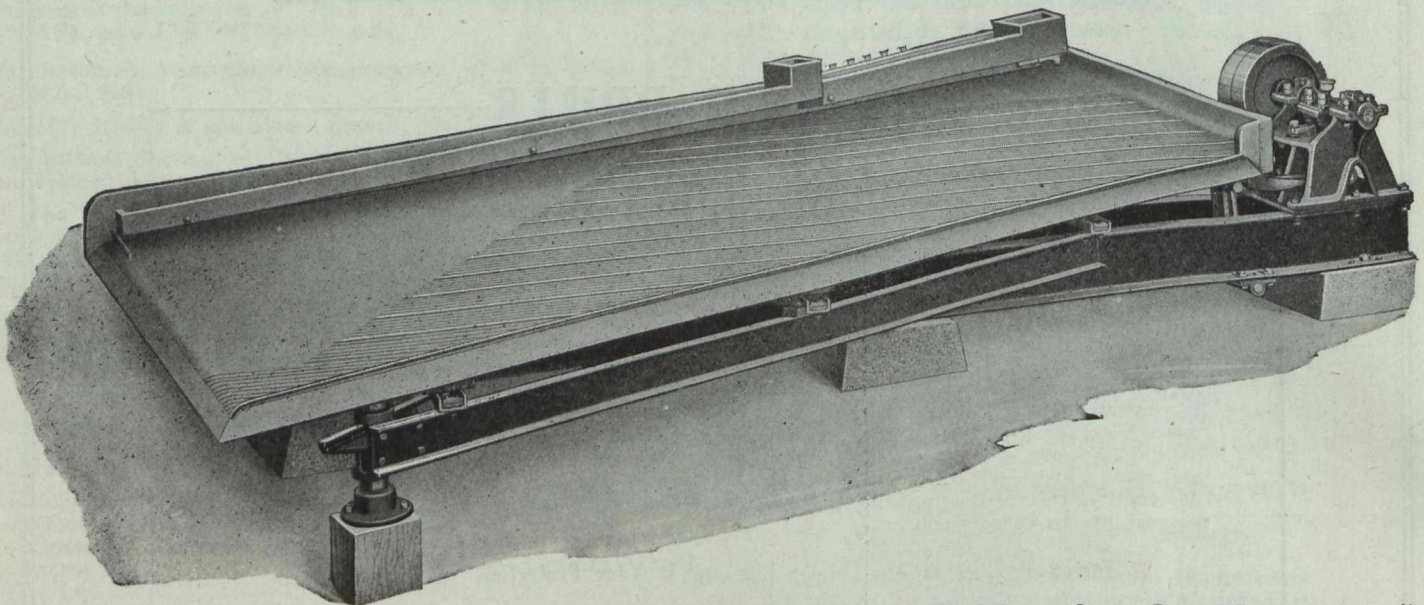
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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

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

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

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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 the 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.

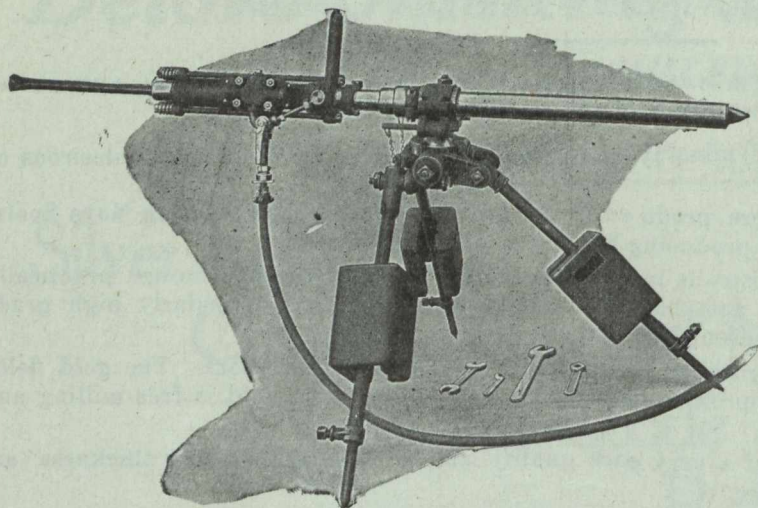
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The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

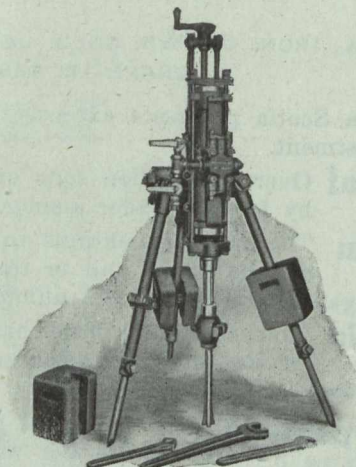
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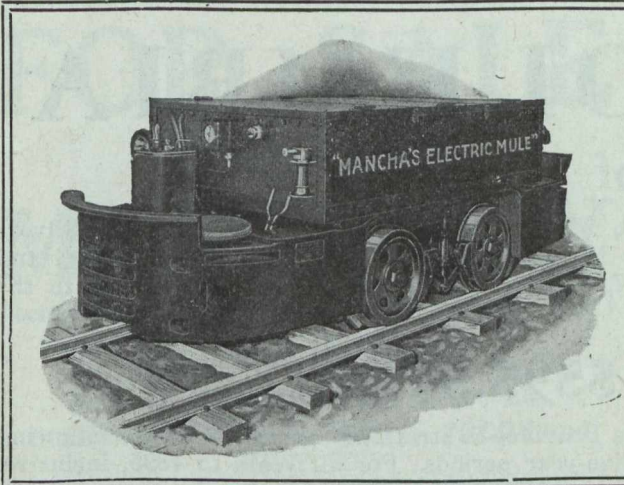
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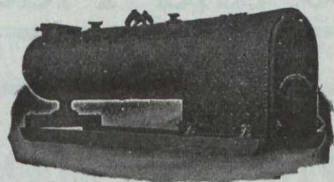
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Aggregate Value of \$595,571,107

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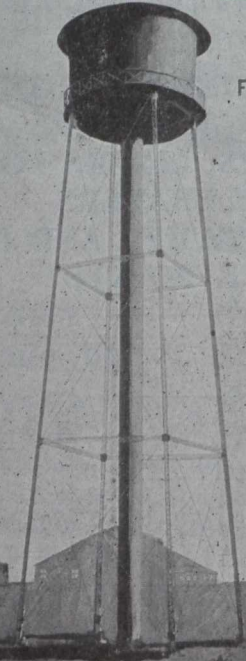
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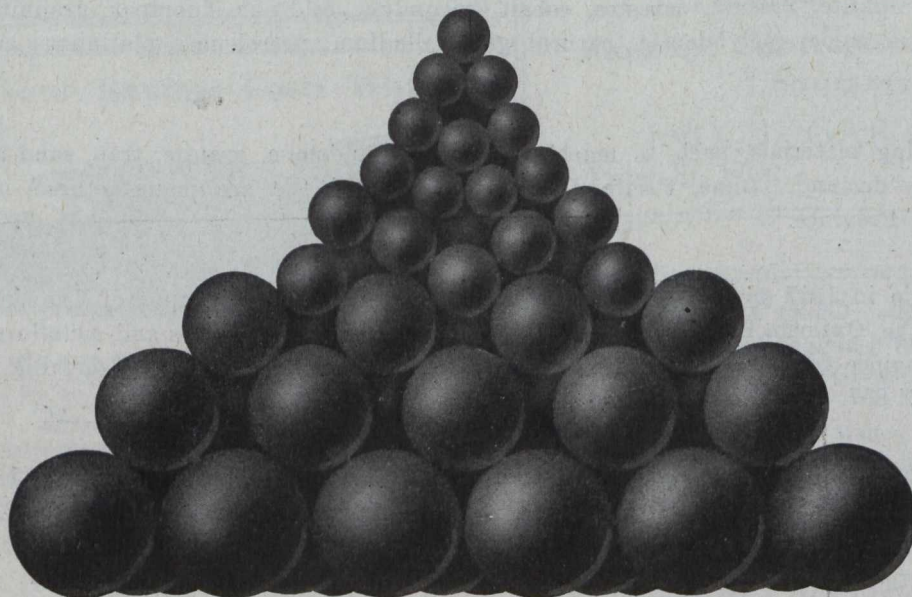
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CONTENTS

Editorial:

Canadian Mining Institute's Prospecting Plan Not Favored by the Government ..	577
Education and Citizenship	577
Bad Housing and Anarchy	578
Serious Contraction of Prairie Provinces Coal Supply Caused by Strikes	579
Poor Roads Delay Development of Boston Creek Area	579
Editorial Changes	579
Memorial on Education Prepared by a Committee of the Associated Technical Societies of Canada	580
National Conference on "Moral Education in the Schools in Relation to Canadian Citizenship," Winnipeg	581

Special Articles:

The Huntingdon Copper Mine, Quebec, With Map, by Reginald E. Hore	582
Preliminary Steps in the Development of a Graphite Deposit. Second Article. By Charles Spearman	586
Old Mines of Western Newfoundland, by E. D. Haliburton	589

Special Correspondence:

Northern Ontario	587
British Columbia	596
Book Review	584
"The Canadian Institute of Mining and Metallurgy"	588
Asbestos Industry in Quebec	588
Oil Notes	590
The Natural Gas and Petroleum Association of Canada	593
Amber Mica in Canada	594
The Magnesite Industry in Canada	594
International Exposition of Mining Machinery	596



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EDITORIAL

CANADIAN MINING INSTITUTE'S PROSPECTING PLAN NOT FAVOURED BY THE GOVERNMENT.

The August "Bulletin" of the Canadian Mining Institute, states:

"It is with very real regret that we are obliged to announce the failure of the Institute's efforts to induce the Dominion Government to adopt the plan, as submitted by Mr. Dresser, for the employment of returned soldiers in national prospecting. As was noted last month, after receiving an intimation from the Minister of Mines of his inability to awaken the interest of his colleagues in the merits of the proposal, which, therefore, was rejected in Council, it was decided to bring the matter directly to the attention of the Prime Minister. This was done by a deputation; but before the termination of the interview the Institute's representatives had arrived at the conclusion that they might expect to receive a negative reply. Unfortunately this premonition proved to be only too well-founded, for a few days later the Secretary was officially notified that the decision of the Cabinet to reject the scheme would not be reconsidered. This was further confirmed by a statement by the Minister of the Interior in the House of Commons, in reply to a question addressed to him by the Hon. R. Lemieux. The nature of this reply clearly indicates that the Government signally failed to appreciate the main aim of the proposal or the direct and indirect benefits that would indubitably result from its adoption. The main aim, of course, was to stimulate and popularise prospecting for minerals in Canada, by Government recognition and encouragement, of the prospector's avocation. The need for prospecting is great, and doubly so now when it is so vitally necessary that the natural resources of the country should be developed and utilised to the fullest possible extent in order that the country's appalling load of debt consequent on the war may be lightened. But curiously enough Canadian statesmen, even men so enlightened as Mr. Meighen, are seemingly unable to grasp the fact that mining is as much a basic industry and as much entitled to encouragement as agriculture, which latter the Government is ever ready, quite properly, to aid. To mining recognition is persistently refused. This industry indeed which even to-day in productive importance holds in Canada the second place, but which eventually may occupy the premier position, so vastly greater are our minerals in relation to our agricultural potentialities, is denied its own representative in the Cabinet, but must be content to be represented by a minister—frequently one of minor rank—holding a dual and unrelated office. Is it to be wondered at then that failing a forceful advocate in the councils of the Government all suggestions to Government to aid mining, however disinterested and well-considered, should fall to the ground."

Unfortunately, Cabinet portfolios continue to be regarded as political rewards, and not as administrative

offices. The idea of appointing a mining engineer as Minister of Mines is too elementary, too sane, too efficient to commend itself to politicians. For such administrative functions as Minister of Railways, of Finance and Agriculture, straight-thinking, not to say ingenuous members of the technical professions, might consider a railway manager, a bank official, and a farmer, but seemingly there must be other and weightier considerations than ability and fitness in filling cabinet offices. The appointment of Dr. Tolmie, a farmer, to the post of Minister of Agriculture, is an exhilarating exception, and gives point to the criticism of the Bulletin that the government cannot grasp the basic importance of mining as they do the importunities of the farmer.

What is the reason? Is it because the farmer is more vocal, or because there are more of him?

The proposal made by the C. M. I. in regard to prospecting had in view not only the employment of returned men, but also the opening up of the unprospected areas of Canada, and the proposal originated out of a desire to assist rather than encumber the government. The Institute was genuinely desirous to assist in the problems of reconstruction, but its proposals received scant consideration. Indeed, although the scheme formulated had received the earnest and protracted consideration of some of the ablest geologists and some of the most experienced heads of mining enterprises in Canada, the Minister of Mines felt justified in surmising that "the advantages which might be secured from a mining point of view are regarded as more or less doubtful."

Which is equivalent to stating that the Canadian Mining Institute had submitted an ill-considered and impolitic proposal, chiefly impolitic we surmise.

EDUCATION AND CITIZENSHIP.

In Winnipeg, October 20-22, it is proposed to hold a National Conference on "Moral Education in the Schools in Relation to Canadian Citizenship." Elsewhere in this issue will be found the announcement of the Convening Committee, and for further details would refer our readers to the General Secretary, Professor W. F. Osborne, of the University of Manitoba. It may be thought that it is a singular departure from established procedure to ask the readers of a mining periodical to consider the ethics of pedagogy, but the times are singular, and we have good precedent in the action of the associated technical societies of Canada that have joined in the approval of a Memorial on education, that is likewise to be found in this issue.

The Committee that prepared this Memorial may be regarded as expressing the opinion of the engineers and technicians of Canada, and, if for no other reason, this unprecedented expression of opinion from a usually inarticulate group of persons, gives it a first-class importance. Two of the recommendations of the Committee touch the roots of our educational problem, namely, the necessity to provide a sufficient number of sufficiently educated teachers before any large expansion of the scope of education can take place in Canada, and, secondly, the necessity to lengthen the period of compulsory education of children. It is also suggested that some form of continuation education should be made compulsory for two or more years after the close of the school-age proper.

The world is very crazy today. There is a great deal of running to and fro in the earth, and a perfect avalanche of free advice, much of it worthless, and people are getting tired of talk of "uplift" and prohibition, and millennial schemes that ignore the little peculiarities of human nature and the general applicability of the Decalogue to modern times. It is therefore, refreshing to find, that nothing revolutionary or impossible is advocated by the Memorial referred to, but that everything it recommends is a natural outgrowth from our existing educational systems. It merely asks that growth should be assisted and that good should be made, if possible, better. Therefore we bespeak for the Memorial the earnest consideration of the Federal Government, and of the provincial governments also, particularly when considering the disposition of the appropriation which Parliament has approved for federal assistance to technical education.

BAD HOUSING AND ANARCHY.

Our King is a sensible man. His occasional expressions of opinion, not too freely proffered, are so sane and true, that like the Decalogue, they are out-of-date, and not fashionable, and not nearly so popular as the opinions of the Fabian Society.

Recently, King George said that better housing and an enlarged, and freer scheme of education were two things he desired to see and would personally strive for. His utterance does credit not only to his heart, but also to his statesmanship.

Has anyone noticed the sinister connection between bad housing and industrial strife in its worst and ugliest shape?

Dublin and Glasgow possess some of the most hopeless and evil slums on earth, and everyone knows what has happened there. At the moment of writing, the slum-dwellers of Liverpool, who live, as a newspaper despatch says with unconscious irony, in "a well-defined area" are rioting and pillaging during a strike of the police.

London has not been conspicuous as a centre of rebellion in recent years, but entirely otherwise, and who

knows what trouble has been avoided by the abolition of the evil rookeries that disgraced the Capital in former years.

