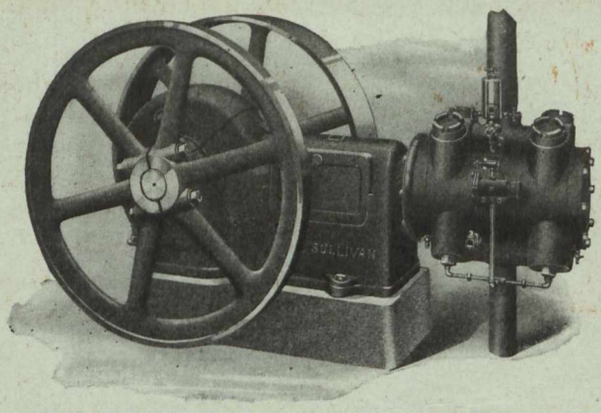
CANADIAN MINING JOURNAL

Vol. XLI. Gardenvale, P. Q., July 2, 1920. No. 26

AIR COMPRESSOR RELIABILITY



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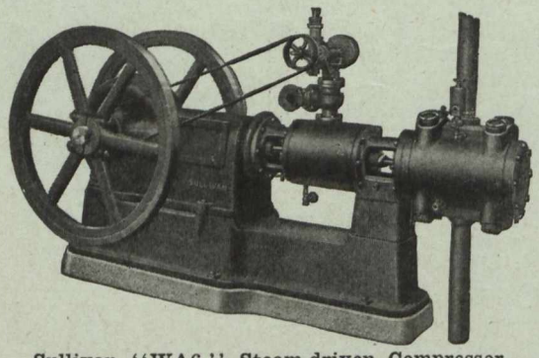

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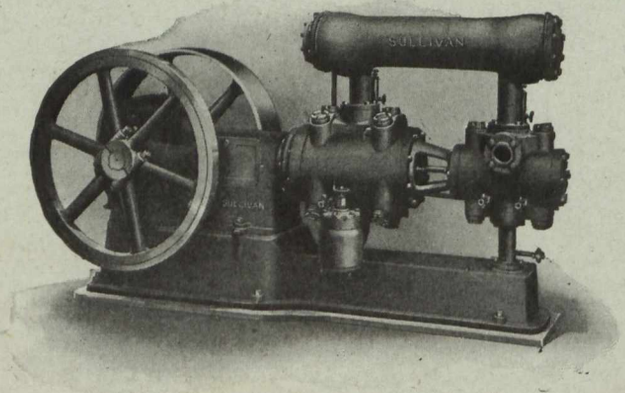

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HON. H. MILLS, Minister of Mines.

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

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

Dividends and bonuses paid to the end of 1918 amounted to $13,359,210 for gold mining companies, and $74,810,521 for silver mining companies, or a total of $88,169,733.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. Hydro-electric power is available in many parts of the Province, and many undeveloped water-powers remain to be harnessed. A miner's license costs $5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 day's assessment work on a claim, patent may be obtained from the Crown on payment of $2.50 or $3.00 per acre, depending on loca-tion in surveyed or unsurveyed territory.

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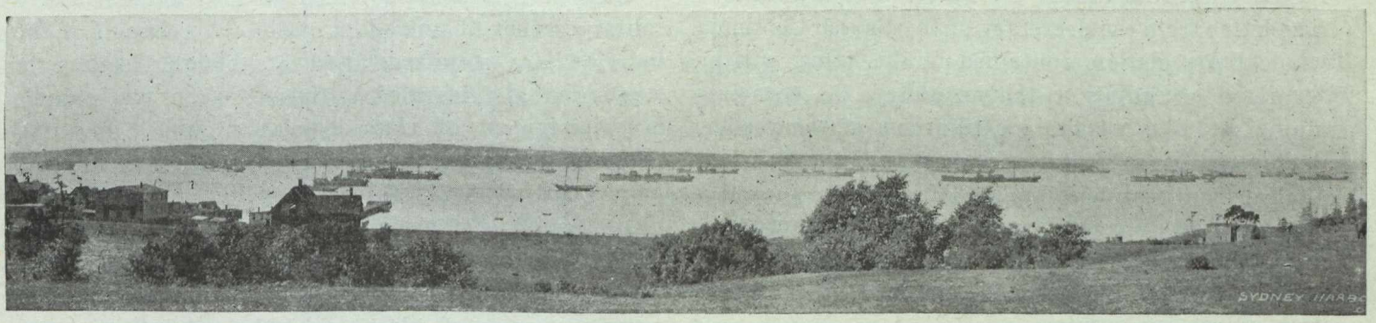

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EDITORIAL

The Reasoned Optimism of Canadian Geologists

Two significant statements have recently appeared in print made by geologists who have a thorough knowledge of Canadian rock formations. Writing in "Canada," Dr. Miller concludes an article dealing with the occurrence of silver in Ontario by remarking: "When Ontario's resources become better known there "is little doubt that further prospecting will lead to "discoveries quite as wonderful as those of Cobalt." There is no person better qualified to form a judgment on this question than Dr. W. G. Miller.

Alfred R. Whitman, writing to Mr. C. G. Daimpre of Toronto, states "it is no longer debatable, but is an "established fact, that the whole Canadian field con-"sists of formation geologically favorable to the con-"currence of rich mineral deposits." "It has long "rankled in my mind"—writes Mr. Whitman—"that "a people enterprising and industrious in so many "ways as the Anglo-Saxons of today should so ob-"stinately ignore and neglect an area so rich and im-"mense, and so near to a dense and wealthy population "as the Canadian North."

Chase S. Osborn, in the "Iron Hunter" wrote: "North of us lies the vastest unexplored territory in "the world. I refer to the Dominion of Canada. It "is rich, and where it is untouched by man it is clean. "There is not a drop of unwholesome water nor any "poisonous insects or reptiles between Lake Superior "and the aurora borealis.....To young men of "courage and resource the limitless North offers the "cleanest fight in the World, and if you win, the "fruits of victory are plenteous and satisfying."

Charles Camsell, the recently appointed Deputy Minister of Mines, some time ago revised Dr. George Dawson's estimate of the unexplored territory of Canada. and concluded that one-quarter of the Dominion remains untouched by the prospector. He quoted Dawson as remarking in 1908 that the existence of so vast a stretch of unknown territory might be considered a reproach upon Canadians "as indicating a lack of justifiable curiosity towards what our country contains."

Mr. Camsell remarked: "That reproach still remains "on us, and will continue so long as such a large pro-"portion of our country remains unknown."

A glace through a year's issues of the "Canadian Mining Journal" will show how new is the knowledge of some Canadian mineral deposits, and how tantalisingly scant and inexact is the information that exists in regard to them. Descriptions have appeared in our columns of most promising finds of the precious metals in the pre-Cambrian rocks of the Upper Harricana River in Quebec, in similar formations in Northern Manitoba, and attention has been drawn to the richness of precious metal ores in Northern British Columbia. The discovery of salt at Malagash, Nova Scotia, and its association with potash-bearing minerals, more detailed information on oil possibilities, the occurrence of radium-bearing ores in Northern Ontario, and, in our last issue, Mr. de Lury's account of the detection of traces of tin in another part of Ontario, are at least suggestive, and indicate that a complete conception of the genesis and occurrence of mineral ores in Canada is only in the making. So far, our knowledge of these matters consists of disjointed and unconnected memoranda, and the patient labors of a few generations of workers, all too few for the territory to be covered—a territory only three parts known even at this date—adumbrate the appearance of a coherent whole, and the availibility of a sufficient accumulation of recorded data to enable a new generation of geologists to build a completed structure that shall be worthy of the herculean labors of their pioneer predecessors and instructors.

The consensus of authorities quoted combined with the periodical recording of new mineral discoveries justify a continued optimism in Canada's future as a mineral producer. Indeed we may look for further important discoveries as more and more the accumulated store of geological records are drawn upon and as the search for minerals in increasingly guided by deductions based thereon.

THE UNIONIZATION OF TECHNICAL MEN.

The letter from the Secretary of the British Columbia Technical Association, contained in this issue, will be interpreted according to the mentality, the economic training and the corporate affiliations of the reader, but its significant feature is that unionization of technical men is an accomplished fact in one province of Canada. The reference in the concluding paragraph to a "Canadian Technical Association" is probably prophetic in the issue of being an intelligent anticipation of coming events.

The meat of the letter is the clear-cut statement: "The primary object of this Association is the protec- "tion and advancement of the material welfare of "its members." It fell to Dr. Turnbull's lot at the Vancouver Meeting of the Canadian Mining Institute to acquaint that gathering with the aims of the newly formed Association, and in doing so he emphasised service as the primary object. He stated that the Association did not want to adopt the trade union method of forcing concessions if they could be obtained in any other way. Between service to others and self-interest Dr. Turnbull suggested a midway path could be found, and concluded by advising those technical men who did not agree with the aims of the Association to "come in, and make it suit you." It is just as well to avoid ambiguity, and as we suggested in this column some months ago, while the British Columbia Association began by making "service" the keynote of its policies, it is useless to disguise the fact that the genesis of this association, and similar associations in other countries, is the necessity laid upon the technical men either to organize for self-protection, or suffer piecemeal disintegration of all their hopes and ambitions in life.

The increase of the material welfare by any body of men is an understandable aim, much preferable to any claim for consideration based upon public interest. Notwithstanding all the Christian virtues supposed to reside in self-abnegation, it is generally regarded as eminently proper that men should look after their own. It is a viewpoint that all can understand, and the British Columbia Technical Association has done the proper thing to declare its real objects so unmistakably.

At the same time there is much danger in undue emphasis of the statement that the technical workers constitute a "third class," the remainder of the public being composed of Labor and Capital. There is also very much to be said against the attempt to legislate the prescription of the status and practice of technical employment in such wholesale blanket enactments as the draft of the Professional Engineers Act which the British Columbia Technical Association originated and backed in its progress through the Legislature of that Province. Class consciousness is a thing that is very much overdone in these days, and it is a thing foreign to the mentality of the technical worker, who is above all men an individualist and a solitary seeker of untrodden paths. A coercion of the individual, a standardization of thought leading to stagnation and lessened initiative, is an unavoidable accompanyment of class legislation and a too pronounced class consciousness. History abounds with examples of national culture that have declined and died because of the rigid division of the people into guilds, castes, priesthoods and classes. We believe the safeguard against such dangers lies in the eman- accompaniment of class legislation and a too processes, and would therefore endorse the recommendation already referred to that technical men should join their own organizations and assist in guiding along proper lines a movement that is already important, and bids fair to become much more influential and widespread.