A great deal of the trouble in the British coal industry originated in the housing conditions in the Lowland coal districts, and in contemplation of the hideous results of the one-room house which is not uncommon in Scotland, the public and the Coal Commission overlooked the great advances which miners' housing has made in recent years in South Yorkshire and elsewhere in Britain.

In Canada we have some plague-spots, some true nurseries of revolt proceeding from hopelessness. The water-front of Halifax, the so-called "Cokovia" of Sydney, and certain "well-defined areas" of Montreal and Toronto, menace the existence of the decent amenities of more favoured localities.

It is usually, and unthinkingly assumed that the present day danger of revolt and resulting anarchy, that spewing-up of the subterranean volcano which Carlyle reverts to again and again in his "French Revolution" as a symbol, comes from the poor and so-called labouring classes. But does it?

Many of the poorest workingmen are carrying on a daily struggle against their surroundings, trying to cling to the decencies of life and the consolations of old-fashioned religion and morals. These people are not dangerous to the social fabric—indeed they are its salt and savour—unless by the selfishness and apathy of those who vote and thereby govern this country, their surroundings are allowed to remain abodes of hopelessness and caves for the Adullamites of today.

The poor are not the anarchists of modern society. It is the profiteer, the slum landlord, and the wealthy alien who exploits his ignorant countrymen in our midst, that have thrown off the bonds of restraint. Some person has recently spoken of England as "a country where the population consists of the nice people whom the war had impoverished and the nasty people it has enriched," and Canada may be divided along similar lines.

There are happily signs amongst us that the menace of slums is realised. In the Memorial on Education—elsewhere referred to in this issue—it is advocated that instruction in community and national life, lessons in citizenship, and the value of the vote, should be included in the curriculum of the elementary schools. This seems a sensible proposal. Why should not the possibilities of town-planning, and the dangers of the slum be taught to children before their minds have lost their receptiveness, and before the alluring money-making possibilities of rack-renting slumdom has dulled the conscience of the prospective voter?

We have especial responsibilities in Canada because our population is cosmopolitan, and we have already had sufficient evidence of the atavistic lapses of aliens in our midst to warn us against permitting the growth of the slum in our still infant cities. Lines

by a former Editor of the "Atlantic Monthly" seem equally applicable to Canada as to the United States: "Wide open and unguarded stand our gates, And through them presses a wild, motley throng— Men from the Volga and the Tartar steppes, Featureless figures of the Hoang-Ho, Malayan, Scythian, Teuton, Kelt and Slav, Flying the Old World's poverty and scorn; These bringing with them unknown gods and rites— Those, tiger passions, here to stretch their claws. In street and alley what strange tongues are loud, Accents of menace alien to our air. Voices that once the Tower of Babel knew! "O Liberty, white Goddess, is it well To leave the gates unguarded? On thy breast Fold Sorrow's children, soothe the hurts of fate. Lift the downtrodden, but with hand of steel Stay those who to thy sacred portals come To waste the gifts of freedom. Have a care Lest from thy brow the clustered stars be torn And trampled in the dust. For so of old The thronging Goth and Vandal trampled Rome, And where the temples of the Caesars stood The lean wolf unmolested made her lair."

SERIOUS CONTRACTION OF PRAIRIE PROVINCES' COAL SUPPLY CAUSED BY STRIKES.

The Minister of Agriculture for Saskatchewan recently wired the Minister of Labour at Ottawa as follows:—

"Protracted strike Alberta coal mines causing serious fuel situation in Saskatchewan, practically all local stocks, domestic and steam coal exhausted. Winter's supply aggregating a million and a quarter tons yet to be mined and shipped, other years considerable tonnage received during July, none this year. Many hundreds steam threshing outfits may be unable to operate unless steam coal is available quickly. Would impress seriousness of situation and urge necessity of promptly resuming coal mining operations in Alberta."

It is said that practically no coal was sent from the Alberta mines to Saskatchewan during July, although in July, 1918, the largest shipments of Alberta coal during the whole year were made. It is a great pity after having so conclusively demonstrated that Alberta coal could supply the home requirements of the Middle West, as was done last year, that the protracted and useless strikes at the Alberta collieries should have undone all the work that the Fuel Controller effectively commenced in 1918. Last year the Alberta miners asked the Canadian Government to put an embargo on American coal so as to help the production of the Alberta mines, and this year, in defiance of their own labour union, the Alberta miners have causelessly thrown the collieries idle during just that portion of the summer when coal production is most effectively carried on, and when transportation for the coal is available, as

it will not be available when the grain commences to move, and when winter sets in. Indeed, it is said that the coal shortage occasioned by the strike is hindering the threshing of the grain, so that the evil is a double one.

POOR ROADS DELAY DEVELOPMENT OF BOSTON CREEK AREA.

At the Miller-Independence mine, three miles from Boston Creek, there is known to be a promising gold deposit, which is quite different in character from those of the producing gold mines of Northern Ontario.

It is highly important that this deposit should be promptly developed. There may be many more deposits of similar nature yet undiscovered, and all that can be learned about this one should be made available as soon as possible. We regret that the operators are not being given proper assistance by the Government of a Province which profits so largely from the development of its mineral resources. A good road to the property should be built.

It has been generally admitted that the production of gold is highly desirable. It is not always easy to indicate the best means of encouraging production, but one fact is well established, and that is that the Government should do its best to furnish roads for promising districts. Up to date next to nothing has been done for the operators in the Boston Creek area, so far as roads are concerned. We hope that the development of the Miller-Independence gold deposit will not long continue to be hampered by transportation difficulties. It is by no means the only promising property in the area; but it is of itself of sufficient importance to warrant the Government building a wagon road which would not only serve this property, but the many others in the neighborhood.

Gold mine operators are spending large sums of money in developing properties. They should not be expected to construct provincial highways with the funds that are provided for exploration of ore deposits. The Ontario Government can show its intention to assist in the development of mineral resources by giving prompt attention to the needs of the Boston Creek area.

EDITORIAL CHANGES.

Mr. Reginald E. Hore, mining geologist, who has since June, 1913, been the Editor-in-Chief of the Canadian Mining Journal, is retiring from active direction of the journal to take up professional consulting practice. Mr. Hore is particularly interested in metalliferous ore deposits and his work will be to assist operators in determining the nature of ore deposits as development progresses. Mr. Hore is an expert petrographer, as well as a geologist, and when he joined the staff of the Journal he was instructor in petrography and geology at the Michigan College of Mines, as well as geologist in charge of work for the Michigan Geological Survey in the copper mining district of Michigan. Previously Mr. Hore had been instructor in pet-

rography at the University of Michigan, Ann Arbor; at Queen's University, Kingston, and at the University of Toronto, Toronto. He spent two summers in Northern Ontario prospecting and examining prospects. In 1906 he was one of Dr. W. G. Miller's assistants in mapping the Cobalt silver area. Since that time he has studied a very large number of silver and gold deposits in Northern Ontario. In Michigan Mr. Hore spent some time in the iron districts, though his special work was in the copper mines. In all the mining districts in which Mr. Hore has worked, the ore deposits are in Pre-Cambrian rocks, and it is therefore in Pre-Cambrian areas that he is particularly able to give assistance to mine operators.

Mr. Hore's long experience in editing the Journal, and his special knowledge of Canadian mines, will be retained for the benefit of our readers, as he will continue to be associated with the paper as Consulting Editor, and will from time to time contribute articles connected with the subjects in which he is particularly interested. As compiler of the "Canadian Mining Manual" Mr. Hore possesses a uniquely extended and intimate knowledge of the minerals and the operating mines of Canada.

Mr. F. W. Gray, who during the past two months has been Associate Editor of the Journal at the office of publication at Ste. Anne de Bellevue, will take the editorship. Mr. Gray has been a regular correspondent and contributor to the Journal since it absorbed the "Canadian Mining Review" in 1907.

MEMORIAL ON EDUCATION PREPARED BY A COMMITTEE OF THE ASSOCIATED TECHNICAL SOCIETIES OF CANADA.

Sir,—A committee representing the Canadian Mining Institute, the Engineering Institute of Canada, the Canadian Textile Institute, the Canadian Manufacturers' Association, and other industrial, educational and technical bodies as enumerated below has had under consideration for a year the pressing necessity for improvements in the education of Canadian children and youth in the direction of better training for citizenship and the general upbuilding of character. It is doubtless known to you that this subject is under earnest discussion throughout Canada by various organizations: all of which have so strongly felt the need for some change in our methods of education, that they have passed resolutions asking for various things including more technical education, more attention to the practical needs of our people, a better training for citizenship, etc. The Committee mentioned above has held a number of meetings and discussed the subject thoroughly. The conclusions reached may be summarized as follows:

1. It is of vital importance for the development of a Canadian nationality with high ideals, and efficient performance, that there should be an early and thorough training for citizenship in all schools throughout the Dominion. To be effective this training must be based upon the ordinary activities and occupations of the children and young people. The success of this method is well shown by the Boy Scout movement. Any attempt to teach the abstract principles of citizenship and moral conduct solely through text-books, notes, or lectures is sure to be futile. Children do not understand the abstract, but must be appealed to by the concrete. Fair play, honest dealing, courage, responsi-

bility, co-operation, service, thoroughness and thrift can be inculcated in connection with games, gardening, carpentering, sewing, and other practical occupations, and also in the course of reading, and other lessons dealing with subjects in which children are interested.

2. The committee are of the opinion that compulsory education should be universal throughout Canada up to the age of 14 years at least. They beg to point out that illiteracy even in a minor degree is a great handicap, reducing the productive efficiency of the population, and tending towards the kind of degeneracy of which there are now painful examples in a number of the provinces. Illiteracy is a danger in another respect. It prevents that education of the people, which would be invaluable in any great crisis such as that at present exemplified in Russia. The masses in Russia cannot be reached because they cannot read. It is thus impossible to influence them as an educated populace can be influenced. They are an easy prey to demagogues. The question should also be considered whether some form of continuation education should not be compulsory for a further period of two or more years.

3. The best system is bound to fail in the hands of teachers who themselves may be undeveloped, and insufficiently educated in the direction required. To secure the desired results it will be necessary to pay the teachers larger salaries in order to make it worth while for the best men and women to devote themselves to the profession. It will also be necessary to give these teachers a better kind of training than they at present receive. This implies an overhauling of the various types of schools for training teachers and incidentally paying better salaries there.

4. Improvements in text-books would be advisable to make them interesting and more closely related to the natural knowledge and the ordinary activities and occupation of children and parents. This would open up the opportunities for character building and for the training in citizenship referred to in section 1. There should also be prepared text-books of special character such as those lately published by the United States Dept. of the Interior, Bureau of Education, and entitled, "Lessons in Community and National Life." The committee feels that in the reading and other books used in the schools great care should be taken that the selection of readings and examples be within the apprehension of the pupils and that they include subjects of every day life.

5. The nature of the instruction should be such as to interest the children more deeply in the things around them and to give them clear ideas of Canadian citizenship and its responsibilities. The character of the illustrations used in teaching should be varied according to the activities of the community. In other words, the school room should be adapted to the interests of the community. The text-books should be supplemented by exhibits of manufactured articles, farm products, etc., and by excursions and lessons outside of the classroom. Schools should be provided in all cases with libraries, selected in part to fit the occupations of the people of the district.

6. The rural schools present special problems. Owing to scattered settlements in many parts of Canada it is very difficult to organize good schools. In the case of settled country a solution may be found in consolidation of small inefficient schools on well known

plans, but in the systematic and scientific planning of new settlements the school needs of the community should be carefully provided for. The committee has also reached the conclusion that larger school units are advisable and where possible the municipality should be the unit for school purposes.

All of which is respectfully submitted with the urgent request that this matter be given serious attention and remedial action undertaken.

Chairman

Secretary

Names of Representatives of Organizations and Industries.

NATIONAL CONFERENCE ON MORAL EDUCATION IN THE SCHOOLS IN RELATION TO CANADIAN CITIZENSHIP.

In common with the rest of the civilized world, Canadian communities have been profoundly impressed, through the revelations of the great war, with the necessity of emphasizing in the strongest possible way the educational activities that make for the formation of character and that tend to promote a high standard of individual and national life. While it is recognised that the ethical aim has always been present in the schools, it is well known that the diverse racial and religious elements of which our people are composed have hitherto made any attempt at organized moral education difficult. Misunderstandings, mutual distrust, inability to agree on content or method have prevented the co-operation necessary to effective action. It is believed, however, that many prejudices that formerly obscured essentials have disappeared as a consequence of the war and that the time is opportune for emphasizing the importance of character training as a preparation for citizenship. At the outset of the great struggle from which we have just emerged, the world was confronted with a people of some sixty millions thinking and feeling as one man in a conspiracy to subject the world to the domination of the German race. This unity of thought and purpose was the outcome of carefully planned and energetically conducted educational propaganda beginning in the elementary schools and carried on by university, church and press. If the energy of an entire people could be enlisted and directed by means of its educational agencies towards an evil purpose, it is believed that the same factors would be even more effective if set in motion for a righteous end. In this belief a number of gentlemen active in the professional, business and educational life in Winnipeg, resolved to come together to discuss the matter, and determine what action, if any, should be taken. On the invitation of His Honor Sir James Aikens, a meeting for this purpose was held at Government House and the progress of the discussion showed that all present were deeply interested, profoundly impressed with the need, and fully persuaded of the possibility of making a forward movement in education. It was recognized that any movement of the kind to be effective should be national in its scope and should command the interest and sympathy of all the people in every part of the Dominion without distinction of race or creed. To ascertain the extent of which such interest existed or could be aroused, a central committee was organized. Five gentlemen undertook to contribute one thousand dollars each for preliminary expenses and steps were

then taken to present the matter to groups in the larger cities throughout Canada. Some forty cities and towns were covered, and local committees formed. Without going into detail, it may be sufficient to say that great interest was manifested at every point and that the various discussions led to the determination to call a national conference to discuss the question of moral education and training for citizenship. The purpose of the conference is to stimulate public interest so as to accentuate character training in the schools and other institutions. It is further hoped that one of the outcomes may be the establishment of a foundation for the study of the whole problem, the result of this study to be made available for educational workers everywhere.

The Rotary clubs undertook the finance and the necessary funds are in sight for the holding of the conference. The sum of \$70,000 has been pledged for the purpose. It is planned to hold the conference at Winnipeg on October 20th, 21st and 22nd, 1919.

The Finance Committee consists of Rev. E. Leslie Pidgeon, Past International President of the Rotary Club; Sir James Aikens, W. J. Bulman, President Canadian Manufacturers' Association; H. W. Wood, Calgary, President Canadian Council of Agriculture; and N. P. Lambert, Secretary of the same organization. The Chairman of the Programme Committee is Chief Justice Mathers. Sir James Aikens, Lieutenant-Governor of Manitoba, is Chairman of the Convening Committee at Winnipeg, and His Excellency, the Duke of Devonshire, the Governor-General of Canada, has graciously accorded his patronage to the Conference and has consented to be present.

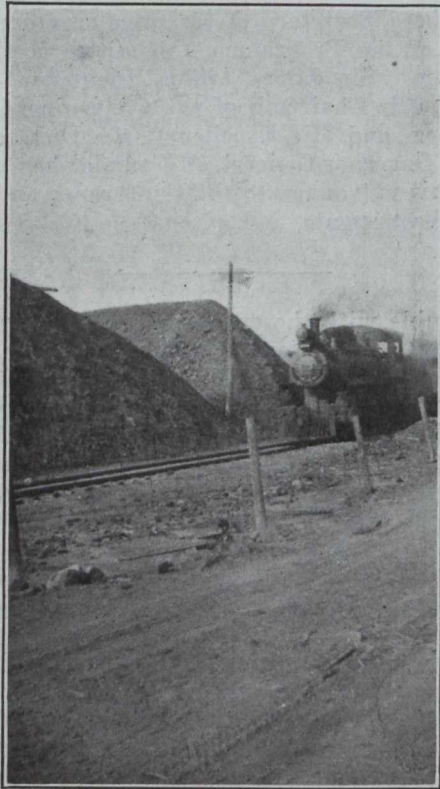
The trouble with the engineer is that, in general, he has received a great deal of instruction and not enough education. Mr. William Maurice lays stress on this point in a well-reasoned paper on "The Education of Colliery Managers for Administrative and Social Responsibilities," which he read recently before the Institution of Mining Engineers. In his opinion, "the daily round and common task of the colliery manager is not so much to direct the inanimate forces of Nature as to guide and control those infinitely more complex living forces which find their expression in the mind and spirit of man." This appears to be a fair statement of the case, and it would apply with equal force to all engineers holding responsible positions. Yet there are engineers who would persuade us that the time and money spent by an engineering student in acquiring a general education are wasted, as witness the following quotation from a paper on Engineering Education which appears in the July number of a well known publication: "Education . . . seems to be something which might well be an after-thought, a post-graduate course, and something that should not be paid for by the rank and file whose aspirations stop with doing engineering." If such a doctrine were approved and adopted by the engineer, his case would be hopeless indeed. It can hardly be doubted that if our engineers had a broader training in the humanities and in the principles of citizenship, and were imbued with the essential elements of "sociology," they would approach their life's work with an entirely new outlook, and one of the causes which lie at the roots of so many industrial disputes would be removed.—C. M. I. Bulletin.

The Huntingdon Copper Mine, Quebec

By REGINALD E. HORE.

In company with Mr. Fred M. Connell, president of the Eastern Mining and Milling Co., Ltd., I have recently visited the Huntingdon copper mine near Eastman, Quebec. From my observations and from information supplied me by Mr. Connell, I believe it probable that the operation of this mine as planned by the present owners will prove a profitable venture. The recent strengthening of the market for copper should encourage the operators to proceed with their plans without delay. Readers of the Journal may be interested in some account of the property, the recent operations and the plans for the future.

When Mr. Connell and his associates took over the property there was on the dumps about 50,000 tons of ore averaging about two per cent copper. This material had been discarded by the former operators whose methods of treatment were suitable only for high grade ore.



Ore Dumps, Huntingdon Mines

The new owners had experiments conducted at the General Engineering Company's testing laboratory at Ottawa and it was found possible to treat the ore successfully by the oil flotation process. A 100-ton oil flotation plant was then installed in the building already on the property. A tramway was constructed from the dump to the top of the mill. An electric transmission line was constructed from the mine to Eastman, connecting with the main transmission line of the Southern Canada Power Company. A contract was entered into with the company for the necessary power at \$37 per horse power per year. A railway siding was constructed. Exploration was conducted on the surface and a tunnel was driven to cross cut the ore-body. The concentrator was completed in October, 1913, and

up to the first week in February, 1919, about 6,000 tons of the ore on the dump had been treated. Twenty-six car loads of concentrate were shipped to the Nichols Copper Co., Laurel Hill, Long Island, New York. Very satisfactory results were being obtained when the great break in the price of copper made production inadvisable. During the first half of 1919 the plant was idle, but operation has been recently resumed.

The price of copper is fast rising toward that which prevailed in 1918. Copper producers, having taken their losses, seem likely to find a good demand for the product from now on, and the Huntingdon resumes production at what seems to be just the right time.

During the operations all parts of the dumps were carefully sampled and ore drawn from many places for the mill. It was found that nearly all the material on the dumps is ore that can be profitably treated by the oil flotation process. Evidently the former owners shipped only high grade ore.

The Property.

The accompanying photographs show the mine to be very conveniently located on a railway. The railway is a branch line of the C.P.R., and was formerly known as the Orford Mountain railway. It crosses the Sherbrooke branch of the C.P.R. at Eastman; but, owing to



Looking North from Dumps at Huntingdon Mine.

a difference in grade at Eastman, connection is made a mile west of the town at Eastray. The Orford Mountain line gives connection with North Troy at the south. Windsor Mills is the north-eastern terminus of the branch. Eastman is about 80 miles east of Montreal. The Huntingdon mill is about 3 miles south of Eastman.

At the mine the railway traverses ground that is probably underlain by serpentine. On the west is low ground, the valley of the Missisquoi river. On the east the ground rises sharply. Close to the railway is ore deposit. On either side of the railway are dumps of ore discarded by the former operators. From near the railway a tram line runs up to the mill, the top of which is visible from the track.

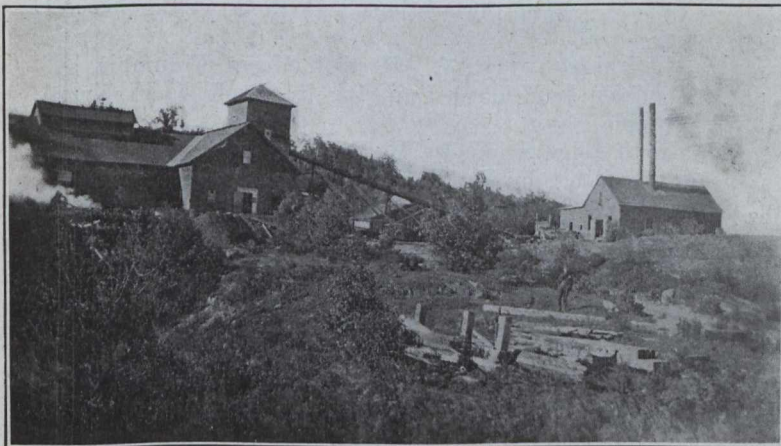
On the property, which consists of 409 acres, there are several good buildings. The mill building is large enough to house the proposed 250 ton plant. Other buildings provide sleeping quarters and cook-camp for the men, office and residence for the manager, store house, power house, blacksmith shop and stables.

While the immediate vicinity of the mine is rugged country, there is close at hand a well developed farm-

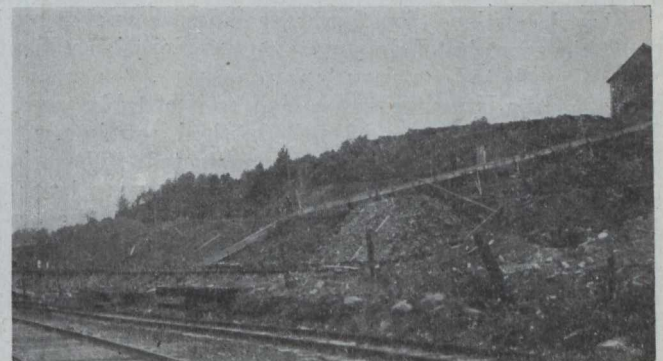
ing area. There are in addition to the exceptional railway facilities some very fair country roads, one of which runs directly from the property to Eastman. The cost of transporting supplies to the mines will obviously be, as compared with many mines, relatively low. The close proximity of the village will also permit of mine workers residing there if they wish to do so. Those who have undertaken to develop mines in out of the way places will appreciate the advantages enjoyed by the operators of the Huntingdon mine. There are also the favourable conditions common to many of our Northern camps as regards fuel and water. There are many trees on the property suitable for mine timber, as well as a plentiful supply of wood suitable for fuel. The Missisquoi river runs across the property a short distance west of the mine, affording a plentiful supply of water. Electric power sufficient for the proposed plant is already provided for.

The Ore Deposit.

The Huntingdon ore deposit is a well mineralized mass of greenstone which strikes in a northerly direction across the property. On the west of the ore deposit there is grey and green massive serpentine. On



View of Power House and Mill.



A View from the Railway, Huntingdon Mine.

the east there is a grey schistose rock. A few feet east of the main ore-body there is a thinner ore deposit in the grey schists.

In the main ore-body, chalcopryrite is liberally sprinkled through the dark green chloritic rock. It occurs in small particles and in sulphide masses. A considerable quantity of pyrrhotite accompanies the chalcopryrite, especially near the footwall side of the deposit. Quartz occurs in veinlets and irregular masses throughout the ore-body, and there is commonly chalcopryrite in the quartz, the mineral being in small particles enclosed in the quartz. Solid masses of sulphides rich in copper and several inches in width form a part of the larger ore-body. In the former operations attention was evidently directed chiefly to the development of these portions, the remainder being too low grade for the then available methods of treatment.

An adit driven a few feet about the base of the hill shown in the accompanying photograph traverses a few feet of serpentine and then 48 feet of ore which averages 3.7 per cent copper. The face of the adit is in a soft grey schist. From surface observations it is expected that more ore will be encountered when driving is continued, the east lode being separated from the main deposit by several feet of grey schists.

Method of Treating the Ore.

To handle the ore from the dumps, a tramway has been constructed from the dumps to the ore bin at the top of the mill building. The ore is trammed in 1,500 lb. cars to the loading station at the tramway and then hoisted in a 2-ton skip. The filling and emptying of the skip is done automatically.

The ore passes through two jaw crushers and is then ground to about 50 mesh in a 6 ft. Hardinge mill. A Dorr classifier returns the coarser product to the mill. The pulp passes to Callow rougher cells and then to a cleaner cell. The concentrate is then allowed to settle in concrete tanks. It is then dried in the tanks by steam and shipped in bulk in case to Long Island smelter. The concentrate averages 12 per cent copper.

Results Obtained.

From the ore treated, concentrate containing 200,910 lb. of copper has been made and shipped to the smelter. The concentrate shipped weighed 1,753,395 lb. The dry weight was 1,698,006 lb. The average copper content was about 12 per cent.

Recovery from ore taken from the dumps was about 80 per cent. From freshly mined ore a recovery of 90 per cent is expected.

From the results of operation of the plant and from sampling of the ore the operators believe that in treating daily 250 tons of ore averaging 2.42 per cent copper the monthly operating, smelting and other charges would be about as tabulated below when the price of copper is 15 cents per lb. With higher copper prices the smelting charges are higher.

Milling 6,500 tons at 87 cents per ton	\$5,655
Mining 6,500 tons at 95 cents per ton	6,175
Freight on 884 tons concentrate at \$6 per ton	5,304
Smelting loss on 884 tons concentrate at \$3.90 per ton	3,447
Smelting charge on 884 tons concentrate at \$3.00 per ton	2,652
Refining charge on 884 tons concentrate at \$4.41 per ton	3,898
Cost of selling concentrate at 88 cents per ton	778
Assaying charge on concentrate at 20 cents per ton	177
Miscellaneous charges, 10 cents per ton	88
<hr/>	
Total cost per month	\$28,175
Selling price of 263,140 lb. copper at 15 cents	42,471

At the time of writing, copper is selling in New York at 23 cents per lb. It seems very likely that there will be a big demand for the metal from now on. The operators had confidence that with a plant of 250 tons capacity they would be able to operate successfully with copper selling at 15 cents per lb. Now that a much higher price is available the success of the enterprise seems assured.

Future Possibilities.

In addition to the knowledge that there is at or near the surface a tonnage of ore available that will permit of steady operation of the proposed plant for many months, there are indications that development will prove the ore deposit to be a very large one. I spent only a few hours at the property, but from what I could see in that time I concluded that the Huntingdon ore deposit is a really big one. A series of flat diamond drill holes would help to determine the length of the deposit and its thickness at intervals. The mine workings are doubtless in the richest part of the deposit. The surface exposures and dumps indicate that the workings are almost entirely in ore of a grade that can be profitably treated by the new plant, even if the higher grade portions have been removed. I have little doubt that there is more ore in the unexplored areas north and south of the known ore. To determine this, exploration is necessary. I do not expect that the deposit will prove to be as wide or as rich in the undeveloped portions, for there are indications that such is not the case; but I do expect that exploration will prove the deposit to be a very large one.

That the Huntingdon ore can be profitably treated at the present prices and by the method now in use seems to have been satisfactorily demonstrated. There is also a chance that the mine may become a very large producer. If the deposit hold its width and values to any great depth, as seems quite probable, it is a big one.

There is a high degree of certainty that the ore in sight can be profitably treated. There is no certainty concerning what cannot be seen and sampled, but there is a very good chance that further exploration will disclose a large tonnage of ore. Mr. Connell, to whom I am indebted for all my information as to the results of sampling and of treating the ore and disposing of the concentrate, is an experienced mining engineer of good standing, and I have confidence that the information which I am here passing on to readers of the Journal is reliable.

U. S. COURTS DECIDE THAT TRADE UNION IS RESPONSIBLE FOR MEMBERS' ACTS.

The most important decision affecting the responsibility of labor unions and the first instance in the United States where a labor union had been held liable for damages for an act of its members is that recently rendered by the United States Circuit Court of Appeals for the Eighth Circuit in imposing against the United Mine Workers of America damages to the amount of \$625,000 for violation of the Sherman Anti-Trust Act. Three essential principles are established by the decision.

First.—That a labor union is responsible under the Sherman Anti-Trust Act for treble damages for injury or destruction of property by its members.

Second.—That the organization is responsible as a principal for the acts of its district and local branches or their officers and members.

Third.—That the organization is responsible when it takes no steps to control or discipline its officers and members for acts of violence.

BOOK REVIEW.

Mining Engineers' Handbook, Robert Peele; $4\frac{3}{4}$ x 7 x $2\frac{1}{2}$ inches. John Wiley & Sons, Inc., New York, Chapman & Hall, Ltd., London, 1918. Price \$5.00.

We bring this handbook to the attention of our readers, believing that it is not as yet sufficiently well known in Canada. Under the editorship of Robert Peele, Professor of Mining Engineering in the School of Mines of Columbia University, a staff of specialists has prepared a veritable encyclopedia of that extremely varied and composite of pursuits, namely, mining engineering as practised today.

Not since the time of Georgius Agricola has any single person essayed to write a volume descriptive of the whole art of mining engineering, but Professor Peele, by combining the labours and experience of men who are acknowledged leaders and specialists in their chosen branch of mining engineering, has well nigh accomplished such a volume.

The volume contains 44 sections, and the best idea that can be given of the scope of the work is to quote a partial list of the sections and their writers, as follows:—

Mineralogy, by Prof. Alfred J. Moses, Columbia.

Geology & Mineral Deposits, by Prof. J. F. Kemp, Columbia.

Earth Excavation, by H. P. Gillette.

Tunnelling, by David W. Brunton & John A. Davis.

Mine Geologic Maps and Models, by Reno H. Sales, Geologist to the Anaconda Copper Mining Co.

Mine Organization & Accounts, by J. R. Finlay, and Cost of Mining, by same author.

Mine Air, Hygiene, Explosions and Accidents, by George S. Rice, United States Bureau of Mines.

Mining Laws, by Horace V. Winchell.