Science has no bounds. The influence exerted upon mankind by scientific workers will not be in proportion to their mutual organization, but will arise in the future as it has done in the past from the unknown and often obscure investigator who plays very little part in the active life of men and is often careless of material welfare. The impossibility of defining the indefinable will always militate against the formation of technical workers into a bourgeois class, and our intellectual classes will persist as a vivifying, and sometimes disturbing element in our national life.

A further responsibility devolves upon those who advocate the unionization of technical workers, namely, that by a process which can be seen in daily operation in Canada, policies may originate which will eliminate from the organization those who enter the ranks of the employer and those daring and ambitious souls who will run their lifecourse untrammelled and scorn direction from any course. Thus such an organization may tend to become mediocre in is composition, and it will devolve upon the leaders to prevent a lowering of professional attainments and the creation of a class that will be midway between the trades unionist and scientific workers of acknowledged eminence, and content to stay there.

.. ONTARIO GOVERNMENT ASSISTING IN .. MARKETING ORE.

Development of the mineral resources of Ontario is making good progress in spite of unfavorable conditions. Better progress might, however, be made if those who develop properties could more readily obtain some return from the preliminary work. At present the producer of small lots of ore finds the cost of marketing very high. Consequently production of metals in Ontario is confined to a comparatively small number of properties, most of which have costly equipment.

From time to time there has been some discussion of the advisability of establishing Government stamp-mills

for the treating of gold ores. It has been pointed out that in Australia a very large number of men are able to market gold from their properties without building expensive mills themselves. One mill serves for many small producers and the miner is then somewhat in the position of the farmer who can sell his grain to the miller. Mine owners of this class in Ontario are not as numerous as they should be. There are many properties lying idle because they are commonly considered as individual properties that would have to bear the burden of costly plant, rather than as sources of ore for a customs plant.

At Cobalt there has been some degree of co-operation between mine owners in treating ores. The customs concentrator has proven of great help in increasing production. Sources of ore have changed, but the concentrator has been kept continuously in operation and many improvements made in treatment methods. The ore sampling works established by Campbell and Deyell and recently taken over by the Ontario Government has also served a useful purpose and seems destined to play a vital part in the development of a new phase in the mining industry in Ontario,

Since the Government took over the plant it has been put in better shape to meet the requirements of mine oprators. A very considerable portion of the product of Cobalt is now sampled at this plant and the assaying done here is becoming more and more the basis of transactions between sellers and buyers.

A feature of the work now done at this Government owned and operated sampling plant that could be developed with advantage to small producers is that of assisting in the sale of ore sampled. The producer of small amounts of silver ore can now ship to the Government plant and have his ore sampled there and sold. As yet comparatively few producers have taken advantage of this means of disposing of ore; but a beginning has been made and many will be glad to learn of the Government's endeavor to assist in marketing ore.

CANADA'S FUEL PROBLEM.

The Interstate Commerce Commission of the United States has directed that after June 24th priority in car supply and preference in traffic movement is to be accorded to bituminous coal for trans-shipment to coastwise points. The intention of this order is to help the bituminous coal situation in the New England States and the vicinity of New York. Its effect will be to place a restriction, which may or may not amount to a complete embargo according to domestic needs, on the export of bituminous coal from United States Atlantic ports.

As under existing conditions of dependence on the United States for coal supply, Canada is, in this regard, merely an extension of the United States, it is necessary that whatever regulatory action is taken by the Government of the United States in regard to coal distribution, must be adopted in Canada also. The Canadian Government has therefore conferred the necessary powers upon the Board of Railway Commissioners, a proceeding that seemed to offer the best way out of an immediate difficulty. Probably the country, as did Parliament, will approve of course taken and will agree that the Board of Railway Commissioners is the body best fitted to handle a situation that is so very largely a difficulty of transportation.

Nevertheless, the action of the Government is nothing more than a temporary measure to meet an immediately pressing situation, and it promises no security against the annual occurrence of a condition that is caused by a chronic fuel inadequacy occasioned by the non-development of our domestic coal resources.

Deserved recognition of the good treatment Canada has received from the United States was accorded by speakers on both sides of the House when the Resolution above referred to was under discussion, and several speakers hoped for a continuance of friendly relations between the two countries. This is something that all the sane people on either side of the line take for granted, but what has the question of coal supply to do with the international relations? Canada's fuel problem is her own, and can only be solved by Canadians. What we take to be the outstanding fact connected with the supply of bituminous coal in Canada is that the Canadian production has steadily declined year by year, whereas the production of the United States has rapidly mounted by annual increments of astonishing proportions.

The effect of increased exports of coal upon domestic supply in the United States has, we believe, been exaggerated. The fuel difficulty in the United States in a reflex of the neglect of railways and railway equipment in years past. The term "car shortage" includes many other deficiencies besides a numerical shortage of rolling stock. The output capacity of the coal mines in the United States has never been really tested because the bottleneck of transportation has always prevented them from achieving the maximum of production. In Canada the tonnage of coal that has been shipped to Europe is absurdly small when compared with the actual deficiency in production, and in Nova Scotia the whole of the tale is told when it is pointed out that the output capacity of the collieries is at this time 5½ million tons annually, and that in 1914 it was 7½ million tons. Similar comparisons could be made with regard to the coal production of British Columbia and Alberta

If Canada would produce more coal there would be enough for our own domestic uses and a much greater margin for export than has ever been seen yet.

We would repeat the suggestion made in these columns last week, namely, that a permanent body should be formed to study the means by which coal production

can be increased in Canada. The basis for this unusual suggestion is a belief that unless Canada becomes self-supporting in bituminous coal supply she must, for obvious reasons, lose her national identity.

WILL MAKE NEW GEOLOGICAL SURVEY OF COBALT.

Mr. Cyril W. Knight, Assistant Provincial Geologist, is now at Cobalt making a study of the geology of the camp for the Ontario Bureau of Mines. Mr. Knight was Dr. W. G. Miller's assistant when the first examination of the discoveries at Cobalt was made by the Bureau. He helped to make the preliminary map in 1905 and the larger scale detailed map prepared by the Bureau in 1906-07. He has since made some underground studies, and is now beginning a systematic examination of the area.

The development of the several mines at Cobalt has given much information that is not easily obtainable by outsiders. The several companies have learned much about the nature of the deposits since they began to work them and the information has been pooled to some extent. There is however much work to be done that is in the general interest and the Bureau is looked to for geological work that individual companies are unwilling to undertake. It is not unlikely that systematic study will result in the obtaining of data that will help in the search for more ore.

CORRESPONDENCE

The Editor, Canadian Mining Journal.

Dear Sir,—Acting upon instructions from the Executive Committee of the Provincial Council of the British Columbia Technical Association, I append herewith a brief statement of the history and accomplishments of our organization, with the hope that it may be of some service in inaugurating similar organizations in other provinces of Canada.

The action of the Toronto Branch of the Engineering Institute of Canada in drawing up resolutions which were forwarded to their headquarters, asking that an organization upon similar lines to those of the B.C.T.A. should be formed, is a further reason for our venturing to write to you upon this subject at the present time.

No doubt you are aware of similar movements in Europe, such as the Federation of Professional Workers in Great Britain and also in the United States, such as the American Association of Engineers.

"Labor," by means of "Unions," is forcing up "Wages" for the "Laborer." "Capitalists and Employers" by similar combinations are raising commodity prices. Neither of these two great classes are interested directly in promoting the welfare of the technical worker. Unless some effective force is organized the product depending upon technical effort will continue to be appropriated mainly by the two organized classes. A nation-wide combination of professional workers is the only effective method of asserting that there is a third class whose rights must be properly considered. That the existence of this third class is rapidly receiving prominent recognition is indicated by the discussions that took place in the House of Commons at Ottawa on May 7th last, on the establishment of a National Research Institute in Canada. For example, Mr. Alfred Thompson, Member for Yukon, made the following statement (See House of Commons Debates, May 7th, 1920, p. 2229):

"Canada is rich in mineral resources—immensely rich—but in order to transmute these resources into commodities which the world needs, one thing particularly is required, and that is applied science. Industry you must have—you must have the intelligent artisan; you must have people in the country who have faith enough in its future to put their capital into manufacturing enterprises; but without science that labor and those manufacturing enterprises would not go very far."

The demand for applied scientists and researchers is greater than the supply. What price should be paid for our absolutely essential and primary commodity Who is to dictate the price? These are questions that we alone can settle.

Many professional and technical organizations exist in Canada. The primary object of these existing organizations is essentially the advancement of knowledge. In February, 1919 a number of technical workers in Britich Columbia co-operated to form the British Columbia Technical Association. The primary object of this Association is the protection and advancement of the material welfare of its members. At the same time this protection operates to the benefit and service of the public by refusing recognition of the pseudo-technologist.

Our infant organization slightly over a year old has in our numerically small province, already about 500 members, with local branches at Vancouver, Victoria, and Cumberland. The membership consists of Civil, Mechanical, Electrical, Chemical and Mining Engineers, Chemists, Geologists, Architects, Naval Architects, University Professors and allied professional workers.

I enclose for your perusal copy of our Constitution, By-laws, list of members, together with our First Annual Report, and would particularly call your attention to the following results of our work:—

(a) List of members to date.

(b) The Professional Engineers' Act of B.C. This Act was based on the Engineering Institute of Canada Model Bill, and was fathered by the Engineers' Joint Legislation Committee. The delegates from the B. C. Technical Association, backed by the organization throughout the province, were very active in working for the passage of the Act.

(c) The Architects' Act of B.C. Our Association was able to give valuable assistance to the Architects Committee in charge of the Bill (a number of whom were members of the B.C. Technical Association).

(d) The Schedule of Minimum Salaries for Civil Engineers.

In addition, special committees have under consideration the preparation of scales of Minimum Fees for Civil Engineers, and also scales of Minimum Fees and Schedules of Minimum Salaries for Mechanical, Electrical, Mining and Chemical Engineers.

Notwithstanding the results already achieved, the Council and Members of our Association feel that our work is circumscribed and that only by the formation of similar organizations in the other provinces and the subsequent federation into a "Canadian Technical Association" can we all obtain the just recognition and dividends that our scientific knowledge and work demand. This will unquestionably react to the advancement of Canada and of our Empire by encouraging more of our youth to choose a scientific career.

We shall be pleased to have you consider our suggestion favourably and to make any enquiries of us that may be of assistance to you and ultimately to our mutual benefit.

Yours faithfully,

R. SNODGRASS,
Secretary-Treasurer.

MINING AND PREPARING DOMESTIC GRAPHITE FOR CRUCIBLE USE.

The United States Bureau of Mines has recently issued Bulletin 112, "Mining and Preparing Domestic Graphite for Crucible Use," by G. D. Dub and F. G. Moses. The work covered by this bulletin was undertaken in connection with the war minerals investigations of the bureau.

Before 1915 nearly all the graphite used in crucible manufacture in the United States was imported, chiefly from Ceylon, Madagascar and Korea. Little domestic domestic graphite was used, that mined being chiefly employed for the manufacture of paint, lubricants, foundry facings and other purposes. Not only was most of the graphite imported, but also all the clay used in crucible manufacture, this clay coming from Klingenburg, Bavaria.

As a result of clay imports from Bavaria being entirely cut off by the war, crucible makers had to turn to domestic sources of clay. The clay problem was soon well in hand, it being found that domestic clays could be obtained that compared favorably with foreign clays.

The use of domestic flake graphite in crucibles, however, in proportions of more than 25 per cent. mixed with imported graphite was not attended with much success.

However, the domestic graphite mining and milling industry expanded rapidly under the pressure of war conditions, being aided by a request of the War Trade Board on August 10, 1918, that crucibles manufactured during the balance of 1918, should contain 20 per cent. domestic flake and 25 per cent. thereafter. At the end of the war there were 39 graphite plants in Alabama, 3 in New York, 5 in Pennsylvania, and 3 in Texas.

The graphite investigations of the Bureau of Mines covered three phases: (1) Field examination of the graphite deposits in the States mentioned, and a study of the methods used in mining and preparing graphite for market; (2) Experimental work on the concentrating and refining of crucible graphite to improve the quality of the product and lessen waste; (3) Experimental work in crucible manufacture to determine the properties of domestic flake and the maximum proportions that might be used without impairing the qualities of the crucibles.

The present importance of these investigations lies in the fact that the domestic industry, if it is to survive the competition of imported graphite, which can be mined and prepared more cheaply than domestic flake, must rely on improved and more efficient methods of producing and preparing graphite. Also, for full extension of the market to domestic producers, crucibles made entirely of domestic flake or nearly all domestic flake, in combination with domestic clays, should be developed.

The bulletin mentioned above outlines the results obtained in the first two phases of the investigation.

The bulletin is in two parts; the first part describes the methods of mining and milling used, suggests a standard method of sampling finished graphite, and describes a rapid and convenient method of analysis developed at the Pittsburgh station of the bureau, which had been assigned the anatylical work and microscopic work. The second part describes experiments on the concentration and milling of graphite, made at the Salt Lake City station of the bureau.

The experimental work on crucible graphite, which was assigned to the Columbus station, will be described in a separate bulletin to be published later.

Copies of Bulletin 112. "Mining and Preparing Domestic Graphite for Crucible Use," may be obtained free of charge by addressing the Director of the Bureau of Mines, Washington, D.C.

ANNUAL REPORT OF THE NEW BRUNSWICK OIL COMPANIES.

Maritime Oilfields.

The report of Maritime Oilfields from October 1st to December 31st, 1919, states that there is a profit of £6,629, in which is included dividends still to be declared of 10 1-3 per cent., less tax, on the Six per Cent. Cumulative Preference Shares and 5 per cent., less tax, on the Ordinary Shares of New Brunswick Gas and Oilfields, Limited. There is a credit balance, including £400 brought forward, of £7,000, out of which, subject to payment of dividends of New Brunswick Gas and Oilfields, Ltd., the directors recommend a dividend of 9 per cent., less tax, on the Ordinary Shares, absorbing £6,237 and leaving to be carried forward £793.

DRILLING IN WEST DOVER OILFIELD, ONT.

Mr. F. H. Stover of the F. H. Stover Drilling Company, recently announced in Toronto that the12-inch drive pipe is set in the Vacuum Gas & Coal Company's well in the West Dover field, and that the well is down 300 feet, and the 10-inch casing will be set at once, when drilling will proceeed as quickly as possible.

The Vacuum Gas & Oil Co.'s West Dover well is situated 600 feet from Petrol Oil & Gas Co.'s No. 1 well, northwest toward the Union Natural Gas Co.'s wells.

Mr. Stover has contracts for five deep wells in the West Dover field.

The Steel Company of Canada has closed down its Hamilton Plant, and two thousand men are thrown out of employment, through coal shortage. The coal used in steel plants is bituminous, and not anthracite. Canada has no anthracite, and must depend on the United States for a supply of that not indispensable, although desirable fuel. Next to the United States, Canada has more bituminous coal than any other nation in the World, and it is bituminous coal that is obtainable in such inadequate quantities in Canada at this time.

The Coal Mining Tradition of the British Empire

Presidential Address by Sir John Cadman, Before the Institution of Mining Engineers.

The British Empire is a world fraternity and the most influential Leauge of Nations history has yet recorded. It was founded by the constant flowing-out from the British Isles of adventurous spirits who, with their descendants, have kept in touch with the land of their origin. The material link has been maritime trade, based upon the mining of coal in Britain, the exportation of manufactured articles with the aid of British coal, and the export of manufactures and of coal in steel ships made in British yards, bringing back cargoes of the produce of those countries where British emigrants have settled.

Wherever British settlers founded states they have emulated, and in some cases, through the opulence of their resources, have outstripped the British Isles in the production of coal and iron; and, in every case, their wealth and importance stands today in proportion to the production of coal and iron within their borders.

In Sir John Cadman's speech there is more than a hint that if decline should mark the future of the British Isles, it will occur because of lessened coal production, and the President of the Institution of Mining Engineers—the parent society of all British mining societies—is living up to the traditions of the race and the Institution when he dares to assess the probable effects upon the Empire of the failure of the British Isles in coal production.

The figures quoted by Sir John Cadman, which were compiled in Toronto by the 12th International Geological Congress in 1913, show that in estimated physical content Canada has sixty times more coal than remains in the British Isles. Such a statement is not, however, sufficiently revealing unless it takes into account the geographical position of the coal deposits and their physical characteristics, but it points distinctly to Canada as the successor of the British Isles in those essential industrial activities that have founded the Empire and knit it together. The burden of Empire is being shifted to Canada. In the light of Sir John Cadman's presentment is it too much to say that Canada's neglect to develop her own coal resources, her thoughtless policy of ease and dependence upon the United States for coal, our present defenceless and humiliating position, have far wider bearings than the present comfort of eight millions of persons in Canada? In a time of world-wide necessity, Canada is found wanting in an essential of national independence, and when world-tides are setting in new directions and it is most desirable that our young country should take these tides at their flood, we are reduced to impotence because our statesmen are unacquainted with the coal-mining tradition of the Empire which, to those who will read it, recites that naval, military and commercial competence all proceed from and are based upon coal.—Ed.

We meet to-day under conditions that are very different from those which were with us last year. Happily the war is over, and although its ravages are still with us, and the irreparable losses we have sustained are ever in our minds, we rejoice that, with our gallant Allies, we have won a victory which will add another page of honour to the history of our Great Empire, and which we hope and pray may have established the peace of the world for many years to come.

In reflecting upon a subject for my Address, I experienced a difficulty, for there is a problem which has been so prominent of late to which I feel that I must refer, a problem which, however, has become so controversial and has raised such divergent views, that I am bound to confess I feel some hesitation in referring to it.

Realizing to the full the risks I am running, and by no means without a feeling of diffidence, I am going to ask you to allow me to direct your attention to that industrial problem which is exercising so much public attention to-day. And in doing so I shall endeavor to indicate the "big side" of the problem with which not only the coal-mining industry of Great Britain, but the whole Empire is brought face to face.

I am, therefore, going to preface my remarks by directing attention to the coal resources of the world, with a view to indicating the magnitude of the subject, and if possible also to draw attention to the poor prospect there is for our industrial future unless we broaden our views and realize our true position in relation to the world's coal resources.

It is so easy for us to become lost in a mist of internal differences, and to forget all that is terrible war has taught us. Never was there a time when the necessity for combination of effort should be more obvious to us, and never was there a time, moreover, when energy and enterprise were more necessary to the welfare and prosperity of Britain.

Let us consider then the estimated coal resources of the world, first of all in relation to their geographical situation, and then with regard to their proximity to industrial centres and their national grouping.

The figures shown on the map exhibited are taken from the *Coal Resources of the World*, compiled and published by the Twelfth International Geological Congress (Canada) in 1913; they include all seams from 1 foot in thickness and over, and down to a depth of 4,000 feet. The estimated reserves of the world, expressed in million tons, are as follows:—

	Million tons.
America	5,105,528
Asia	1,279,586
Europe	784,190
Oceania	170,410
Africa	57,839
Total	7,397,553

These quantities may be subdivided, in accordance with the various nationalities, as follows:—

	Million tons.
United States	3,838,657
British Empire:	
Canada	1,234,269
Great Britain	189,533

Australia	165,572	
India	79,001	
British Africa	56,849	
New Zealand	3,386	
Newfoundland	500	
British North Borneo	75	
		1,729,185
China		995,587
Germany		423,356
Japan		7,970
Rest of the world		402,798
Total		7,397,553

Although these figures are only approximate estimates, the basis on which they have been compiled is the same, and for comparative purposes they are of great interest and value.

It will at once become evident that if the potential value of coal resources is a measure of a country's industrial wealth, the United States of America, China, and Germany, with their stupendous reserves, will last longer in the industrial race than the United Kingdom, but that the British Empire taken as a whole, with her resources scattered about the world, is nevertheless in a position of considerable strength.