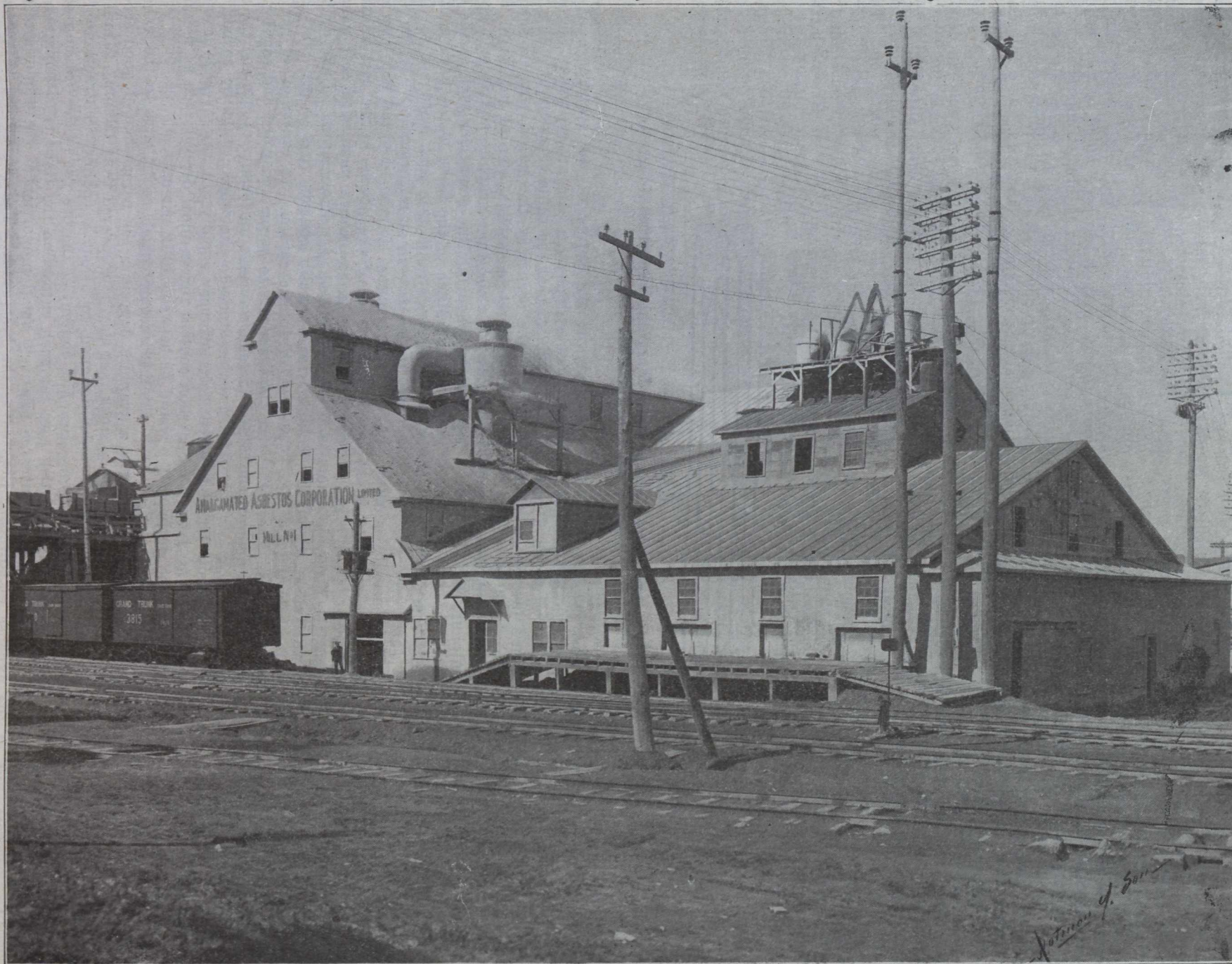
Ore Dressing, by the late R. H. Richards.

Each of the sections is fully detailed in itself, for example, the Section on Mineralogy contains 116 pages, and includes a bibliography of the more important books and papers relating to the particular subject covered.

A set of mathematical tables, and a full index complete the volume.

The book will not only be useful to the mining engineer, but also to the lawyer and other men requiring reliable information regarding mining in all its branches. The arrangement of the book into sections, and the full index make reference easy. "Peele" will doubtless take its place as a standard work of reference along with other well-known engineering handbooks, and we do not see how any student of mining can afford to be without it. The volume contains 2,375 pages, but is surprisingly handy, considering the wealth of its contents. The bibliographies add greatly to the reference value.

A number of changes have recently taken place among the officials of the Dominion Coal Company's collieries at Waterford. Bart. Connors, Manager of No. 14 Colliery for the past ten years, has retired from that position and has been appointed Coal Inspector of the Waterford District. W. D. Haley, formerly Manager of No. 17 Colliery becomes Manager of No. 15, and his place at No. 17 is filled by J. P. McIntyre. Mr. H. A. Macleod is appointed Manager of No. 14 Colliery.



Asbestos Mill of the Asbestos Corporation of Canada, Ltd., Thetford Mines, Quebec.

Preliminary Steps in the Development of a Graphite Deposit--II.

By CHAS. SPEARMAN.

Probably no other branch of mining offers a wider field of general investigation than that of graphite and the many failures in this industry may be attributed in the majority of cases to venturing without accurate preliminary knowledge of its various subdivisions such as the nature of the deposit, the mining, the refining, the uses, the marketing, etc.

The value of a graphite deposit depends firstly upon the physical and chemical properties of the contained graphite; secondly, upon the tonnage and tenor of the ore available for milling purposes; and thirdly upon the process of refining and the market.

Graphite differs from most minerals in that an average assay sample from a deposit may on analysis show a high content and yet the deposit may have a relatively low value when measured by the physical properties as standardized by the consumer. The bulk of graphite marketed goes into the manufacture of crucibles and this grade commands the highest price, and the consumer specifies that the stock shall have

ers it less suitable for the purpose of crucible manufacture, and in addition the extra refining usually creates an abnormal quantity of fines or low-grade stock. There are exceptional cases where this enclosed foreign matter has been noted to run as high as 10 per cent. It would be almost impossible to successfully treat ore from such a deposit in order to produce good crucible stock as it would mean the elimination of all the remaining impurities. As a rule Canadian graphite flake is remarkably free from such interstratified impurities. The writer has had several analyses of flake from well known Canadian deposits and has not as yet found flake wherein the involved impurities exceeded 1.10 per cent, although a great many flakes contain coarse interlaminated marginal impurities such as pyrite, quartz, calcite, etc. Those impurities penetrate laterally into the jagged margin of the flake but a relatively short distance, and are practically all removed by proper ore-dressing methods without serious injury to the flake. (See fig. 1.)

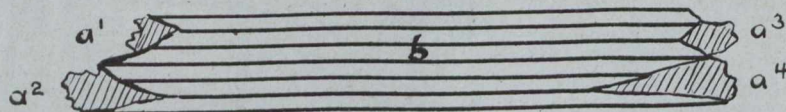


Fig. 1

FIG. 1.—a¹, a², a³, a⁴ Represents Marginal Impurities Penetrating the Flake b.

a moderately thick flake, shall pass through a standard 16 mesh screen, at least 50 per cent shall pass over a standard 50 mesh screen and the whole shall pass over a standard 90 mesh screen and in addition shall contain at least from 85 per cent to 90 per cent or more graphitic carbon and shall be free from such impurities as lime, iron, mica, sulphur, etc. The foregoing specifications eliminate all the finely flaked or so-called "amorphous" graphite from this particular demand and classifies it with the lower grades of graphite with which the market is usually stocked and for which consequently prices are very low. It is, therefore, important that the deposit shall contain distinctly flaky graphite and that the flakes are not too thin and of such dimensions that all or practically all shall be larger than that set forth in the specifications of the consumer of the higher grades. The higher the graphitic carbon content of such a deposit, the more valuable the deposit.

The quality of the graphite of a deposit should be considered from the chemical as well as from the physical standpoint, for if the flake be intimately interlaminated with very thin plates or scales of a micaceous decomposition product or other impurities the grade of the refined graphite may be low if subjected to ordinary ore-dressing just sufficient to liberate the composite flake from the surrounding gangue, and any attempt at further refining may have the desired effect chemically, viz., to raise the graphitic carbon content, but at the expense of lowering the grade physically by creating a thin flake. This thin-flaked refined stock causes a further increase in volume per unit mass of the refined flake and thus rend-

A study of the nature of the occurrence of the graphite of a deposit is also an important factor in the determination of the value of a deposit. As a rule the best flake occurs in the softer gangues such as crystalline limestone, schists, etc., or in fissure veins containing little else than graphite and formed apparently under pneumatolitic conditions such as the Ceylon deposits. Much of the flake in the hard gangues such as quartz, etc., is thin and more apt to disintegrate in the process of refinement, while the flake in the softer gangues may be liberated with the minimum injury to the flake. Some of the best Canadian deposits occur in the above mentioned soft gangues and are designated as "disseminated" flake graphite deposits and usually contain from 5 per cent to 20 per cent graphitic carbon. In excess of 20 per cent the flake appears to become crowded and smaller and loses the characteristic uniformity of size and the ratio of crucible stock to the whole graphitic carbon content falls off very rapidly. A fair average graphitic carbon content for an ideal deposit such as the above would be between 10-12 per cent.

Another feature which contributes to the value of a graphite deposit is the percentage of good crucible stock that may be recovered from the ore. A mill may be designed to affect a complete extraction of the graphite content of the ore yet in the dressing of the ore for such extraction the flake is so impaired that a relatively small proportion of the whole is recovered as the best grade. The measure of efficiency of a graphite mill is therefore not the extraction altogether, but for comparative purposes may be designated as follows:

Weight. of graphite recovered as No. 1 crucible stock from ore treated

Total weight of graphitic contained in the ore treated

calculated as a percentage, and the value of a deposit varies directly as the efficiency of the mill. It is therefore very important before constructing a mill to select the most efficient process for the particular ore by submitting representative samples for mill test to the various types of concentrating machines.

A certain process may recover a fair percentage of stock that will pass over a standard 90 mesh screen and analyze 90 per cent plus graphitic carbon and apparently resemble good crucible stock, but due to over-refining in order to raise the graphitic carbon content the stock will not classify as good crucible stock on account of failing to meet the mass-volume test.

Most Canadian deposits may be developed quickly and cheaply to a certain point by means of the core drill. This preliminary development work, which is more of the nature of determining the structural geology of the deposit may give valuable information such as revealing large possible tonnages of ore, and thus directing subsequent mining operation, or may reveal conditions which would discourage further expenditure for development. A fair approximate net value of a deposit may be calculated from the above preliminary steps if accurately followed and a fair safety factor carried in each step when applied to the deposit as a whole.

NORTHERN ONTARIO.

The Cobalt Strike Situation.

Outwardly, the visitor to Cobalt would scarcely know that a labor strike is in full swing. The only visible evidence is the large number of men who may be seen idling about the streets in groups. Outside the town, however, the change is more notable. Here almost complete silence reigns.

A rather disquieting situation developed when it became known that the watchmen at a number of the mines had been taken from their posts by members of the Union during the night. In some instances an arrangement has been made that the mining company may hire a watchman, provided also that one Union member shall also remain on picket duty.

Up to the time of writing the public utilities had not been interfered with, although the power plants of the Northern Ontario Light and Power Company have all been closed with the exception of the Mata-bitchoun plant, where some 10,000 h.p. is generated. The public utilities, including the Nipissing Central Railway depend upon this plant for electric energy.

All the neutral influences are being brought to bear an effort to bring about the resumption of work at the mines.

Porcupine Situation Harmonious.

In the Porcupine district the labor situation appears to be exceedingly favorable, a situation in sharp contrast to Cobalt and Kirkland Lake. Such is the impression gained as a result of a visit to the camp and a careful discussion with mine employees and a number of the managers of the mines. Not since 1915 has there appeared to be such abundant reason for optimism over the general outlook in the great gold camp. Also, never before in the camps history were so many men employed at the mines of Porcupine.

As a result of exercising the utmost mutual consideration, the men and the managerial staffs are found to be working together in a manner that appears likely to last. The spirit of co-operation is abroad and its actual application will be intensified as time goes on. The situation is perhaps without parallel in any of the mining districts of the North and speaks for the sane judgment of all concerned.

Work at the mines is going on space and each day less difficulty is experienced in securing men. The Hollinger Consolidated alone has about two thousand men employed, the largest number in its history. The McIntyre-Porcupine has close to four hundred men on its pay-roll.

Official advice is that co-operative stores whereby it is hoped to reduce the cost of living about eighteen per cent below that obtaining during the past twelve months will be put in operation with the least possible delay. It is proposed to operate the stores independent of the mine, having an experienced and efficient man in charge so as to give the employees the full benefit of every possible saving.

Also, the plan to insure men half-pay during time which they may lose due to illness is to become a reality, it is learned officially. Thus, in Porcupine, the foundations of future harmony are being laid. With such able men as A. F. Brigham, R. J. Ennis and C. D. Kaeding working together toward this end and with the good-will of the great body of men engaged, there appears to be every reason to believe that the Porcupine gold area is already rising above the stormy and tempestuous period of re-construction, in a manner that might well prove to be the criterion of other mining areas in the Dominion.

From other districts where labor strikes are in force there has gone out to Porcupine a few men whose chief efforts are stated to be directed toward disturbing the present harmonious situation. Good judgment on the part of the men, it is confidently expected, will withstand the adverse outside influence, and instead of disrupting mining operations, the effort of the "drifters" may still further consolidate the Porcupine men into a great and lasting co-operative body.

Progress of the James Bay Railway Survey.

The survey party which was sent north last spring for the purpose of looking into the possibilities of extending the Temiskaming and Northern Ontario Railway from Cochrane to tide water at James Bay is making satisfactory progress and is understood to have covered over one-half the total distance of not far under 180 miles.

From present indications some more or less serious obstacles have been encountered in the form of muskeg and in some places large stretches of territory where layers of moss occur sometimes several feet in thickness, and through which road-building would be quite difficult. For the first seventy miles the country is understood to present no serious obstacles, but beyond that point the muskeg and the moss-covered areas are extensive.

As to just how serious the difficulties may prove to be cannot be intelligently estimated until the completion of the survey, although already enthusiasm has grown less pronounced than was the case earlier in the year.

The James Bay survey expedition has experienced considerable hardship during the early stages, including two drowning fatalities and a number or less

serious injuries to members of the party, who had to be taken back to the railway. However, the work is being continued unremittingly, and by the close of the current year the feasibility of a railway to the sea and a seaport for the province of Ontario will probably be known.

That the building of the road would not be impossible is already known, but it is not yet determined whether or not the estimated cost of construction would prove to be within reason as compared with the expected advantages accruing therefrom.

Operating News.

The dividend of one per cent, declared payable August 12th to shareholders of the Hollinger Consolidated Gold Mines of record July 31st, will call for the distribution of some \$246,000, and will be the fourth of like amount to be paid this year, or a total of \$984,000. By the end of the current year the company is expected to be in a position to increase the rate of to double the present amount by disbursing one per cent every four weeks instead of every eight weeks as at present.

Since going on a dividend paying basis the dividends paid by the Hollinger total some \$9,264,000.

A contract has been let for six thousand feet of diamond drilling on property held in the townships of Tisdale and Whitney by the Northwoods Gold Mining Company. One drill is stated to be already at work.

Interest in control of the Hill Gold Mines, in the Munro township area are stated to be negotiating in an endeavor to secure control of the adjoining Gold Anchor property.

The Mining Corporation of Canada, one of the important silver producing companies of the Cobalt district, is becoming quite active in the silver area in the Port Arthur district. It is stated that a small shipment of ore has been made from the West End mine, which is being worked by the Mining Corporation. It is also stated that the company is looking into the possibilities of such old properties as the Badger, Porcupine, Keystone and the East End.

The Port Arthur district yielded considerable silver during the latter part of the nineteenth century, some of the ore being exceedingly rich. It is believed possible that the more efficient mining methods of the present day may result in once more placing certain of the old properties on a profit producing basis.

Progress at the Clifton-Porcupine mine, in the Porcupine field is understood to be exceeding expectations. A contract for drifting has been given to some of the employees of the company, and the work is being carried forward rapidly and at a cost somewhat less than that incurred heretofore.

More than usual interest attaches to the operation for the reason that a number of neighboring properties would take on added value should the development of the Clifton Porcupine continue so favorable as is now the case. The operation is recognized as one of the most efficient for its size in this country.

THE ASBESTOS INDUSTRY IN QUEBEC, CANADA.

The most productive asbestos region in the world is in the neighborhood of Thetford Mines and Black Lake in the Province of Quebec, Canada. Though the output was somewhat curtailed through lack of export trade during the war, prices have greatly advanced and the industry has prospered. About 14 companies are now in operation in the district, and several of them operate two or more quarries.

The rock is excavated almost exclusively by open-pit quarry methods, the small amount of tunnelling done being chiefly for the purpose of obtaining more direct and convenient transportation lines. The rock is drilled chiefly with air-operated tripod drills, and is shot out in benches about 16 feet deep. The larger masses thrown out by the primary shots are block holed, jackhammers being used for this purpose.

The crude fibre occurs in irregular veins scattered through the rock mass, and constitutes the most valuable product. In all quarries producing crude fibre hand loading of quarry rock is a necessity, as the crude must be sorted out by hand. A few quarries producing little or no crude employ steam-shovel methods of loading.