Let us examine now the rate at which these reserves have been depleted. It is significant how the order of annual output by nations is arranging itself gradually in accordance with the relative potential magnitude of each country's total resources.

These figures are very striking, for they indicate that for a short period prior to the war the output in the United States of America had increased at an annual rate of 6 per cent, Germany 4 per cent, China 3 per cent, and Great Britain 2 per cent. And it is clear, moreover, that unless some new source of power be discovered, the dominant industrial position will continue to move westward.

It should be observed that Great Britain has occupied a unique position in the past, in that her coalfields are distributed within easy reach of the seaboard, and that as the coal merchant of the world she could place her surplus coal into ships with a facility not possessed by any other nation. With the growth of railways however, this natural advantage is by no means as great as it was. As some indication of the change in this respect, and indeed as an indication of the coal-using capacity of various nations in their industrial development, the railway mileage of some of these countries may be cited; and for this purpose the following figures are of interest:—

	Date	Miles of Railways.		
Country.	opened.	1840.	1906.	1916.
United Kingdom	1825	1,857	23,063	23,701
Germany	1835	341	34,563	37,894
France	1828	....	24,755	32,030
Canada	1836	16	22,452	38,604
Japan	1874	....	4,783	5,856
China	1883	....	.....	6,109
United States	1827	2,818	222,340	259,705

It is, moreover, instructive to examine the shipping tonnage, as recorded in Lloyd's Register, which again may be taken as a measure of a country's industrial capacity:—

Tonnage of Vessels of 100 *Tons and Upwards.*

Country.	1886.	1906.	1916.	1919.
British	11,165,092	17,611,096	20,901,999	18,607,875
U. S.	2,083,002	4,241,589	6,148,861	13,091,773
Worlds total	21,507,856	37,554,017	48,683,136	50,919,273

It would seem that about the year 1923 the United States will have a tonnage equal to that of Great Britain.

Before I elaborate upon the foregoing figures, I should like to say a few words regarding the conditions of production and consumption of coal as an article of wealth.

It will be observed that our resources are distinctly limited, and it may be assumed, with our limited knowledge of the nature of any new source of power, that, compared with any other nation, dearth of coal to this country must mean national ruin.

Enough has been said elsewhere as to the gigantic increase in the population of this country during the past centuries, of the increases in our exports, in all commodities, and of the increase in those areas comprising the British Empire.

But when we consider what have been the factors at work which have made this British Empire, we are forced to no other conclusion than that it is due to the growth of our coal-driven industries and the liberation of human energy.

I do not propose to touch upon this latter phase other than to say that no matter to what extent the enlightened policy of liberty which crept into Europe at this date, has played a part in our general prosperity, it would have been impossible to attain the position we enjoy to-day if it had not been for the power we possessed in our coal resources.

Now, what are the particular aspects of the question that are exercising the minds of thinking people in Great Britain to-day? There is great industrial unrest, a persistent clamoring for better conditions and better wages on the one hand, and for profits and freedom from Government control on the other. So violent did this controversy become that the Coal Industry Commission Act was introduced, and for the purpose of considering the question from every standpoint a Commission of Enquiry was appointed on which sat some of the most violent and vociferous members of each school of thought.

For a time, at any rate, it has afforded some relief to the tension under which the extremists were labouring. Many important points have been considered, but in the deliberations that took place the large aspect of the problem remained in obscurity, and the published proceedings of the enquiry can hardly be said to have added dignity to the parent coal industry of the world.

No sane person will deny that modern civilization requires better living conditions for all; no experienced observer ,moreover, will fail to deplore the paucity of capital development into which a great many of the collieries of the country have dropped; nor will he allow his scientific mind to be satisfied with the extravagant waste of fuel that takes place in almost every industrial and social organization in which coal is used.

At this juncture, when the facts are staring us in the face, and when the nation's industrial existence is in peril, it is lamentable to see such an exhibition of feeling.

What does this state of affairs reveal? It reveals a lack of organization in the industry as a whole, as well as a total ignorance of the rocks towards which we are slowly drifting.

A diminishing output is slowly having a serious effect upon us, and is indicated in the following figures:—

Total Coal Produced Per Annum Per Person Employed

Year.	United Kingdom.	Canada.	Australia.	United States.
1886	312	341	333	400
1900	298	457	426	494
1906	275	439	462	596
1912	244	472	542	660
1916	263	471	547	731

The cause of this diminished production will be found in the increased difficulty of working the coal —not in an absolute sense, for there are probably no mechanical difficulties within very wide limits which ingenuity cannot surmount—but in relation to the ease of working other coalfields to which our own have been, and in some cases still are, superior, but which are gradually gaining on us as our mines become deeper and their more accessible.

There has been much speculation as to the real cause of this diminished rate of output, and it has been said that a policy of restriction of output has been introduced and encouraged by the workers. I have never seen any tangible evidence of such a policy, and I do not believe it to exist; nor do I believe for a moment that the great body of workers in this industry, with their great traditions behind them, are capable of any such policy.

As I have indicated, the deeper the coal has to be drawn, the farther it has to be carried to the shaft and the less must become the output per man unless there be at the same time a progressive and organized introduction of mechanical appliances and better conditions that will enable the human factor to be utilized with greater efficiency.

It seems to me that we must produce cheap coal. By "cheap," I mean relatively cheap, as compared with the ruling prices of the world; and there must be a large surplus for export: for when our coal becomes scarce and dear, as it is temporarily to-day, the world will not adapt itself to our convenience, but will buy elsewhere.

As we know to our cost at the present time, rising prices for coal mean rising prices for every article consumed by the miners as well as by the people; furthermore it is obvious that with the high price of coal, pressure must be exerted continuously to secure the highest wages for the workers. And as ill-paid and discontented workmen generally mean inefficient labour, one is bound to recognize that the real remedy for the production of cheap coal does not lie in curtailing the wages of the workers.

The remedy lies in every section of the industry realizing that the only way in which this country's industrial position may be maintained is by increased efficiency on the part of every human unit in it, by more efficient use of plant and materials, by greater care in the way coal is made use of in the various manufacturing industries and in domestic life, and by the export of greater and greater quantities of coal.

If England does not wake up to the recognition of these fundamental essentials, she will assuredly be relegated to a position amongst the nations of the world very different from that which she occupies to-day.

So long as Great Britain continues to share in the great commerce of the world, so long will her coal-consumption and her output increase.

It is absolutely necessary that every advantage in the way of greater economies of motive power should be converted into capital to be devoted to the further development of the industry; and this applies not only to our collieries, but to every other industry as well.

It is unnecessary for me in an Address of this character to labour the fact that so little of the heat value contained in coal is utilized. It is well known that from 25 to 50 per cent of the total quantity of coal at present consumed can be saved and still the same amount of heat or power be generated. And in the discoveries still to be made in the better utilization of fuel, it is imperative that we should not wait for other naitons to give us the lead. We must stimulate the Watts and and the Murdochs among us, and must be lavish almost to the degree of the spendthrift in our investment in research, whether it be from the national or from the private purse. The coal-mining industry of the country has still much to do in this direction, and it is regrettable that the enlightened policy entered upon by the Doncaster coal-owners, under the able guidance of Dr. J. S. Haldane, and more recently by the Lancashire and Cheshire coal-owners, under the presidency of Mr. R. A. Burrows, has not been followed in other coal-mining centres.

It is in this direction that the solution will be found, rather in wrangling over such hypothetical discussions as to the merits or demerits of nationalization.

I do not wish to imply that considerable progress has not been made in the direction of economy in fuel: there are many industries in which great strides have been made. One has only to look at the progress in blast-furnace practice and in the development of the steam-engine. The excellent paper contributed by Messrs. Hill and Cork* indicates what has been done in this district.

It is not unnatural that nationalization should be suggested at this period of our existence, and we must not dismiss the suggestion and dogmatize as to any hidden motive which has stimulated those who advocate it, for I believe that they are sincere in their belief that it is a simple remedy and an easy way of meeting the tide of circumstance and the difficult national conditions with which we are faced.

I say it is not unnatural that such a proposal should be seriously advanced to-day. We have become so accustomed to Government control in the everyday affairs of life during the war, we are so inured to the establishment of new State departments and to new controllers, that the invasion of what were formerly regarded as the rights of the individual no longer shocks or alarms us. The various functions which it is suggested that the State should undertake in industrial and domestic spheres have assumed truly staggering proportions.

If, however, we reflect on what such State control will involve, we shall realize that it would convert the State into a trading concern and, sooner or later, would involve us in international complications which

* Trans. Inst. M.E., 1918-1919, vol. lvii., page 177.

could only increase the risk of war. We should ,in fact, be emulating the example of Germany, whose method we have learned to despise.

In business it is absolutely necessary to act promptly, to have a free hand, and take risks, and we know that with the most efficient Government department and the very best-intentioned of civil servants such conditions are impossible.

A department of State, constructed under our present Government machinery, must err on the side of safety. With the possibility of public disclosures resulting from mistakes, no business could exist which had to compete in the markets of the world.

Another and most important factor presents itself to the student of this problem. The State, occupying as it does a detached and impartial position, must bring its power into play in the settlement of industrial differences, and, in order to perform this function impartially and honourably, it cannot itself be the controlling authority.

I am almost tempted to think that it would be better for the prosperity of this country if the coal-owners and miners were to combine and form a gigantic trust, so as to stimulate the output and an ever-increasing export of coal, and thus ensure to Great Britain the retention of her place as a seller of coal to the world.

If by maintaining a high price of coal in this country the population could be impelled to find ways and means of using more effectively the heat values contained in the coal, it is conceivable that even this drastic policy might ultimately be to the national advantage.

If the great traditions of the coal-mining industry —an industry of which the country should be justly proud, an industry in which all that is noble and good in the human characteristics of the race has been so conspicuous for centuries—is to count for nought, in Heaven's name let us prepare for our gradual decline under the cloak of nationalization.

In my remarks to you last year I pointed out the vital need there was for all of us to pull together in harmony and work in the closest possible co-operation if we were to secure that victory which we were determined should be ours.

These words I might repeat to you to-day, now that the victory is ours and peace is with us again. There is as great a need as ever at present for that spirit of co-operation and comradeship in the whole of our organization.

The solution of the problem appears to me to lie in a better understanding and a fuller co-operation between all those engaged in the mining industry. We must do our utmost to get rid of misunderstanding, and eliminate the causes of labour antagonism and dissatisfaction. There must be personal as well as collective interest in the prosperity of the industry, and a real and sincere spirit of co-operation among everyone concerned. We must also be thoroughly awake to the need for greater efficiency in our methods and a more complete utilization of the heat values contained in our coal. There must, moreover, be a full realization of the fact, which none of you, I am sure, will question, that this problem is one which stretches far beyond our own shores, and in which is involved the future prosperity—nay, the very destiny —of our country; a realization, too, that our own existence is merged into that of a Greater Britain and that through the combined coal resources of the Empire we may still hold a leading place in the intellectual and industrial development of the world and bring peace and happiness to millions of its peoples.

T HE WORLD OUTPUT OF OIL IN 1919

"Petroleum Times," of London gives the world output of petroleum in 1918 and 1919 as follows:

	1919 (In barrels)	1918 (In barrels)
United States	377,719,000	355,927,716
Mexico	87,359,436	63,828,327
Russia	34,284,000	40,456,182
Dutch East Indies	15,780,000	13,284,936
Roumania	6,352,929	8,730,235
India	8,453,800	8,000,000
Persia	8,320,000	7,200,000
Galicia	6,255,300	5,591,620
Peru	2,560,000	2,536,102
Japan and Formosa	2,120,500	2,449,069
Trinidad	2,780,000	2,082,068
Egypt	2,548,000	2,079,750
Scotland	2,048,000	2,032,000
Argentine	1,504,300	1,321,315
Germany	925,420	711,260
Canada	220,000	304,741
Venezuela	245,300	190,080
Italy	38,254	35,953
Other countries (appr.)	25,000	20,000
Totals	559,539,239	516,801,354

With reference to Canada's contribution the following curious editorial comment is made:"..... "It must come as somewhat of a regrettable fact that Canada's production is on the down grade. Here, recent events leave favorable impressions, but we think that until the Dominion's shale reserves are commercially tapped, the Dominion can do little to supply the enormous demand which exists within its own borders." Unless there is a very widespread misapprehension among Canadian geologists it is a little too early to conclude that Canada's oil reserve is all contained in the oil-shale deposits of Nova Scotia and New Brunswick. It is also evident that London opinion attaches greater value to these oil-shales than has been accorded to them by Canadian investors.

NEW BRUNSWICK GAS AND OIL FIELDS

The report of the New Brunswick Gas and Oilfields for the period from August 1st, 1919, to December 31st, 1919 states that the gross revenue amounts to £40,773, and the net profit, after debiting against revenue all well sinking and deepening costs, except the cost of well 52 situated outside the area of the Stony Creek Field, is £18,670, to which add balance brought forward, £25,921, making together £44,591, out of which the directors have carried to general depreciation fund £15,235, bringing it up to £21,235. A dividend of £10. 6s. 8d. per cent. on the Preference Shares will complete payment on the cumulative preferential dividend to December 31st, 1919, including arrears, and the directors accordingly recommend the payment of same, less tax, together with a dividend of 5 per cent. (less tax) on the Ordinary Shares, leaving to be carried forward £17,810.

The Mineral Resources of Alberta

First Annual Report to the Mines Branch of Alberta, 1920.

The Province of Alberta has issued a first annual report on mineral resources made by Dr. John A. Allan, Professor of Geology in the University of Alberta. As stated in the letter of transmittal, the Report, being the first of its kind published by the Provincial Government, is largely a compilation of the information published to date by the Geological Survey and the Mines Branch at Ottawa. About four weeks was spent by Dr. Allan during the summer of 1919 in making a general field survey of some of the mineral deposits, chiefly those containing iron and salt, the observations then made being included in the Report. The eighteen different minerals of economic importance known to exist in Alberta are listed, and the individual occurrences are referred to in detail.

The minerals are: Bitumen, building stone, clay, coal, copper, gold, gypsum, iron, lead, mineral springs, natural gas, nickel, petroleum, phosphate, potash, salt, talc, and zinc.

In order of economic importance these occurrences may be listed as coal, natural gas, clays and bitumen, the remaining minerals being present only in small quantity, or of potential value only, in default of more exact information. The most interesting possibilities are the occurrence of petroleum and the possible association of potash bearing minerals with partially known occurrence of gypsum and salt. The impression is to be gathered from reading the Report that as yet very little is known about the far northern portion of Alberta.

The Report is a fair and discriminating statement of the mineral resources of a province that has hitherto been chiefly interested in agriculture, and has only recently acquired the urban population that requires the development of minerals, or that concentration of capital that renders mineral development possible.

Very little space is given in the report to the coal deposits of Alberta but it is not necessary to be loquacious when it is possible to preface the chapter on coal with the statement that: "Alberta contains 17 per cent of the coal reserves of the world, and about 87 per cent of the coal reserves in Canada."

Whether Alberta's other minerals will prove to be large in quantity and valuable in themselves, the persent state of knowledge of these deposits, as disclosed by the Report, will not permit of judgment at this time but their economic value will be relatively greater because of the proximity of so large a supply of bituminous coal. Speaking superficially, and basing the statement on what is admittedly only a superficial survey of the mineral deposits of Alberta, we believe that this province will some day be the seat of great chemical industries, having as their foundation the availability of coal in great quantity. The occurrences of salt are particularly interesting in this connection, and money spent on proving the occurrence of mineable salt, or sources of brine, will be well expended. A Calyx drill, to test the presence of salt, is being put down by the Provincial Government in the the vicinity of Fort McMurray and definite information is expected to be obtained early in 1920.

The chapter on iron-bearing rocks disposes of some fairy tales, and indicates that as yet no commercially workable deposits of iron-ore have been found. On the Sheep River, south-west of Okotoks, the presence of billions of tons of iron-ore has been reported in newspapers, but the Report states "not a single ton of rock exposed in this section would be classed as iron ore." Dr. Allan, quite rightly, remarks: "I wish to emphasise this point, that steps should be taken at once to prevent the circulation of such an erroneous report, which is most detrimental to the industrial welfare of the country when the facts are known."

Alberta should be very careful in the matter of iron ore. This material is of all raw materials dependant as to relative value upon location and the proximity of coal. A very lean ore within economically transportable distance of coal deposits is relatively of greater importance than rich ore situated at points remote from coal supply. The iron-bearing rocks of Alberta, so far as now known, are, according to report, disappointingly small in quantity and meagre in content of iron, and it may be that iron ore will have to be imported into Alberta, because one thing is very certain, namely, that wherever there is found a large deposit of bituminous coal of coking quality, there will be brought the ores necessary for metallurgical industries, of which iron smelting and steel manufacture is chief.

The mineral deposits of Alberta have a possible value out of all relation to their present commercial exploitation, and it would seem that there are some local problems that require to be solved before proper use can be made of the minerals of the Province. For example, the clays present difficulties in the drying stage of brick-making, and, as stated in the Report, "further investigation and experimentation on the physical properties of the raw material are urgently required before the manuacturer can be induced to operate on these resources." Similar problems are associated with the utilization of the bituminous sands on Alberta.

The Province is to be congratulated on the publication of this Report, marking, as it does, a stage in the development of Alberta, and that forward step on the historical road of human culture always signalized by the addition of mineral and metallurgical pursuits to agriculture.

Many of the problems of Canada, particularly the apparent conflict between the agricultural interests of the West and the manufacturing interests of the East, will disappear as Alberta comes into her own as the industrial centre of Canada, an evolution of the future that is predestined. As the flower is contained in the bud, so is an industrial dominance in Canada assured to Alberta through the possession of the greatest fuel concentration in North America. Coal she has beyond any doubt, and oil she may have, although that is not yet a demonstrated fact, and, sooner or later, Alberta will become dominant in industry, in population, in finance, in political influence and material power, as is the destiny of any country rich in coal beds and populated by a civilized and virile people, particularly if it is surrounded by a territory unprovided with coal resources.

SILVER IN ONTARIO.

By Dr. W. G. MILLER in "Canada."

The first great precious metal area discovered in North America east of the Rocky Mountains was that of Cobalt, Ontario. Prior to 1903, when this area was found, both gold and silver mines had been worked east of the mountains, but none of the fields were of first importance, and the belief had grown up that the precious metals in quantity were only to be found in the United States and Canada in the mountainous regions of the West.

The discovery of Cobalt has attracted attention to the many little-prospected regions that occupy a large part of Canada in the east and north. Silver veins were discovered at Cobalt in 1903, during the building of the Ontario Government railway—the Temiskaming and Northern Ontario. Owing to the fact that there was little real prospecting in the area at that time the discovery attracted little attention, and although Government officials, through publication, made the discovery known to the world, the public took little interest in it for a year and a half. The belief was strong that Ontario was not destined to become a great precious metal producer. Gradually, however, the value of the area came to be recognised, and by the second half of 1906 Cobalt was the centre of a great mining boom. The companies floated had an aggregate capitalisation of nearly £100,000,000. Of course, many of them were what are known as "wild cats," but a number of them have paid large dividends. Some, indeed, have paid in dividends two or three times their capitalization.

Four Metals.

The veins of cobalt are narrow and contain values in four metals, which, in order of their economic importance, are silver, cobalt, nickel, and arsenic. Since 1907, when mining began, the area, with two or three small outlying ones in the district, has produced about 300,000,000 ounces of silver. The value of the other metals produced there, especially that of cobalt, has also been large.

As regards the metal cobalt and its compounds, the mines of this area now absolutely control the world's markets. It is a curious fact that Ontario should have a monopoly not only of this metal, but practically all of the sister metals, nickel and arsenic. Both are necessities in modern metallurgy, especially in alloy steels.

A striking fact about the production of the Cobalt area is that about one-half of the receipts from the sale of ore have been paid out in dividends to the stockholders in the mines.

The Cobalt deposits, as a whole, require little capital to work them. One of the first men to begin work expended a total of $2,500 on labor, buildings, mining tools, etc., and produced ore that sold for $250,000.