Most of the rock is removed from quarries by overhead cable-way hoists. A recent development in rock transportation consists in the projection of inclined tunnels through which the rock is hauled on cable cars.

The crude fibre is "rough cobbled" in the quarry to remove most of the adhering rock. It is then taken to cobbing sheds where it is hammered and screened to free it of all rock impurities, and it is then shipped without milling. Rock containing fibre veins less than half an inch in width is milled to separate the fibre. Briefly, the milling process consists in crushing and hammering the rock, separating the fibre by air suction and screening, and grading the product into various classes depending on the fibre length.

There is no prospect of a shortage of fibre for all prospective needs. Present plant capacity is sufficient for normal requirements, and the industry could be readily expanded as there is evidently a very large reserve supply of asbestos-bearing rock. Core drilling has shown good fibre-bearing rock at a depth of at least 700 feet below the surface, and it may continue to a very much greater depth. As an indication of the possibilities of development in the region it may be noted that within the past year a new quarry has been opened in the Coleraine district about 10 miles from Thetford mines. The rock contains an exceptionally large proportion of crude and mill fibre, and the deposit is undoubtedly of large extent. — Oliver Bowles, from June Report on Minerals Investigation, United States Bureau of Mines.

"THE CANADIAN INSTITUTE OF MINING AND METALLURGY."

As a result of the recent balloting the Institute will in future be known as "The Canadian Mining and Metallurgical Institute," or "The Canadian Institute of Mining and Metallurgy," as the Council shall determine. At present a majority of our members are miners. By their vote favoring the change of name, they have paid a graceful compliment to their fellows of the allied profession of metallurgy, and at the same time have fittingly expressed their recognition of the important position now occupied by the metallurgical industries in Canada.—C. M. I. Bulletin.

Old Mines of Western Newfoundland

By E. D. HALIBURTON, Port-au-Port, Nfld.

Newfoundlanders have so often heard Newfoundland spoken of as one of the richest mineral countries in the world, yet undeveloped, that they usually accept the statement as a matter of course; but they are appallingly ignorant, as a whole, of any real knowledge of the mineral possibilities of this island. It is that lack of knowledge which induces our moneyed men to invest rather in the mines of other countries. They welcome the success of any local venture, but they have too little faith in our minerals to back mining enterprises financially and to the want of capital, the undevelopment of the country must be attributed.

In this article I shall deal with mines which have been exploited, rather than worked, on one section of the West Coast alone.

The possibilities of the oil areas on the West Coast have never been really tested. About twenty years ago a company, called "The Western Oil Company," was promoted in New Brunswick to develop these areas and a man named Bell was given a contract to bore, at Shoal Point, in Port au Port Bay, on the north side of the harbor of Picadilly. Oil was struck at eight hundred feet and five or six wells were sunk to that depth, the best of them flowing about four barrels a day. But the strike was not rich enough to save the company which, its capital exhausted, abandoned the project, and the pipes are there today, still filled with the oil which is used by all the fishermen around as lubricating oil for their motor boats.

In 1908 an English company sent an oil-expert to the same place, with six Londoners who were supposed to have been accustomed to drilling. These men bored to a depth of three hundred feet beside a well of eight hundred feet and of course got no result. The outfit used an old fashioned drill and appliances more antiquated than those used by Bell years before, and the expert is said to have had no control over his helpers who stopped work when they felt so disposed, to drink tea or to go swimming or read the newspapers as fancy willed, and so accomplished little work. This attempt was begun in the winter and many difficulties had to be overcome as a consequence. Instead of bringing their machinery to the spot by boat, as they might have done a little later in the season, they had to come by train to the nearest station eight and twenty miles away, hauling it ten miles across the bay on the ice.

The company in England, considering that the expenses of operations were too great, sent the outfit somewhere else, so they loaded their machinery aboard a schooner in Picadilly and sailed away. But the expert went away very unwillingly, he had studied the formation of the country closely, the strike and dip of the shales on the opposite sides of the bay, and he was convinced of the existence of unlimited quantities of oil anywhere in the bay at a depth of two thousand feet, for in his opinion it was ideal country.

About the oldest attempt to work a mine on the West Coast, then, the French having certain rights of curing fish and certain jurisdiction over it, called the French Shore, was a venture of those pioneers among Newfoundland mining men, Messrs. McKay and Bennett, whose names are still connected with many of our mines. At that time McKay was manager of

the Anglo-American Telegraph Company, which owned as they do still, large tracts of land in various parts of the island. In 1873, the Anglo-American people sent out Captain Andrew Harvey and his son, to prospect on land owned by them on the Western side of Port au Port Bay. These men prospected all summer without success and in the fall set out on their return journey to St. John's. They crossed a cove near the isthmus when the tide was very low and Capt. Harvey, walking out to the waters edge along the ledges on one side of the cove, noticed some gleaming metal which he took for galena; but on closer examination he found that he was standing on a lode of pure lead. They blasted out a specimen, boxed it and brought it to St. John's. The lump weighed four hundred pounds and proved to be 75 per cent pure lead with enough silver in the residue to pay for working the mine.

The company determined to work their property and men were sent on to build the necessary houses and stores in readiness for the next spring. The following year, a schooner left St. John's bringing men and supplies, and immediately upon her arrival at the mine, which was called Lead Cove, operations were begun, under the management of the Harveys.

Thirty men were employed. They sank a shaft on the beach just above high water mark, and at the foot of the cliff, then tunnelled in the cliff about thirty feet and sunk another shaft, tunnelling north from the bottom. Every earlier indication of an unlimited quantity of the metal was supported by the result of these workings, and the quality uniform, with that of the original lump taken as a specimen. For three years work was continued and hundreds of tons of ore were mined and piled on the beach behind a break-water, built to prevent the sea washing it away. Before this mine had been three years in operation its existence was discovered by the French, and being so near the sea, was within the limits over which they had rights and one morning a French man-o'-war appeared off the cove and ordered the mine shut down. At that time there was much enmity between the French and English, who were always in dispute on this coast, and the Harveys refused to stop working the mine. A second warship, and a third bringing the Commodore of the French squadron appeared, to no purpose. Not daring to use force the French complained to the English cruiser further down the coast. This cruiser was the only law and order enforcing instrument recognized by the British at that time on the coast, for there were no representatives of the law on land, and English laws applied to the English, and French to the French, so the English cruiser came and put a stop to the mine. The place was deserted and hundreds of tons of ore, the result of three years labor, left to the mercy of wind and tide, which soon scattered it over the bay.

Forty-five years ago, when prospecting up Robinsons River, Harvey found a four foot seam of coal, dipping at an angle of forty-five degrees, and striking diagonally across the river to be lost in the woods on the other side. They paid little attention to it as coal was then of little value. The party camped beside this seam for the night and building a fire, heaped huge piles of coal over it so that it burned all night and

kept away the flies which had previously bothered them. Years later when one of the party tried to locate the same spot it could not be found; a landslide had covered over the outcrop. Many coal seams have been relocated in that vicinity during the past few months. Higher up the river the prospecting party referred to, found many huge boulders of hematite, pointing to the existence of a deposit of iron in the neighborhood, but as iron also held little attraction for them they wasted no time looking for it. Coal and iron, the latter containing a trace of titanium, are now known to exist in large quantities on the Eastern side of St. George's Bay, and the whole of Port au Port Peninsula on the opposite side is composed of limestone, all the essentials, including a harbor in the centre, for creating a great industrial community within a radius of twenty miles. At Indian Head, in the bottom of the bay, a deposit of magnetite containing a large percentage of metallic iron, was discovered a few months ago. Just prior to the outbreak of war, an American lady, calling herself a doctor, became interested in this ore and brought down some men from New York with drilling machinery, ostensibly to learn the size and value of her claim. They did no work, however, and on the outbreak of war the whole outfit vanished and nothing has been heard of them since, the circumstances were so peculiar at the time that the people around universally concluded that she was a spy.

The most interesting mine on the West coast, the scene of many attempts, and as many failures, is the chrome iron mine at Bluff Head, the entrance to Port au Port Bay. About fifty years ago a man named Holden was sent from St. John's to open up this mine in the fall and he had huts, stores, and stables erected and a few miners employed. These few miners were working but a few months when winter and disaster overtook them. The mine was nearly up to the top of the mountain, which formed one side of the gulch terminating at the bottom in Bluff Head Cove. The huts where the men lived, were built on a sort of terrace about half way up this mountain and to get to the mine they had to traverse a path that curved around and upward. The miners were four in number and one morning these men left the huts to shovel a path to the mine. When half way across the snow began to move and unable to save themselves three of them were swept away in a gigantic snow-slide; the fourth happening to be the last man and furthest from the centre of the slide, was carried down the mountain for two or three hundred feet but escaped with his life.

One of the men who was swept away was Holden's brother, and after this accident, the company abandoned the mine. But another company, calling themselves the Halifax Chrome Company, took it over. This company, under the management of a man named Leeward did a good deal of work; as many as sixty men were employed, a crusher was installed, and thousands of tons of ore mined, crushed, and ready for shipping. But when the company had reached what would be the red-letter day of its history, it received a big check. A big cargo tramp which came to take away a load dismayed at the appearance of the coast, refused to anchor there and steamed on into the bay, and smaller craft had to be employed to load her, doubling the expenses. Eventually shipping difficulties caused this company also to give up the idea of working this mine.

The wind sweeps down the mountains and gulches with terrific force, but despite all the disadvantages

of locality, possessed by this mine, it is being continually "considered." It must wield some unknown attraction over visiting prospectors. The latest failure was an undertaking of two young Americans, brothers, from Oklahoma. They took an option on the mine, and undertook to ship the ore across the straits to Sydney, where they could get seventy dollars a ton for it; all the ore they could have shipped in one season was mined and ready for shipment. They had the chance of a lifetime to make money, but their attempt went the way of the others, although under good management it could hardly have failed.

The country around Bluff Head is rich in many minerals. The Louis Hills and the Blue Hills are rich in asbestos, and gold has also been found there. Lumps of malleable native copper occur in many places.

OIL NOTES.

Anglo-Persian Oil Company Ask for Extensive Oil Rights in the Peace River District.

Whether the Government of British Columbia should grant a very extensive prospecting license in the Peace River district to the D'Arcy Exploration Company, and accept a royalty of 12½ per cent net on whatever output the company might succeed in obtaining, or whether the Province should hold these rights, prospect the territory at its own expense and keep control of the entire output, was the question upon which the Board of Trade, at its regular quarterly meeting recently was asked to express an opinion. It was decided to refer the matter to the council for consideration.

Charles F. Law explained the objects of the D'Arcy Company, which he said was backed by the British Government. If oil were found they were prepared to pipe it to the Pacific Coast, where it would be available for naval and mercantile vessels. It was the object of the British Government, he said, to develop as extensively as possible the oil resources within the British Empire. He explained that the D'Arcy Company was a subsidiary of the Anglo-Persian Company, which had made such a success of the Persian oil fields after three other big companies had failed in the field. Before commercial oil was brought in, \$1,000,000 was spent and then 360 miles of pipe line were constructed over mountain ranges 5,000 to 6,000 feet in elevation.

Mr. Law said the main objects for consideration in the matter were that:

1. It is an Imperial matter.
2. There is no cost to the Province.
3. The royalty of 12½ per cent is the maximum received by the United States Government from Federal oil lands in developed oil fields.
4. The royalty payable to the British Columbia Government will exceed by 300 per cent the royal collectible under the ordinary regulations now in force.
5. The Province has no money to go into the oil business, and should not take any risk in what is known to be a most hazardous undertaking.

Would Spend Millions.

6. The total expenditure which will be made in British Columbia, including the cost of pipe line from Peace River to the Coast, if oil is found in large quantities, will be \$25,000,000.

7. There is no reserve on surface rights, except such as may be required for ordinary drilling operations and laying pipe lines.

8. The extension of the Pacific Great Eastern Railway to the Peace River would be assured.

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1918

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9. A general development of British Columbia Peace River district would follow and contribute to the financial relief of the province by finding business for the P. G. E.

10. The total acreage sought to be controlled does not exceed one per cent of lands in the Peace River district.

11. The company is willing to be limited to the selection of ten per cent of the lands reserved.

Mr. Law explained that there were 25,000,000 acres of land east of the Rockies, which contained one of the greatest coal areas in the world. Many thousands of dollars had already been spent in exploring and prospecting for oil, but indications were not discovered until the fall of 1916. Development of oil fields in Alberta had not yet proved successful. He reviewed the history of oil developments in Western Canada and spoke of the great financial benefit which would accrue to the Province if the scheme were permitted to go ahead.

George Bell, M.P.P. for Victoria, asked Mr. Law why his company had not taken up prospecting rights under the Government regulations. Mr. Law replied that neither his company or anyone else could do as the Minister of Lands had closed the area in question from prospecting and had secured an appropriation of \$50,000 to send Prof. Gwillim to investigate the district, which meant that the Government was merely doing again what had been done forty years ago by Prof. Dawson. This, he said, had been done after his proposition had been put before the Government. He considered the Government would be well advised to accept the safer and more advantageous proposition of his company.

"There is a feeling to-day that these things are given to humanity and not to a favored few. These things are in the mind of the Government, and it would be well to hear both sides of the case before dealing with the matter," remarked Mr. Bell.

"That is what we are here for," said another member of the Board.—Victoria "Times," B.C.

It is stated that Mr. J. J. Oxley, an English mining engineer is in charge of boring operations to test forty square miles of country containing oil-shales at Deer Lake, one of the upper lakes of the Humber River on the West Coast of Newfoundland. Some machinery has already been installed.

PETROLEUM IN ENGLAND.

In the Times Trade Supplement there is an article on the Derbyshire oil field, containing this statement: "So far as present indications go, the oil field in Derbyshire, although of some promise, does not appear likely to be very important compared with most of the world's oil fields."

The Hardstoft well was struck on May 28, since which time the flow of oil has been regular, though further drilling has not resulted in any appreciable increase of the production. The well is about 3,100 feet deep, and a pump is to be installed to bring the oil to the service. A gusher is not anticipated, and in calculating the yield of oil a great deal depends upon the area of the field and certain technical features. It is probable, from present indications, that the yield will be of only moderate proportions; but that the wells will be of comparatively long life. The article concludes:

"There are no indications at present that the Derbyshire wells will modify the British oil business of importing and marketing to any considerable extent. At the same time it must be remembered that it is proverbially unsafe to prophesy about petroleum, and that new facts may come to light at any time."

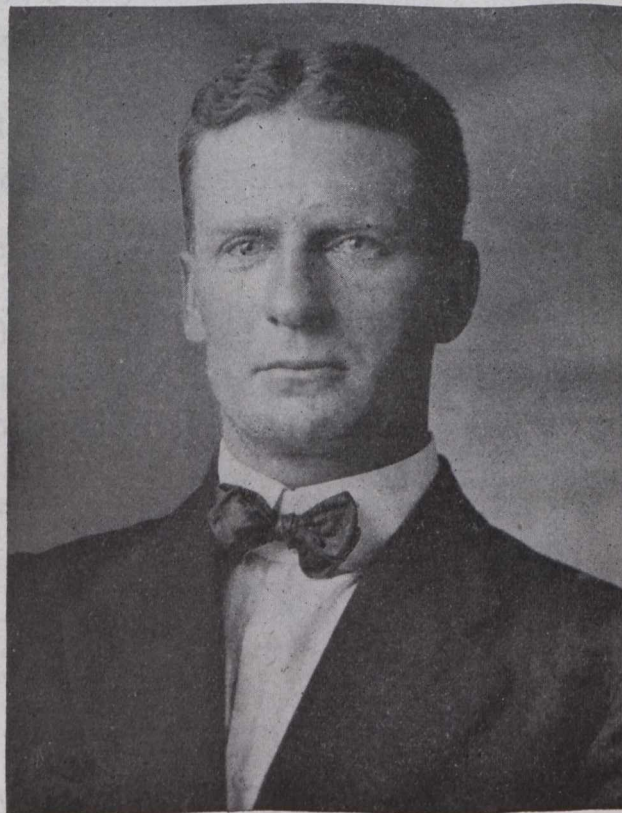
One fact that does not make for optimism in connection with the Derbyshire oil occurrence is that every geologist of note who has given attention to the matter has concluded that the finding of oil in quantity was improbable.