The greatest production in the area was in 1911, when over 31,500,000 ounces of silver were produced. Although the production has declined since then, the value of the output during the last two years, owing to the rise in the price of the metal, has almost equalled that of last year of maximum output.

The silver deposits are not confined to the marvellously rich area in the vicinity of the town of Cobalt is shown by the fact that important discoveries have been made at 12 or 15 miles to the north-west, at Gowganda. In the last-mentioned area a very rich mine is being worked. It is believed that discoveries of silver ore will continue to be made in this part of Ontario for years. When the veins are not exposed at the surface, prospecting is difficult. It is necessary to trench through the soil to the compact rock beneath. Most of the veins have been found by this method. Other veins have been found only by underground workings, as they do not come to the surface of the rock.

Cobalt lies within a few miles of Lake Temiskaming, which has a length of about 60 miles and is an extension of the Ottawa River, here forming the boundary between the two Provinces of Ontario and Quebec. This river was a great route for travel by the earliest explorers and Jesuit missionaries in this part of Canada. On the shore of one of the bays on the north side of the lake is a rather striking outcrop of lead ore. This outcrop was doubtless seen by the earliest explorers as they paddled their canoes northwards, following the shores of the bays for protection from wind and wave. On a French map, published in 1744, and based on a still earlier one, the bay is marked "Bay of the Mine," or "Ance a la Mine." That the Cobalt mines, only a few miles away, were not discovered till the building of the railway, nearly 160 years later, is a striking confirmation of the belief held by many of the best-informed Canadian mining men that great discoveries will be made in the unprospected regions of the Dominion.

An Interesting Speculation.

Had the Cobalt area been discovered during the French period, prior to 1756, the whole political complexion of North America would likely have been changed. The richness of the deposits and their general character would have enabled them to have been worked at a huge profit even in those days. The Ottawa River afforded a fine transportation route, and labor and most supplies were cheaper at that time than they have been during recent years, while the price of silver was high. The discovery of the Cobalt area at the beginning of the eigheenth century would naturally have led to the French coming to Canada in much larger numbers, and the likelihood is that they would not have lost the country in 1756. On the other hand, the New England colonists, with large additions to their numbers from the Homeland, might have swarmed into what is now the Province of Ontario and wrested it from the French at an earlier date. Then, if events had occurred as they did in 1776, when the United States detached herself from Great Britain, Ontario and the surrounding region would probably have become part of the Republic. In either case, owing to the large incursions of French or of English colonists at that early date, it is safe to say that the great riches of Cobalt would have had a lasting influence on the destiny of what has come to be called the Dominion of Canada.

When Ontario's resources become better known there is little doubt that further prospecting will lead to discoveries quite as wonderful as those of Cobalt.

Mr. Harrington, the Fuel Controller of Ontario, recommends as a solution to our national fuel problem that Canadians should dig for coal in Canada. Reams have been written, and many pages will still be written on this question, but when all is said and written, Mr. Harrington's terse advice will be found to point out the only way.

Our Northern Ontario Letter

THE SILVER MINES.

The first half of 1920 closes another favorable period for the silver mines of Cobalt. During the six months, the production of silver, according to preliminary estimates, amounted to around $5,500,000. Added to this is a considerable amount of cobalt-oxide and cobalt metallics which brings the value of the whole up to not far under $6,000,000 for the half year.

During the past week, some 140 members of the National Editorial Association of the United States were the guests of some of the leading mines of Cobalt. They were shown the standard methods of mining and metallurgy, following the silver as found in its native state through the process of treatment until actually run out in bars.

The Nipissing Mining Company has declared a dividend of 5 per cent., payable July 20th and amounting to $300,000. This means a total of $1,200,000 paid so far during the current year, making an aggregate of $21,540,000 since the company first went on a dividend-paying basis in 1906. It is also announced that the cash in bank, Canadian and United States war bonds, ore in transit, etc., amounts to upwards of five million dollars, the highest point so far in the company's history and thus indicating earnings considerably in advance of the present large rate of dividend disbursements. A feature in connection with the standing of the Nipissing is that the 1,200,000 shares issued, are in the hands of more than 13,000 shareholders. This goes to show how widely are being distributed the earnings of the company.

Following last week's announcement in the "Journal" that a re-survey of the geology of the Cobalt silver area would be made this summer by the Ontario Bureau of Mines, it is now interesting to note that Cyril W. Knight, Assistant Provincial Geologist is already on the ground and has commenced this very important work. The task is perhaps one of the largest ever undertaken in this district, in connection with geological survey work and may occupy about six months. When completed, however, it will consist of an assembly of up-to-date data of great value to the owners of property in the district.

It is announced that the capitalization of the Victory Silver Mines, owners of the old Hylands property, has been increased from $500,000 to $2,000,000, being divided into 2,000,000 shares of the par value of $1 each. It had formerly been planned to consolidate the Victory property with the Adanac, but this plan did not materialize, and the Victory Company is now planning to proceed with a comprehensive development program. The geology is favorable, and there appear to be excellent chances of commercial deposits of silver.

The Ruby Silver property, situated near North Cobalt, in the township of Bucke, has commenced work in a small way, having been idle since 1907. The shaft of 56 feet has been de-watered, and arrangements are being made to carry out a limited amount of underground work. A large calcite vein is in evidence, in which medium grade silver values occur, while a narrow pay-streak is found along one side of the vein.

Work has been suspended on the Bartlett property in the Gowganda district, it having been decided to await better transportation facilities. The property has been worked quite steadily during the past several years.

The possibility of work resuming on the Aguinico property in Bucke township is reported. It is thought possible to mine the large deposits of cobalt at a profit, and any work to be done would have this object in view. One of the strongest cobalt veins in the district occurs on the Aguinico.

Criticism of the Ontario Government has been volunteered by mining men interested in the Gowganda district. It arises from the fact that the crushing equipment with which the construction of a macadam road was commenced to the camp last year is now being removed. The equipment was assembled at considerable expense, and work had just gotten well under way when winter arrived. While no official announcement has been forthcoming from the Government, it is presumed that the removal of the equipment is due to a charter having been granted to the Northern Light from Elk Lake to Gowganda. As to this, the mining men point out, that unless the Government has received a guarantee that such a railway will actually be built, the decision to leave the mines of the district at the mercy of the fortunes that are to attend the efforts of the promoters of the light railway project to finance the enterprise is not good business.

An effort is being made to introduce "Thompsonite," a comparatively new blasting powder, into more general use in Cobalt than formerly. Its manufacturers claim the explosive has a greater breaking power and gives off less gas and smoke than other blasting powders in common use.

The Appellate Division of the Supreme Court of Ontario delivered judgment June 25th in the case involving the correct location of the boundary between the Violet property of the La Rose and the O'Brien Mine. The judgment declares the O'Brien is entitled to possession of everything west of a straight line from the No. 4 post of the Colonial property "To Shaw to Earle". An injunction is accordingly given against the La Rose tresspassing past that point, with damages. No costs are imposed against either party.

The judgment is a reversal of the decision of the lower Court.

Ore and Bullion Statement.

During the week ended June 25th, four Cobalt companies shipped an aggregate of nine cars containing approximately 720,723 pounds of ore. The Nipissing with five cars containing 444,304 was the heaviest shipper, as shown in the following summary:—

Shipper	Cars	Pounds
Nipissing	5	444,304
Mining Corporation	2	125,350
McKinley-Darragh	1	84,150
Temiskaming	1	66,919
Totals	9	720,723

During the corresponding period the Mining Corporation shipped 50 bars of bullion weighing 50,509 ounces. It is noted that one large shipment made on June 10th was omitted from previous reports. It was made up of 99 bars containing 100,333 fine ounces. The only other bullion shipped during the week just ended was the Dominion Reduction with seven bars containing 734 ounces.

THE GOLD MINES.

Not a few of the gold miners of Northern Ontario believe they see a solution of the problem of the present shortage of labor. They point to the steady stream of immigrants pouring into Canadian ports of en-

try. Already the operating companies report a change for the better, and, emigration, while still more or less slow, is expected to gain momentum as the year advances.

For the first half of 1920, the preliminary estimates indicate a gold output of over $6,000,000 from the mines of Northern Ontario, the production amounting to more than the value of the silver produced during the corresponding period. It is believed this rate will be still further exceeded during the last half of the year.

On July 20th the Dome Mines will disburse a dividend of $100,000, amounting to 2½ per cent. It is understood to be the intention of the directorate to continue dividends at the rate of 10 per cent. annually, in addition to which a capital reduction may be made at such time as the treasury permits. It is pointed out that a comparatively small treasury of $2,000,000 would make it possible to pay shareholders $5 per share, and would thus reduce the par value of the issued shares from $10 to $5 each, upon which a dividend of $100,000 quarterly would then amount to 20 p.c. annually. Following the recently held annual meeting, the directors of the Dome paid a visit to the mine, and were highly pleased with the general outlook.

Some opposition is developing in connection with the proposal made by the directors of the Porcupine V. N.T. to borrow $50,000 from the Associated Gold mines of Western Australia for the purpose of financing the re-opening of the Porcupine V.N.T. The opposition is based upon the fact that the directors propose to grant a first mortgage against the mine, whereas it is felt that a better course would be to sell a part of the large block of treasury shares remaining in the treasury.

Operations have been indefinitely suspended at the property of the Dome Lake Mining and Milling Company. The small low-grade ore shoots have been found to be too erratic to treat profitably under the present economic conditions. It is believed, of course, that another attempt will be made to operate the property following a re-adjustment of conditions.

In May, according to an official statement just issued by R. C. Coffey, manager of the Lake Shore Mine, that property produced $41,187.62, having treated a total of 1,636 tons of ore and recovered an average of $25.18 from each ton treated. A feature of the monthly statement, is this brief announcement: "Preparations are being made to sink the shaft another 400 feet." In view of the ore treated during the past two years having averages between $24 and $25 to the ton, the decision to continue the shaft from its present depth of 400 feet to a depth of 800 feet is regarded as exceedingly important. Should the bonanza ore a found at the 400-ft. level be found to continue with similar volume and richness at the 800-ft. level the future of the Lake Shore would take on such proportions as to cause the company to greatly increase its milling facilities. The result of work at the 600-ft. and the 800-ft. levels will determine the extent of mill additions, according to a statement made to the "Journal" some months ago by Harry Oakes, president of the company. Now, with preparations actually under way to carry out this work the prospects of greater production from the Lake Shore appear to be extremely favorable.