W. H. HANNAH RETIRES.

G. T. R. Chief Fuel Inspector With System Since 1880.

Mr. Wm. D. Hannah, chief fuel inspector of the Grand Trunk Railway System, with headquarters at Montreal, has retired after nearly forty years of continuous service with the company. Mr. Hannah is well known by a large circle of friends, not only in the city of Montreal, but throughout Eastern Canada and the central middle United States, where his duties have brought him in contact with a great number of people in railroad and coal circles. Mr. Hannah was born at Newton-Stewart, Wigtownshire, Scotland, on September 1st, 1844, and entered the service of the Grand Trunk in Montreal in 1880. Since that time he has been assistant agent and night yardmaster at Toronto, general inspector, station agent and fuel inspector at Montreal.

Before severing his connection with the company his fellow workers in the stores and purchasing departments presented him with a purse of gold.



F. E. LUCAS
Economy Engineer, Dominion Steel Corporation

THE NATURAL GAS AND PETROLEUM ASSOCIATION OF CANADA.

The Natural Gas and Petroleum Association of Canada held its organization meeting at the Tecumseh House, London, Ontario, on June 18, 1919. The meeting was a great success and the new Association got away to a splendid start. Sixty-eight delegates signed the roll.

Many prominent men were present, among whom were: Mr. Thos. W. Gibson, Deputy Minister of Lands, Forests and Mines for Ontario; Mr. B. C. Oliphant, President of the Natural Gas Association of America, and Dr. M. Y. Williams, of the Geological Survey of Canada.

Mr. T. P. Pinckard, President of the Windsor Gas Company, took the chair and Mr. Victor Lauriston of Chatham, Ontario, acted as Secretary. Mr. Pinckard outlined the events leading up to the calling of the meeting. At a conference of gas and oil men, held at Chatham, Ontario, last winter, the formation of a Gas and Oil Association had been discussed and a Committee was appointed to go into the matter. This Committee consisted of Mr. F. W. James, Manager of the Union Natural Gas Company of Canada, Limited; Mr. H. W. Braden, Superintendent of the Dominion Natural Gas Company; Mr. R. L. Pattinson of Chatham, and Mr. F. S. Coate, Manager of the Chatham Gas Company, Limited, and the speaker, Mr. Choate, was Chairman of the Committee. The Committee had drawn up a Constitution and a set of By-laws for the proposed Association.

The Chairman then invited a full discussion as to the desirability of forming the proposed Association. Views

and comments were freely expressed by a large number of the delegates. The unanimous opinion was that a Natural Gas and Petroleum Association was greatly needed in Canada, and that such an Association should be formed without delay.

Mr. B. C. Oliphant was then called upon and delivered an instructive paper on "The Organization and Aims of the Natural Gas Association of America." Mr. Thos. W. Gibson, Deputy Minister of Lands, Forests and Mines, for Ontario, also gave an address, in the course of which he heartily commended the idea of forming such an Association.

The motion that the Natural Gas and Petroleum Association of Canada be organized was put and carried unanimously. The Chairman then read the proposed Constitution and By-laws, as prepared by the Committee on Organization, and the adoption of same was carried unanimously.

The following officers and directors were elected:—
President—Chas. E. Steele, President Sterling Gas Co., Port Colbourne, Ontario.

First Vice-President—A. M. McQueen, Vice-President Imperial Oil, Limited, Toronto, Ontario.

Second Vice-President—T. P. Pinckard, President Windsor Gas Co., Ltd., Windsor, Ontario.

Secretary-Treasurer—S. A. Morse, Secretary-Treasurer, The Union Natural Gas Co., of Canada, Ltd., Chatham, Ontario.

Directors.—R. F. Miller, President National Gas Co., Ltd., Selkirk, Ont.; A. W. Parks, Oil Producer, Oil Springs, Ontario; J. B. Williams, Jr., Secretary-Treasurer, Sarnia Gas Co., Ltd., Sarnia, Ontario; D. A. Coste, Manager Provincial Natural Gas Co., Ltd., Niagara Falls, Ontario; P. S. Coate, Manager Chatham Gas Co., Ltd., Chatham, Ontario; H. R. Davis, Vice-Pres., Dominion Natural Gas Co., Ltd., Buffalo, N.Y.

On motion it was unanimously decided that the first annual meeting of the Association to be held at Hamilton, Ontario, on Friday, the 19th day of September, 1919.

Evening Session.

At 6.30 p.m. the newly formed Association held a banquet in the Grill Room of the Tecumseh House, President-elect, Mr. C. E. Steele, presiding.

At the conclusion of the meal the President proposed a toast to the King. The toast "The United States of America" was also honoured. Dr. M. Y. Williams then delivered an address on "The Geology of Ontario as it affects Gas and Oil Production." Mr. H. R. Davis presented a paper dealing with "Some Factors Affecting the Domestic Consumption of Natural Gas." Mr. E. S. Estlin, Natural Gas Commissioner for Ontario, read a paper entitled "The Gas Enterprise of Yesterday, To-day and To-morrow." Mr. Thos. W. Gibson again addressed the Convention and predicted a very useful future for the Association in respect of the public as well as gas and oil interests. He expressed the belief that the Association would co-operate with the Department of Lands, Forests and Mines, to the end that the best interests of both distributors and consumers would be served. The meeting closed with a brief address by the President, who asked for the co-operation of all members with a view to making the new Association the success that its auspicious beginning promised for the future. After the singing of the National Anthem the meeting adjourned. Sixty-one names were entered on the roll of active membership.—C.M.I. Inst. Bulletin for August.

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AMBER MICA IN CANADA.

Phlogopite, or amber mica, is soft and pliable, and is well adapted for certain electrical purposes, though its dielectric strength is not as great as that of high-grade muscovite. While it is widely known and in fair demand, the only commercial deposits so far discovered are confined to the Provinces of Ontario and Quebec, not far from the city of Ottawa.

One of the important deposits is near Kirk's Ferry on the Gatineau River, about 12 miles north of Ottawa. The deposit was first worked as a phosphate mine, and later for its mica content. It consist of a series of parallel veins in gneiss, the phlogopite being associated with pink calcite, pyroxene, and apatite. The workings are for the most part superficial, and no definite plan of development has yet been worked out. On account of a dull market, production is lagging. Present activities are confined to recovery of mica from the dump piles accumulated in early days when the deposit was worked for phosphate only. There is evidently a large reserve of mica in this locality.

What is probably the largest and best developed mica mine on the American continent is operated by the General Electric Co., near the town of Sydenham, in northwestern Ontario. The deposit consists of irregular pockets and well-defined veins in granite gneiss. The mine was first operated as an open pit worked to a depth of over 150 feet. Later, shafts were sunk and drifts projected at various levels, the lowest being 200 feet below the surface. Two types of mica are obtained, dark amber and pale amber known as "milky," the former being of superior quality.

The mica occurs in remarkably large and rich veins. One vein observed by the writer is 30 feet wide and consists almost entirely of mica in huge crystals, the largest being 4 to 6 feet across and 6 to 8 feet in length. The associated vein minerals are calcite, apatite, and pyroxene. The reserve supply is evidently very great. Present production averages about 7,000 pounds of rough-trimmed mica per week. There is a large proportion of waste which is due chiefly to minute folds and cracks.

Many other deposits of amber mica are worked, for the most part spasmodically as occasioned by the demand, or at slack periods in farming.

It is evident that the Canadian deposits are ample to supply all prospective needs, and that amber mica mining will continue as a distinctive Canadian industry.—Oliver Bowles, from June Report on Minerals Investigation of the United States Bureau of Mines.

OPENING FOR A LEARNED PHILANTHROPIST.

The Civil Service Commission of Canada advertises this month for: "An Investigator, Division of Road Materials, Mines Branch, Department of Mines, at an initial salary of \$1,600 per annum. Candidates should be **graduates** in science or engineering of a **recognized university** and have had **special training** in highway engineering and the examination of road materials. They must have a **practical knowledge**, gained by **several** years of experience, in field and laboratory investigation, of problems in the use of naturally occurring road materials in their relation to factors and conditions affecting the highway construction situation in Canada. Reference to any reports the applicants have **written** should be given." The italics are ours. Obviously in the enumeration of the qualifications that the candidate for this post must possess

some quite essential ones have not been mentioned. He should also surely be required to have private means, or at least a comfortable bank balance to keep him going during his term of service as a Government official, and naturally he would have to be a true patriot and lover of his country — or else terribly hard-up for a job.—C. M. I. Bulletin.

We think he would require to be all this, and more.—Ed.

CANADIAN MAGNESITE INDUSTRY.

Dead-burned magnesite is produced by the Scottish Canadian Magnesite Co. in the plant of the Canada Cement Co., at Hull, Quebec. This work began in October, 1917, one rotary kiln being used. The initial production was 35 tons of grain magnesite per day. The demand for the product has increased to such an extent that three kilns were in operation during May, 1918, the production amounting to 100 tons per day.

The magnesite as it comes from the mines in Grenville, Quebec, is mixed with 6 per cent of iron ore and the mixture is passed through a jaw crusher and ball mill and ground finely enough to pass through a 130-mesh screen. This mixture is fed to the rotary kilns, such as are ordinarily used in cement burning, and fired at a temperature approximating 2800°F. The fuel used is powdered coal which is blown into the kiln under pressure. The kilns are 60 feet long and it takes one hour for the material to travel through. The burned product is hard, dense, and granular, of a dark-brown color and about the size of fine gravel. This is the grain magnesite sold to the steel manufacturers for lining the bottoms and sides of furnaces.

The following analyses of the raw and calcined Canadian product are of interest especially when compared with the accompanying figures for the Washington material (sample 3.) The high lime content in the Canadian product is especially noteworthy.

Constituent	Sample 1*	Sample 2**	Sample 3***
Silica (SiO ₂)	2.60	6.3	6.83
Alumina (Al ₂ O ₃)	1.40	1.9	6.98
Iron (Fe ₂ O ₃)34	6.4	8.3
Lime (CaO)	9.78	16.5	3.20
Magnesia (MgO)	35.80	69.0	82.98
Carbon dioxide (CO ₂)	47.10		
Water83		
	97.85	100.1	99.99

* Average sample of raw magnesite from Grenville township, Argenteuil County, Quebec. Analyst, R. T. Elworthy, Mines Branch.

** Dead-burned magnesite from Hull, Quebec (6 per cent of iron ore added to raw material before burning. Analyst, S. G. McAnally.

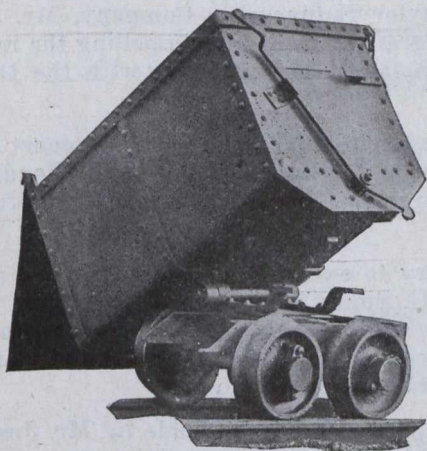
*** Average of over 200 carloads of dead-burned magnesite from Northwest Magnesite Co., Chewelah, Wash.—From June Report on Minerals Investigation of the United States Bureau of Mines.

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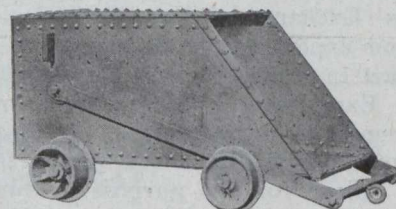
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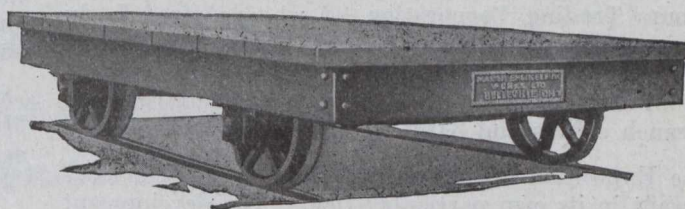
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We have been designing and building cars for a quarter of a century. Our designers know their business, and are at your service free of charge.



STEEL SKIPS

For use on Mine Tipples. Made any size to suit your work, and if desired, with double bottom, and rivets countersunk and flush on the inside, to facilitate easy dumping.



HEAVY BUILT PUSH CAR

A good general purpose car for any kind of heavy work. Heavy steel frame work decked with 2 1/2 in. or 3 in. planking. Self-oiling rabbitted boxes. Made for any gauge of track, and any required weight to suit the load.

If you use Wood Cars we can supply you with the wheels, Axles, Boxes, etc., so you may build your own cars. You will save money by so doing.

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Sales Agents: *MUSSENS LIMITED, Montreal, Toronto, Winnipeg, and Vancouver*

FOR SALE

2 Norwalk straight line three stage Compressors for charging air locomotives, having compound steam cylinders and two flywheels.

Air pressure 800 lbs. Steam pressure 110 lbs.

Size of steam cylinders—High pressure, 20 ins. diameter. Low pressure, 38 ins. diameter. Stroke, 36 ins. diameter.

Size of air cylinders—23 ins., 16 ins., and 8 ins. in diameter.

ALSO THE FOLLOWING LOCOMOTIVES:—

Maker	Size	Description	Dia., Driver	No. Wheels	Wheel Base	Weight	Length Overall
2 Porter	7" x 12"	Simple	23"	4	4'0"	14000	13'4"
4 Porter	10 1/2" x 14"	"	26"	4	5'3"	30000	19'4"
2 Porter	7" x 14"	"	24"	4	5'3"	20000	18'0"
1 Baldwin	11" x 14"	"	28"	6	6'6"	40000	22'8"
1 Baldwin	11" x 14"	"	28"	6	6'5"	34000	19'8"
1 Baldwin	9" x 14"	"	28"	4	5'6"	25000	17'0"

These locomotives are 3 ft. gauge and have a clearance height from top of rail of 4 ft. to 5 ft. 2 in.

This machinery is all in working order and is open to inspection at Glace Bay.

DOMINION COAL COMPANY Limited, Glace Bay, N.S.

International Mining Machinery Exposition Announced

Announcement is made by the Merchants and Manufacturers' Exchange of New York that one of the big permanent expositions to be a part of its great world trade mart in Grand Central Palace will be the International Exposition of Mining Industries. Since the announcement made some weeks ago that the Merchants and Manufacturers' Exchange was to take over Grand Central Palace for the purpose of turning it into a mammoth trade clearing house, considerable comment has been made in many lines of industry, especially in the mining world.

The new enterprise enjoys phenomenal backing. The Nemours Trading Corporation, of which Alfred I. du Pont is president, owns and controls the Merchants and Manufacturers' Exchange of New York. It has branches in all of the leading cities of the world, consisting of 19 branch offices and 3,000 foreign selling agencies.

The Exposition of mining industries will fill a long-felt want in its own particular field. The development of both foreign and domestic trade to which the venture looks forward unquestionably will be remarkable during the next few years, and in this development the Merchants and Manufacturers' Exchange in general, and the Mining Exposition in particular, will be big factors.

Already the fame of the enterprise is spreading throughout the world and newspapers and trade papers in many foreign countries have commented upon it most favorably. It is practically assured that Grand Central Palace is destined to become a mecca for buyers both domestic and foreign.

Through representatives of the Nemours Trading Corporation inquiries from many parts of the world where machinery and other commodities are desired will be referred to the Merchants and Manufacturers Exchange, and these pertaining to mining will be referred to the Mining Exchange and exhibitors of the specified lines of goods so notified.