At the Kirkland Lake Gold Mines, which is controlled by the Beaver Consolidated of Cobalt, the output of $1,200 daily as reported not long ago in the "Journal," has now been exceeded, a record of around $1,400 daily having been established for at least a part of the month of June. It is believed that the mine is now well on its way to earn substantial net profits, and that its large mill with a capacity of 150 tons is about to weigh heavily in its favor.

Shareholders of the Baldwin Gold Mines are reported to ratify an option of the property owned by the company at Kenogami Lake in which the holders of the option would be obliged to carry out a specified amount of work each month, in return for which they would be given treasury shares at the rate of 40 cents each and be permitted in that way to acquire a 51 per cent. interest in the company. The Baldwin property lies about six miles south-west from Kirkland Lake.

Having run out of money, the Bourks Gold Mines, situated at Bourk's Siding has closed down indefinitely. Considerable work was done on the property during the past couple of years, and substantial tonnage of ore was opened up in comparatively narrow ore shoots. The promoters of the enterprise appear to be confident of being able to handle the ore profitably provided the requisite capital were available. No official announcement has been made relative to what methods may be adopted to re-finance the enterprise.

An enthusiastic meeting of about 200 shareholders of the Crawford-Skead Gold Mines was held recently in Chatham. It is announced that subscriptions for shares are increasing and that an aggressive campaign of exploration and development work is now under way.

The work of surveying a route for the proposed light narrow-gauge railway from Swastika to Kirkland Lake has commenced. It is planned to build the line direcly through the proven mining area of Kirkland Lake, thence to pass through the township of Lebel where very favorable results are announced at a number of new properties; after which it would pass through the township of Gauthier to the Argonaut Gold Mine, and, finally to Larder Lake. It is the intention of the builders to continue the line from Larder Lake through the township of Skead and back through the Boston Creek district to the T. and N. O. Railway.

TORONTO NOTES

A prospectus just issued by the King Kirkland Gold Mines, Limited, draws attention to the fact that the company has completed its organization with an authorized capital of $2,500,000 and $1,250,000 in the treasury. Seven mining claims in the Kirkland Lake District have been acquired, which consists of 309 acres in the township of Lebel, with a lake near the centre of the property for milling and mining purposes, and these will be thoroughly developed. It is stated that visible gold is in evidence in a vein which has been exposed for about 150 feet on surface and assay values are stated to be high.

Hamilton B. Wills, stock and bond broker, Toronto, on July 1st turn over the entire business to a company to be known as Hamilton B. Wills & Co., Limited, which will own the entire assets of the organization and assume all its liabilities. Mr. Wills will continue to be the guiding spirit of the new company ad will remain as President and General Manager. The company has branches in Toronto, Detroit, New York, Rochester, Buffalo, Syracuse, Cobalt and Porcupine.

British Columbia Letter

The Metal Mines

Stewart, B.C.

A prospect has been located on Fish Creek about six miles from the town of Hyder in the Portland Canal District, over which Henry Benson, a resident of Victoria, B.C. and his sons are considerably excited. They are of the opinion that there property will turn on development to be fully as rich as the now well-known Premier Mine, situated somewhat further north on the Salmon River. Not enough work has been done, however, to indicate whether there is any justification for this optism. Still there is a good lead and samples taken at the outcropping give returns of $120 a ton in gold, silver and lead. No trace of zinc is shown. The Bensons have organized a company of business men in the cities of Victoria and Vancouver and propose carrying on development during the summer.

The definite announcement from official sources that the Provincial Government plans the building of a road from the Premier Mine, to which point there already is a fairly good avenue of transportation from tidewater, as far as what is known as the Joker Flats has been received by mining men of the district with satisfaction. It is indicated that this work will meet the needs of a number of the most important mining undertakings in the Portland Canal District. Among these are the "Big Missouri" Group, on which work has been in progress for over a year and which is being continued extensively this summer, it being the intention to do home 12,000 feet of diamond drilling; "Mineral Hill," on which nearly two years work has been done; the "Hercules," which is to be developed this summer in preparation for which supplies already have been forwarded; the "Silver Tip" and 'Silver Crest" being opened up by Vancouver interests; and the holdings of the Algunican Development Company. Regarding the operations of the latter Company, which is said to be backed by Belgian capital. it controls a subsidiary concern known as the Northern Light Consolidated Group, a group of claims situated adjacent to the Premier Mine and diamond drilling thereon is contemplated this summer. The same Company has the Spider Group under option. This property, on which considerable development is planned, is situated on the west side of Long Lake and is equipped with an air compressor and other plant.

The Monitor Group of Mineral Claims, Salmon River, is reported to have been bonded by Vancouver interests. This is a well-known property having been located for years. Development consisting of surface stripping and some tunnel work has been done.

Alice Arm

The rolling stock of the Alice Arm Railway, running between tidewater and the Alice Arm Mine, Kitsault River, is being augmented materially. Part of a shipment of twenty cars is on the ground and three new locomotives are on order. It is thought that with heavier metal and new equipment not only will it be possible to make regular shipments of ore, but maintain the service for the greater part of the year: Preliminary work relative to the proposed extension of the railway to the Wolf Property, about three miles north of the Dolly Varden, has commenced. Surveyors are busy and it is reported that the contract has been awarded.

Omineca, B.C.

Several of the properties situated on Legate Creek, Skeena section of the Omineca District, are reported to have been bonded and it is stated that there will be much development this year as soon as the snow goes. When that occurs there will be a number of prospectors in the field. The B.C. Exploration Company is one concern showing considerable interest in the mineral possibilities of the region. In the 1918 report of the Minister of Mines, J. D. Galloway, Government Mining Engineer, in describing the M & K. property, Legate Creek, observed that some 130 tons of ore had been shipped in the early months of 1917. This consisted, he explained, of float lying on the surface wash and but little work had been done to ascertain where this ore originated. The float ore occurred in pieces weighing up to several hundred pounds and, Mr. Galloway asserted "it does not seem likely that it has been moved any great distance from the vein in which it was formed. During the slummer considerable work by the owners in prospecting stringers and showings of ore close to where the float had been taken out. Short tunnels have been run and cuts made and ore exposed, but it does not seem probable that the rich float ore came from any of these showings. "Again he explains that this ore consisted of an intimate fine-grade mixture of bornite and galena which was nearly solid mineral. Very little of this type of ore had been found in the ore showings occurring in solid formation. This more or les mysterious find of over two years ago, together with the evident merit of the properties of the creek in question, accounts for the promised activity of this summer both on the part of prospectors and operators.

Sheep Creek, B.C.

A new concentrating mill having a capacity of 50 tons of ore a day, has been completed at the Emerald Mine by the Iron Mountain Limited, operators of the property. This mine has been one of the steady producers of this section of the Province. During 1917 the mine run averaged about: lead, 27 per cent; zinc, 5 to 6 per cent; silver 1½ ounces. As originally designed the mill was to have a capacity of 30 tons, but the addition of an extra set of rolls for the crushing and some alterations in the process, principally in the direction of limiting the percentage of the product sent through the ball mill, makes it possible to run through 50 tons, while the crushing capacity is set at 100 tons.

The Nugget Mines Ltd.

Sheep Creek has its property on a steady producing basis, the Mother Lode Mill as remodelled and extended being in operation. It is giving entire satisfaction. The ore is being taken care of as quickly as it can be brought to the surface.

Nelson, B.C.

The annual meeting of the Californian Mining Company was held recently at Nelson when it was reported that good progress was being made in the development work underway on the California Mine as well on the installation of new machinery in connection with the Athabasca Mill, which is being put in shape for the treatment of the ore. Officers were selected as follows: President J. R. Casin, Spokane, Wn.; vice-

president, J. B. Schieger, of La Crosse, Wis.; secretary-treasurer, W. R. Orndorff, Spokane, Wn.; auditor, John Fraser, Nelson, B.C.; Mine Superintendent, W H. Turner, Nelson, B.C.

Trail, B.C.

The site of the concentrating mill to be constructed by the Consolidated Mining & Smelting Co. for the treatment of the ores of the Rossland Mines has been definitely selected. It is a point between the towns of Rossland and Trail. Being on the hillside and within reach of an adequate and a sure water supply it is in every respect admirably adapted to the purpose in mind. A spur line of railway is to be constructed by the C.P.R. from Warfield to the new mill site, following a line surveyed by one of the staff of the Comsolidated Company. This road will be down grade from Warfield, so that there will be no heavy hauling in bringing the ores from Rossland. The arrangement of the Mill will be such that the ore will be unloaded at the highest point into ore-bins and will travel thence downwards through the crushers to the kilns, ball-mills, grinders and classifiers, eparators, thickeners, filters, flotation and table concentrators until finally ready for delivery as concentrates to the smelter. This gravity system, of course, will reduce cost of handling to a minimum. The new wagon road from the smelter to the mill site already is under construction.

Vanvouver, B.C.

The mining camp of Phoenix will soon be no more. It is gradually being dismantled. The Granby Consolidated Mining & Smelting Co., has a crew of thirty or forty men removing its plant and shipping it to Grand Forks and elsewhere, twenty or thirty cars having been forwarded already. This work will not be finished before August when the C.P.R. will remove its steel. Its depot now is being taken away. The Great Northern has been busy in dismantling its railway line for the past month, several buildings in the town also are being taken elsewhere.

H. S. Munroe, newly appointed General Manager of the Granby Consolidated Mining and Smelting Co. in British Columbia, before leaving to take up his work at Anyox made an interesting public statement as follows:

"I have just made an inspection of the Cassidy coal holdings on Vancouver Island. Cassidy is a minature Gary and we expect to continue and expand our coal holdings at that point. The Granby Company has achieved in the mining world under its former management and our policy will continue to be one of progress. We hope to increase copper production at Anyox and to mine more coal at Cassidy.