The Exposition of Mining Industries will include all that is latest and best in machinery used in the development and exploitation of metal mines, non-metal mines, and oil wells. Likewise machinery used in the subsequent extraction, reduction or refining of the raw products by concentration, leaching, cyanidation, flotation, smelting, distillation, coking, etc.

One great talking point of the Merchants and Manufacturers' Exchange is that buyers going to the Palace who are interested especially in one line of goods in one exchange, will also take advantage of the opportunity to visit the other expositions and exchanges in the building at the same time, with the result that they will find other things of interest in addition to what they came especially to see.

Howard R. Ward will manage the International Exposition of Mining Industries. He is a mining engineer who has practised in the west for the last fifteen years. Prior to entering war work he was for three years consulting mining engineer with the American International Corporation and in addition to his mining work was associated with the organization of its machinery export companies both home and abroad. Inquiries should be addressed to Suite 421, 405 Lexington Avenue, New York.

British Columbia

DOLLY VARDEN LAND GRANTS TO BE REGISTERED.

On the application made by Mr. E. C. Mayers, on behalf of the Taylor Engineering Company, Mr. Justice Murphy has granted an order compelling the registration of certain lands in connection with the Dolly Varden Mines.

In spite of the fact that, by judgment of court and by statute this property has passed into the hands of the Taylor Engineering Company, the registrar refused registration.

It was necessary to exercise care about such a matter, said Mr. A. G. Smith, registrar of land titles. He showed there were technical conflicts about mineral and surface claims and that Crown grants and charges had not been shown according to law.

Registration was ordered to be made by Mr. Justice Murphy, who held that a statutory right was as good as a crown grant.

PERSONALS—Northern Ontario.

R. J. Ennis, general manager of the McIntyre-Porcupine mine, has returned to Porcupine from a brief business trip to southern points.

T. R. Finucane, director of the McKinley-Darragh mine paid a visit to the property.

Robert W. Norrington, together with Mr. Smith, of Detroit, both of whom are interested in the Allied Gold Mines, have returned from a trip to the Matachewan gold area where they made an examination of property held in that district.

The many friends of Mr. Alstair MacGregor, who has travelled in Northern Ontario almost since it opened up in steel and kindred lines, will very much regret to learn that he died at his residence in Toronto after a short illness on Wednesday, July 30th, 1919.

Mr. W. C. Weir, the Secretary of the Temiskaming Mine Managers' Association, died suddenly in a Toronto Hotel on July 29th.

DEEPEST SHAFT IN PORCUPINE.

McIntyre Now Down to a Depth of 1,300 Feet.

McIntyre Porcupine has now the distinction of having the deepest workings in the Porcupine camp. The main shaft has reached a depth of 1,300 feet and is being continued to 1,350 feet where a main tramming level will be established.

Hollinger workings have reached a depth of 1,250 feet, and the deepest work at the Dome is at 1,100 feet. Diamond drill holes have been put down by all three mines to much greater depth, which have proven the existence of similar conditions as met with on upper levels of the mines. That Porcupine is becoming a deep mining camp can be seen by following the developments on its leading properties.—The "Northern Miner."

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Smelters and Refiners of Cobalt Ores

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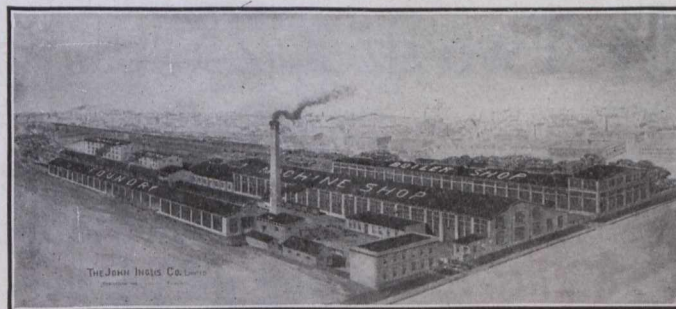
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Prime Metals for the Manufacture of Nickel Steel, German Silver, Anodes and all remelting purposes
Our Nickel is produced as Rods, Sheets, Strip Stock, Wire and Tubes.

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We are **SOLE PRODUCERS** of this natural, stronger-than-steel, non-corrodible alloy.

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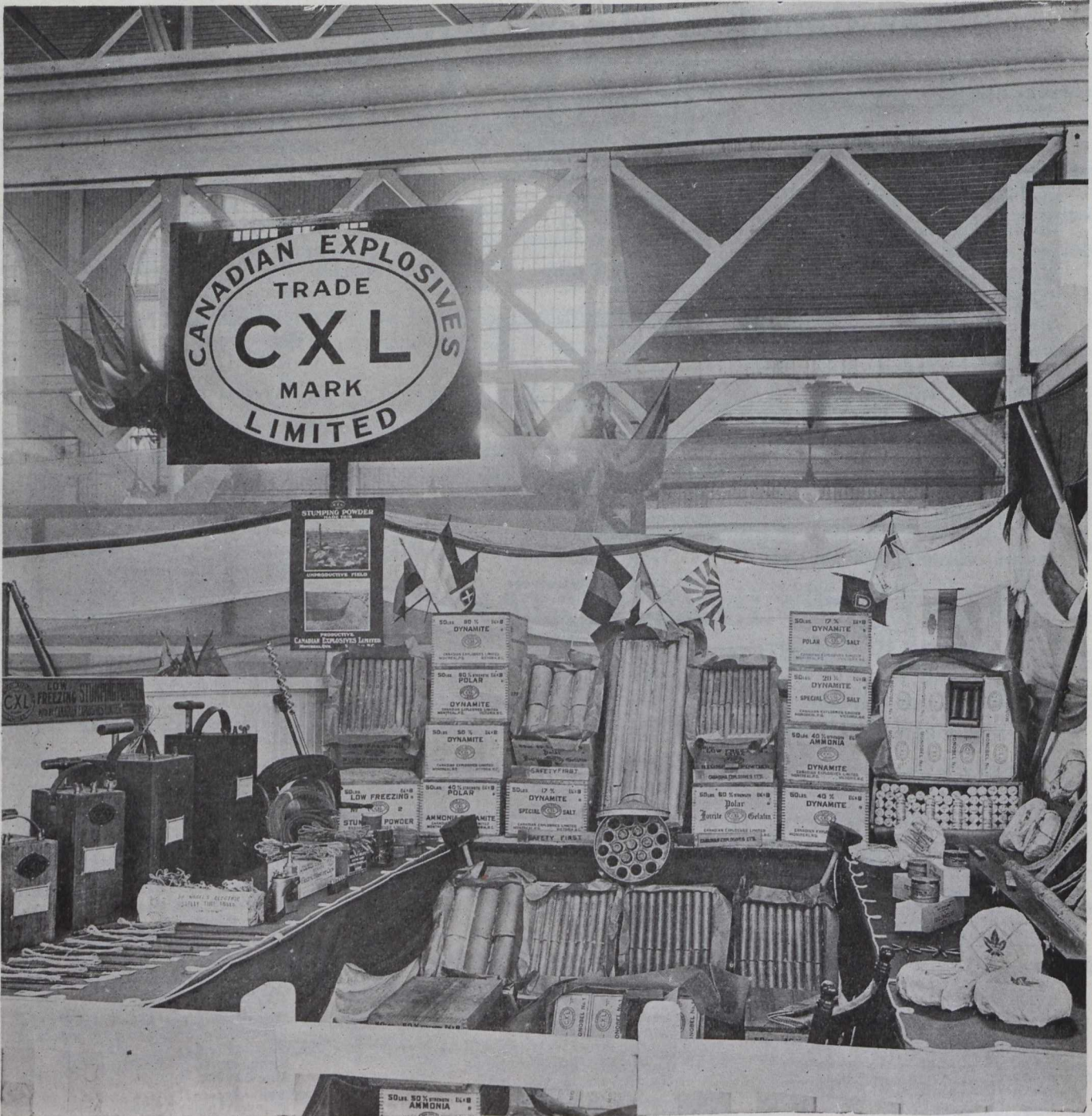
THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED

Harbor Commission Building,

TORONTO

The Canadian Miners' Buying Directory.

- Acetylene Gas:**
Canada Carbide Company, Ltd.
- Air Hoists:**
Canadian Ingersoll-Rand Co. Ltd.
Montreal, Que.
- Amalgamators:**
Northern Canada Supply Co.
Mine and Smelter Supply Co.
- Antimony:**
Canada Metal Co., Ltd.
- Assayers and Chemists:**
Milton L. Hersey Co., Ltd.
Campbell & Deyell, Cobalt.
Ledoux & Co., 99 John St., New York.
Thos. Heys & Son.
C. L. Constant Co.
- Assayers' and Chemists' Supplies:**
C. L. Berger & Sons, 37 William St., Boston, Mass.
Lymans, Ltd., Montreal, Que.
Stanley W. F. & Co., Ltd.
Mine & Smelter Supply Co.
- Brakeshoes:**
Can. Brakeshoe Co., Ltd.
- Babbit Metals:**
Canada Metal Co., Ltd.
Hcyt Metal Co.
- Balances—Heusser:**
Mine & Smelter Supply Co.
- Balls:**
Canadian Foundries and Forgings, Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries Ltd.
- Ball Mills:**
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Belting—Leather, Rubber and Cotton:**
Northern Canada Supply Co.
Jones & Glasco.
- Blasting Batteries and Supplies:**
Northern Canada Supply Co.
Canadian Explosives, Ltd.
- Blowers:**
MacGovern & Co., Inc.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Boilers:**
Northern Canada Supply Co.
Marsh Engineering Works.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The John Inglis Company.
- Boxes, Cable Junction:**
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.,
- Buckets:**
Canadian Ingersoll Rand Co., Sherbrooke, Que.
Hendrick Mfg. Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works,
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Cable—Aerial and Underground:**
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.
- Cableways:**
M. Beatty & Sons, Ltd.
Fraser & Chalmers of Canada, Ltd.
- Cages:**
Canadian Ingersoll Rand Co., Sherbrooke, Que.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Cables—Wire:**
Standard Underground Cable Co. of Canada, Ltd.
Canada Wire & Cable Co., Ltd.
Northern Electric Co., Ltd.,
- Car Dumps:**
John J. Gartshore, Toronto, Ont.
Sullivan Machinery Co.
R. T. Gilman & Co.
- Carbide:**
Canada Carbide Company, Ltd.
- Cars:**
Canadian Foundries and Forgings, Ltd.
Canadian Ingersoll Rand Co., Sherbrooke, Que.
John J. Gartshore, Toronto, Ont.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Marsh Engineering Works.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Car Wheels and Axles:**
Canadian Car Foundry Co., Ltd.
John J. Gartshore, Toronto, Ont.
Marsh Engineering Works, Ltd.
- Castings (Iron & Steel):**
Canadian Steel Foundries, Ltd.
- Cement Machinery:**
Northern Canada Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Chains:**
Jones & Glasco.
Northern Canada Supply Co.
- Chemical Apparatus:**
Mine & Smelter Supply Co.
- Chemists:**
Canadian Laboratories.
Campbell & Deyell.
Thos. Heys & Sons.
Milton Hersey Co.
Ledoux & Co.
- Classifiers:**
niMe & Smelter Supply Co.
- Coal:**
Dominion Coal Co.
Nova Scotia Steel & Coal Co
- Coal Cutters:**
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
- Coal Mining Explosives:**
Canadian Explosives, Ltd.
- Coal Mining Machinery:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Sullivan Machinery Co.
Marsh Engineering Works.
Hadfields, Ltd.
Fraser & Chalmers of Canada, Ltd.
- Coal Pick Machines:**
Sullivan Machinery Co.
- Compressors—Air:**
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Concrete Mixers:**
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
- Condensers:**
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Concentrating Tables:**
Mine & Smelter Co.
- Converters:**
Northern Canada Supply Co.
MacGovern & Co., Inc.
- Conveyor—Trough—Belt:**
Hendrick Mfg. Co.
- Cranes:**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
- Crane Ropes:**
Allan, Whyte & Co.
- Crucibles:**
Mine & Smelter Supply Co.
- Crushers:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Canadian Steel Foundries, Ltd.
Lymans, Ltd.
Mussens, Limited.
Mine & Smelter Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Derricks:**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works.
R. T. Gilman & Co.
- Diamond Drill Contractors:**
Diamond Drill Contracting Co.
E. J. Longyear Company.
Smith & Travers.
Sullivan Machinery Co.
- Dredger Pins:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Dredging Machinery:**
Canadian Steel Foundries, Ltd.
M. Beatty & Sons.
Hadfields Ltd.
- Dredging Ropes:**
Allan, Whyte & Co.
R. T. Gilman & Co.
- Drills, Air and Hammer:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Sullivan Machinery Co.
Northern Canada Supply Co.
Canadian Rock Drill Co.
- Drills—Core:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
E. J. Longyear Company.
Standard Diamond Drill Co.
Sullivan Machinery Co.
- Drills—Diamond:**
Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company.
- Drill Steel—Mining:**
Hadfields Ltd.
- Drill Steel Sharpeners:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Sullivan Machinery Co.
Canadian Rock Drill Co.
- Drills—Electric:**
Northern Electric Co., Ltd.,
- Drills—High Speed and Carbon:**
Hadfields Ltd.
- Dynamite:**
Canadian Explosives.
Northern Canada Supply Co.
- Ejectors:**
Northern Canada Supply Co.
- Elevators:**
M. Beatty & Sons.
Northern Canada Supply Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Engineering Instruments:**
C. L. Berger & Sons.
- Engines—Automatic:**
Smart-Turner Machine Co.
John J. Gartshore, Toronto, Ont.
Fraser & Chalmers of Canada, Ltd.
- Engines—Gas and Gasoline:**
Alex. Fleck.
Smart-Turner Machine Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
- Engines—Haulage:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Marsh Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Engines—Marine:**
Smart-Turner Machine Co.
MacGovern & Co., Inc.
- Engines—Steam:**
Smart-Turner Machine Co.
M. Beatty & Sons.
John J. Gartshore, Toronto, Ont.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Flood Lamps:**
Northern Electric Co., Ltd.,
- Forges:**
Northern Canada Supply Co., Ltd.
- Forging:**
M. Beatty & Sons.
Canadian Foundries and Forgings, Ltd.
Smart-Turner Machine Co.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Frogs:**
Canadian Steel Foundries, Ltd.
John J. Gartshore, Toronto, Ont.
- Furnaces—Assay:**
Lymans, Ltd.
Mine & Smelter Supply Co.
- Fuse:**
Canadian Explosives.
Northern Canada Supply Co.
- Gears, Machine Cut:**
Canadian Steel Foundries, Ltd.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.



**Your Favorite Brands
Should Be Here**

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

- Gears:**
Canadian Steel Foundries, Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Hammer Rock Drills:**
Canadian Ingersoll-Rand Co., Ltd.
Montreal, Que.
Mussens, Limited.
- Hangers & Cable:**
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel:**
Hadfields Ltd.
- High Speed Steel Twist Drills:**
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam:**
Can. Ingersoll-Rand Co., Ltd., Montreal, Que.
Jones & Glassco.
M. Beatty & Sons.
Marsh Engineering Works.
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Hoisting Engines:**
Mussens, Limited.
Can. Ingersoll-Rand Co., Ltd.
M. Beatty & Sons.
Marsh Engineering Works.
Fraser & Chalmers Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Hose:**
Northern Canada Supply Co.
- Hydraulic Machinery:**
Hadfields Ltd.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
- Ingot Copper:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds:**
Standard Underground Cable Co. of Canada, Ltd.
- Jacks:**
John J. Gartshore, Toronto, Ont.
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
- Laboratory Machinery:**
Mine & Smelter Supply Co.
- Lamps, Miners:**
Canada Carbide Company, Ltd.
Dewar Mfg. Co., Inc.
Northern Electric Co., Ltd.,
- Locomotives (Steam, Compressed Air and Storage Steam):**
H. K. Porter Company.
John J. Gartshore, Toronto, Ont.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Link Belt:**
Northern Canada Supply Co.
Jones & Glassco.
- Manganese Steel:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Metal Merchants:**
Henry Bath & Son.
Geo. G. Blackwell, Sons, & Co.
Consolidated Mining and Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.
- Mining Requisites:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Monel Metal:**
International Nickel Co.
- Motors:**
R. T. Gilman & Co.
- Nickel:**
International Nickel Co.
- Ore Sacks:**
Northern Canada Supply Co.
- Ore Testing Works:**
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.
Hoyt Metal Co.
- Ores and Metals—Buyers and Sellers of:**
C. L. Constant Co.
Geo. G. Blackwell.
Consolidated Mining and Smelting Co. of Canada.
Orford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
- Perforated Metals:**
Northern Canada Supply Co.
Hendrick Mfg. Co.
- Pig Tin:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pipes:**
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
Smart-Turner Machine Co.
- Pipe—Wood Stave:**
Pacific Coast Pipe Co., Ltd.
Mine and Smelter Supply Co.
- Piston Rock Drills:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Mussens, Limited.
- Plate Work:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
John Inglis Co., Ltd.
- Pneumatic Tools:**
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
- Prospecting Mills and Machinery:**
E. J. Longyear Company.
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Pulleys, Shafting and Hangings:**
Northern Canada Supply Co.
- Pulverizers—Laboratory:**
Mine & Smelter Supply Co.
- Pumps—Boiler Feed:**
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Centrifugal:**
Mussens, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Electric:**
Mine & Smelter Supply Co.
- Pumps—Sand and Slime:**
Mine & Smelter Supply Co.
- Pumps—Pneumatic:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Smart-Turner Machine Co.
Sullivan Machinery Co.
- Pumps—Steam:**
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Turbine:**
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Pumps—Vacuum:**
Smart-Turner Machine Co.
- Quarrying Machinery:**
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields Ltd.
- Rails:**
Hadfields, Ltd.
John J. Gartshore, Toronto, Ont.
R. T. Gilman & Co.
- Roofing:**
Northern Canada Supply Co.
- Rope—Manilla and Jute:**
Jones & Glassco.
Northern Canada Supply Co.
Allan, Whyte & Co.
- Rope—Wire:**
Allan, Whyte & Co.
Northern Canada Supply Co.
- Rolls—Crushing:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Samplers:**
Fraser & Chalmers of Canada, Ltd.
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heyes & Son.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Screens:**
Northern Canada Supply Co.
Hendrick Mfg. Co.
Hadfields Ltd.
- Screens—Cross Patent Flanged Lip:**
Hendrick Mfg. Co.
- Separators:**
Smart-Turner Machine Co.
- Sheet Lead:**
Canada Metal Co., Ltd.
- Sheets—Genuine Manganese Bronze:**
Hendrick Mfg. Co.
- Shoes and Dies:**
Canadian Foundries and Forgings, Ltd.
Fraser & Chalmers of Canada, Ltd.
- Shovels—Steam:**
Canadian Steel Foundries, Ltd.
John J. Gartshore, Toronto, Ont.
M. Beatty & Sons.
R. T. Gilman & Co.
- Smoke Stacks:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Hendrick Mfg. Co.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works.
- Special Machinery:**
Montreal, Que.
Canadian Ingersoll-Rand Co., Ltd., John Inglis Co., Ltd.
- Spring Coil & Clips Electric:**
Canadian Steel Foundries, Ltd.
- Steel Barrels:**
Smart-Turner Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Steel Castings:**
Canadian Brakeshoe Co., Ltd.
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Steel Drills:**
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.
- Steel Drums:**
Smart-Turner Machine Co.
- Steel—Tool:**
N. S. Steel & Coal Co.
Hadfields Ltd.
- Stone Breakers:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Hadfields Ltd.
Fraser & Chalmers of Canada, Ltd.
- Surveying Instruments:**
C. L. Berger
- Switches & Switch Stand:**
Canadian Steel Foundries, Ltd.
John J. Gartshore, Toronto, Ont.
- Tables—Concentrating:**
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks (Wooden):**
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.
- Tanks—Steel:**
Canadian Ingersoll-Rand Co., Sherbrooke, Que.
Marsh Engineering Works.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks—Cyanide, Etc.:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Hendrick Mfg. Co.
Pacific Coast Pipe Co., Ltd.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
- Tanks (water) and Steel Towers:**
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
- Tramway Points and Crossings:**
Canadian Steel Foundries, Ltd.
Hadfields Ltd.
- Transits:**
C. L. Berger & Sons.
- Transformers:**
R. T. Gilman & Co.
Northern Electric Co., Ltd.,
- Tubs:**
Hadfields Ltd.
- Welding Rod and Flux:**
Prest-O-Lite Co. of Canada, Ltd.
Imperial Brass Mfg. Co.
- Welding and Cutting, Oxy-Acetylene:**
Prest-O-Lite Co. of Canada, Ltd.
Imperial Brass Mfg. Co.
- Wheels and Axles:**
Canadian Steel Foundries, Ltd.
John J. Gartshore, Toronto, Ont.
Hadfields Ltd.
- Winding Engines—Steam and Electric:**
Can. Ingersoll-Rand Co., Ltd.
Marsh Engineering Works.
Fraser & Chalmers of Canada, Ltd.
- Wire:**
Canada Wire & Cable Co., Ltd.
- Wire Cloth:**
Northern Canada Supply Co.
Greening, B. Wire Co.
- Wire (Bare and Insulated):**
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.,
- Zinc Spelter:**
Canada Metal Co., Ltd.
Hoyt Metal Co.

THE CANADIAN MINING JOURNAL
ALPHABETICAL INDEX TO ADVERTISERS

A

Allen Whyte & Co. 10
American Zinc Lead & Smelting Co.

B

Balbach Smelting & Refining Co. 10
Blackwell, G. C., Sons & Company, 12
Beatty, M. & Sons
Berger C. L. & Sons 12
Brigstocke, R. W. 11
British Columbia, Province of 8
Burns & Roberts 10
Burnett & Crampton

C

Campbell & Deyell, Ltd. 11
Canadian Allis Chalmers, Ltd. 6
Can Chicago Bridge & Iron Wodks 8
Canadian Explosives, Ltd. 30
Canadian Fairbanks-Morse Co., Ltd.
Canada. H. K. Porter, Ltd. 12
Canadian Milk Products
Canadian National Railways 9
Canadian Labratories, Ltd. 12
Canadian Link Belt Co.
Canadian Ingersoll Rand Co., Ltd. . . . 3
Canada Foundries & Forgings, Ltd. 21-10
Canadian Wire & Cable Co.
Canadian Rock Drill Co. 32
Canadian Steel Foundries
Canada Carbide Company
Canada Metal Co.
Canadian Brakeshoe Coy. 7
Canadian Sirocco Co.
Capper Pass & Son, Ltd. 12
Consolidated Mining & Smelting Co.
Coniagas Reduction Co. 27
Constant, C. L. & Co. 7

D

Deister Concentrator Co. 4
Denver Rock Drill Mfg. Co. 32
Deloro Smelting & Refining Co. 4
Department of Mines, Canada 2
Dewar Mfg. Co. 9
Diamond Drill Carbon Co. 32
Diamond Drill Contracting Co. 12
Dominion Coal Co., Ltd. 25
Dorr Co. 11
Dresser, Jno. A. 11
Dunlop Tire & Rubber Co., Ltd.
Dwight & Lloyd Sintering Co., Inc 8
Dom. Engineering & Inspection Co., Ltd. 10

E

Electric Steel & Metals Co., Ltd.
Engineering & Machine Works of Canada 7
Everett & Co.

F

Fleck, Alex.
Ferrier, W. F. 11
Fasken, Robertson, Chadwick & Sedgewick 10
Fraser & Chalmers of Canada, Ltd.

G

Garthshore, John J. 12
General Engineering Co. 12
Gilman R. T. Co. 9
Goldsmith Bros., Smelting & Refining Co., Ltd. 10
Greening, B. Wire Co. 1
Goodyear Tire & Rubber Co. of Canada, Ltd.

H

Hadfields, Ltd. 34
Hall, G. C. & Co.
Hamilton Gear & Machine Co. 10
Hardinge Conical Mill Co. 16
Hassan A. A. 11
Hendrick Mfg. Co. 12
Hersey, Milton Co., Ltd. 11
Heys Thomas & Son 11
Hull Iron & Steel Foundries, Ltd. . . . 14
Hoyt Metal Co. 34

I

Imperial Bank of Canada 9
Imperial Oil Co.
International Business Machines
International High Speed Steel Co. 25
International Nickel Co. of Canada, Limited 28
International Nickel Co. 28
Inglis J. & Co. 27

J

Johnston, Matthey & Co. 10
Jones & Glassco

L

Laurie & Lamb
Ledoux & Co. 10
Lindsey, G. C. S. 11
Longyear E. J. Company 6
Lymans, Ltd. 23

M

McDonald, M. P. 11
MacGovern & Co., Inc.

MacKinnon Steel Co., Ltd. 23
Marsh Engineering Works, Ltd. 11
McEvoy, Jas.
Mine & Smelter Supply Co.
Mond Nickel Co.
Mussens, Ltd.

N

Northern Canada Supply Co.
Nova Scotia Steel & Coal Co. 5
Nova Scotia Government 6

O

Ontario, Province of 13

P

Pacific Coast Pipe Co., Ltd.
Peacock Bros., Ltd.
Pennsylvania Smelting Co. 10
Powley & Townsley 7
Prest-O-Lite Co. of Canada, Ltd.

Q

Quebec, Province of 5

R

Ridout & Maybee 12
Rogers John C. 11
Rogers, Geo. R. 11
Reddaway, F. & Co.

S

Smart-Turner Machine Co.
Smith & Travers Company 11
Standard Underground Cable Co. of Canada, Ltd.
Stewart, Robert H. 11
Sudbury Diamond Drilling Co., Ltd. 10
Sullivan Machinery Co.
Swedish Steel & Importing Co.

T

Toronto Iron Works
Tyrell, J. B. 11

U

University of Toronto 7

W

Wabi Iron Works
Whitman, Alfred R. 11

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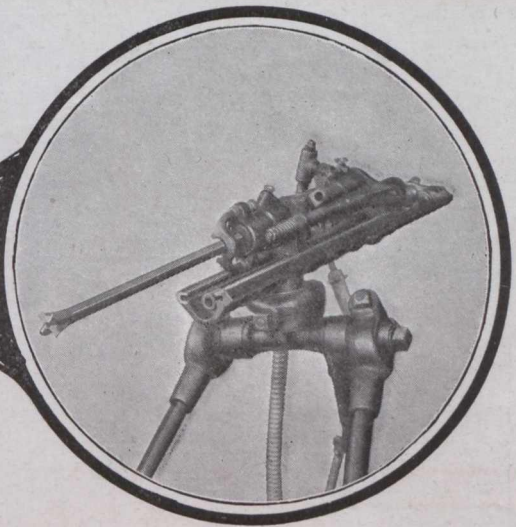
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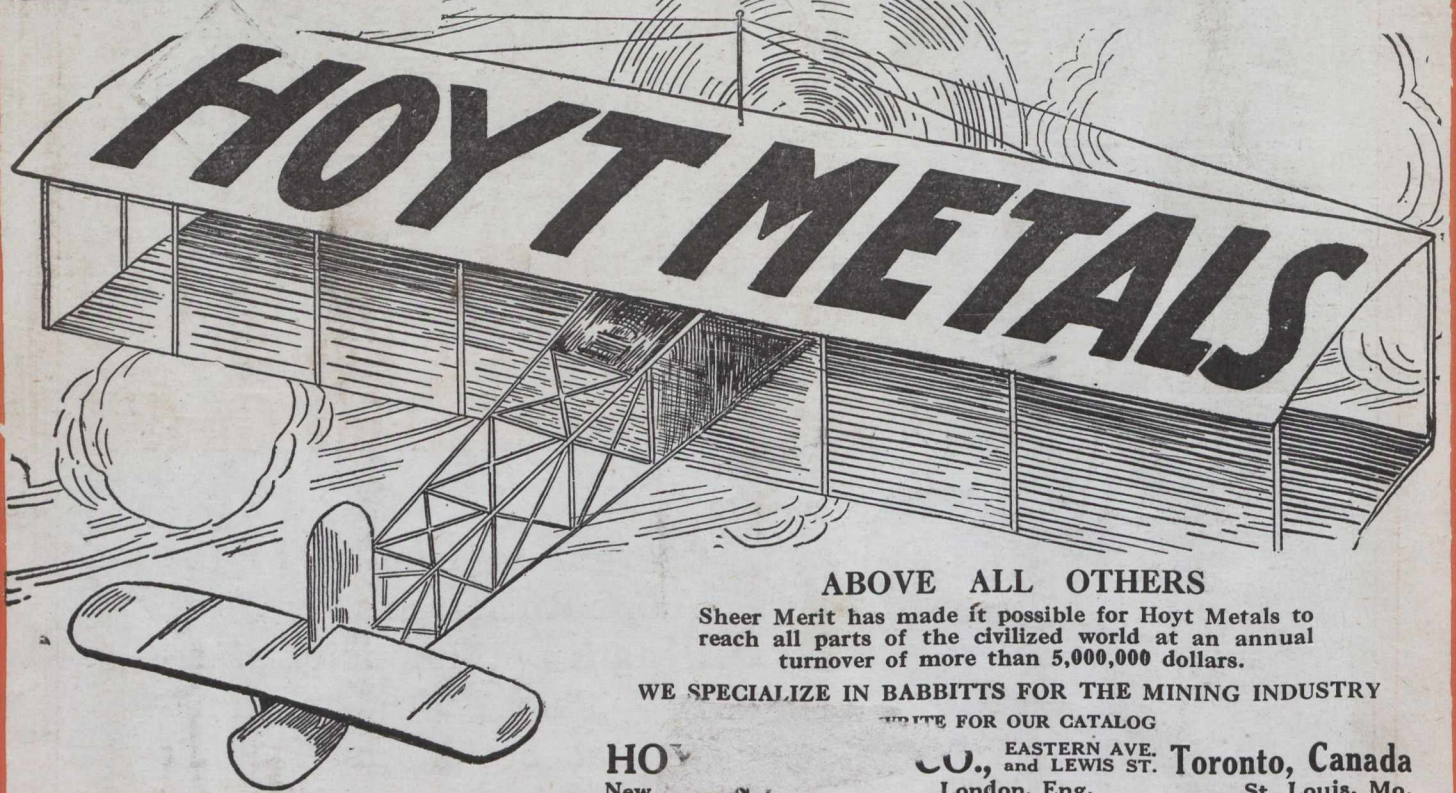
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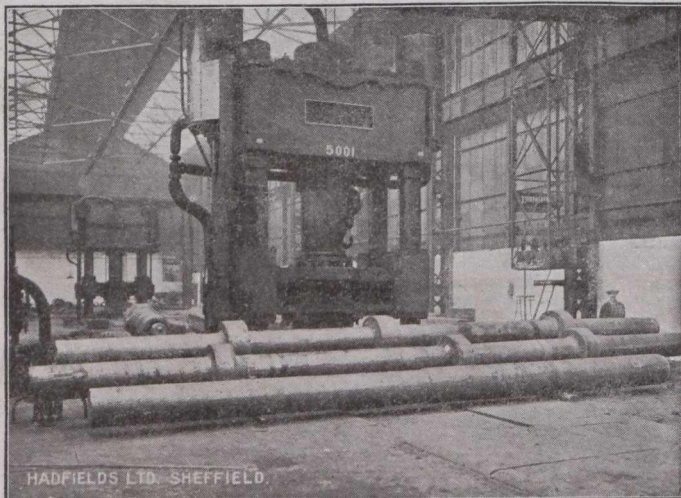
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