"As to the general copper situation it is the belief among copper men that the industry today is in the best strategical position since the Armistice was signed and that by January, 1921, copper will have advanced to a price a little below that obtained during the war. Optimism reigns among copper interests. The domestic consumption is the heaviest now that it has been for two years and surplus stocks are less than at any time for that period. Exports to Europe are increasing right along and Japan is a heavier buyer.

"An example for the increased demand for copper is the work of centralization of telephone exchanges in Paris for all Europe. This alone will entail an outlay of $165,000,000. The electrical equipment for this undertaking will make a heavy demand on copper.

"As the Granby operations at Anyox it may be stated that the difficulties at the Coke Plant, incident to new operations of this character, are readily being overcome and in the course of a few weeks a satisfactory solution will be found which will make Granby entirely independent, as far as its coke supply is concerned. Operations at the by-product plant are going right along and inquiries from Great Britain and the Orient have been obtained for all by-products that Granby can furnish. However the home market is attractive just now and we are disposing of benzol, naptha, coal tar and other by-products of coal to advantage.

"The policy of Granby will be to prosecute vigorously exploration for ores in Northern British Columbia which may be tributary to the Anyox smelter and it also will be the policy of the Company to extend smelter operations as tonnage available warrants. We hope to acquire new properties or buy ores from other companies. Granby always is in the market for cuperiferous and silicious ores."

THE COLLIERIES.

The results of examinations conducted by the Board of Examiners acting under the Coal Mines Regulation Act of British Columbia during the last week in May at Fernie, Merritt, Nanaimo and Cumberland have been announced. Certificates of Competency are to be granted as follows:

First Class: Arthur Newbury, Nanaimo.

Second Class: William Beveridge, Cumberland; Michel Donald McLean, Michel; Benjamin Ball, Michel; Louis Francescini, Cumberland; John Gilham, Nanaimo; William Park, Nanaimo.

Third Class: Edward Hardy, Fernie; Robert Taylor, Natal; Robert Clarkson, Natal; Henry Ferryman, Michel; Robert McFegan, Michel; Joseph Travis, Bankhead, Alta.; Josept Lavin, Nanaimo; Robert Drybrough, Merritt; William Ross, Merritt.

Mine Surveyors: George W. Waddington, Merritt; Robert Strachan, Cumberland.

First class certificates qualify the holders to take a position as Manager of an active Colliery in the Province; second class certificates to act as Overman in the coal mines of the Province; and third class to take places in the mines as Shiftboss, Fireboss, or Shotlighter.

The retail price of coal in Calgary, Alberta, has been raised from $8.75 a ton to $10.50 for lump and $8.75 for steam. This action has been taken, it is stated, to meet the wage advances granted the miners recently. No definite word, however, had been received at the time of writing and that the agreement between the Operators and the Men had been ratified, although it is understood to have met with overwhelming approval when put to a vote at Fernie.

It is possible that the City of Vancouver will go into the coal distributing business. The cost of fuel has been the subject of much critical comment of late among the citizens and Mayor Gale has made the statement that, from data gathered, it would appear that the City might purchase and deliver coal from $4 to $5 a ton cheaper than it now costs the consumer. The investigation on the part of the municipal authorities is continuing.

PARTY TO INVESTIGATE PEACE RIVER OIL FIELD.

Arrangements are being made by the provincial government for further investigation, this summer, of the petroleum possibilities of the Peace River section.

The minister of lands has engaged Dr. John A. Dresser, consulting geologist, of Montreal, to head a party which will include Prof. McLean, University of Toronto, and Edmund Speaker, of the department of geology, Johns Hopkins university, Baltimore, Md.

THE YUKON PLACER MINING ACT AMENDMENT

An interesting piece of legislation, and one fraught with noteworthy possibilities as to mining in the Yukon Territory, Canada was recently before the Parliament of Canada, Ottawa. It is termed the Yukon Placer Mining Act Amendment.

On its second reading in the Canadian Parliament its design was explained by Hon. Arthur Meighen, Minister of the Interior, as follows:—

"Its design is to supply additional incentive to placer mining in the Yukon Territory. When the Yukon was opened up, and for many years thereafter, placer mining was vigorously prosecuted because the rewards under the then conditions were ample. They now are not so great as they were at that time, and it is sought by this Bill to amplify them in the following manner:

"To adopt the practice of issuing leases—that is to say lease of territory along creeks where placer mining is carried on of considerable extent—; practically a reservation of that territory for the applicant in order that he may prospect it and if he finds that it is in his interest to stake claims, to do so. The territory proposed to be granted in respect of land already worked over—that is land already taken up, cancelled or abandoned—is five miles in length on any creek, and the time allowed is one year. The prospector is bound to expend at least one thousand dollars in that year on prospecting operations, and if he does so he is entitled to a renewal, if he desires,, for another year, and under similar circumstances for a third. He pays $25 per mile or fraction of a mile rental for that prospecting lease. Then in respect of the class of claim already worked over, he is at liberty to stake within those three years any area he wishes, or rather as many claims as he desires. Each claim is about 23 miles in maximum.

"Now as regards new areas—that is to say creeks not already applied for, forfeited or abandoned, or not worked over—he is entitled not to five miles but to one mile. He is entitled to renewals in the usual way—or rather in the way I have just defined as respects the other class—but he cannot stake the whole thing. He can only obtain a discovery stake—that is to say three times the ordinary stake—the discovery stake being one that has always been given. Where a man is in the position of the discoverer of the area he gets three times the ordinary stake. So in this class of creeks already worked over, that is all he can obtain. He pays the same rental as I stated before for the other class, viz., $25 per mile or fraction of a mile.

Mr. Alfred Thompson, the member for the Yukon, elaborated the above explanation, in the following terms:—

"It is now over twenty years since gold was first discovered in the Klondyke. A very large area of gold bearing gravels has been worked, many creeks have been prospected, and many worked, and others prospected but not worked and subsequently abandoned, which claims have reverted to the Crown. Now we have quite a large area of ground in that containing gold bearing gravels of this character; ground that is not sufficiently rich in gold contents to be worked by the ordinary placer mining methods or by the individual claims."

"But by placing these gravels in larger groups it is hoped that it may be possible to have them prospected by what is known as the core drill method, involving the use of machine drills, as opposed to the ordinary shaft sinking method. These admendments were suggested by a non-partisan organization known as the Yukon Development League and it is hoped that their adoption will prove an impetus to the further prospecting of this low grade gravel on abandoned creeks. So far as virgin ground is concerned the leases cover only one mile for a term of one year, and within that mile the prospector can secure at the end of the term only one discovery claim of the same size as he would be able to obtain if he were to make a discovery on any other ground upon which claims did not already exist."

Answering the question as to whether better results were to be expected by allowing five miles to be included in a claim instead of the smaller area allowed heretofore Mr. Thompson said:—

"This low grade ground can only be prospected by the use of expensive power drills, and the gold contents of any one claim were not such as to warrant their continued operation, otherwise, the claims would not have been abandoned. The idea is to give the prospector a larger claim so that he will be able to secure the necessary capital to embark on this somewhat expensive prospecting."

J. M. Sinclair, of Guysborough, N.S, observed that a prospector in his Province required nothing more than a loaf of bread, a powder horn and a pick, the best mines of Nova Scotia having been discovered by men so equipped. He did not concur with an Act having the effect of shutting out the gold prospector. He wanted to know why it was necessary to confine the application (for leases) to "men of wealth or means.".

To this Hon. Mr. Meighen replied:—

"It does not confine the application of men of wealth, it simply provides that before a man can get a lease he must show he is able to do something on the ground. It would be bad policy to grant to any applicant a lease, thereby tying the territory up, if he has no means at all of utilizing that territory. When the Yukon was new and the mining was carried on under the old method, the prospector did not require any capital, because the gold was there and could be mined by that method. But these worked-over claims can be mined only by the use of these powder drills. It is not we who compel the presence of capital; it is nature; consequently, to avoid tying up claims by those who cannot work them we simply say: Show us that you are able to work them, or show us that you have associated with you men who can work them, and that is sufficient."

NOVA SCOTIA NOTES.

Mine Illumination.

The miners in No. 2 Colliery of the Dominion Coal Company have demanded the replacement of the existing oil-flame safety-lamps by electric lamps of the cap and belt-battery type. There have been a number of instances in Canada where new collieries have been equipped with electric lamps, but few, if any, instances of replacement of existing equipment by them. While there is a growing inclination among colliery managers to recognize the undoubted advantages of the electric lamp, there is not by any means complete unanimity among mining engineers on this question. The doubt which exists in some minds centres chiefly about the problem of gas detection, for which the electric lamp is useless. There is no doubt that this difficulty can be overcome by appointing officials charged with gas detection and provided with oil-flame lamps in addition to an electric light, but, in a large and gaseous mine, the question of entire replacement of oil lamps by electric lamps requires careful consideration and much pre-arrangement. It is therefore difficult to understand the action of the No. 2 workmen in demanding—with the alternative of a strike—the provision of electric lamps within a given time. These lamps are not made in Canada, and the manufacturers in the United States are so full of orders that they do not particularly desire additional business. The cost is excessively high at this time, and the exchange premium adds greatly to that cost, and, what is more important in view of the action taken by the No. 2 miners, delivery is an uncertain thing. No matter how firmly convinced of the advantages of new equipment all parties may be, it is not possible for those who have the direction of collieries to allow themselves to be stampeded into the adoption of untried equipment before they are satisfied as to its wis-

dom, nor is it likely to give the purchasing agent much opportunity for economy unless time is given for the trial of competing types of lamps, for comparison of bids, and for inspection of promises of delivery. The Dominion Coal Company estimate the cost of replacement of the existing equipment by electric equipment at $100,000, and this is a moderate estimate, probably an under-estimate. It would be a pity to spoil the initiation of an advance in underground illumination, which has long been foreseen, by hasty and ill-considered purchases and by insufficient consideration of the large number of arrangements that such a change will require in the interest of safety.

The Rev. John Forrest, for almost thirty years President of Dalhousie University, Halifax, died on June 23rd. Dr. Forrest was well known throughout mining circles in Nova Scotia because of his membership on several Boards of Conciliation having to do with labor disputes. Dr. Forrest's keen intellect was well employed in this work, and he was very successful in adjusting differing points of view. Although 78 years of age, Dr. Forrest's death was unexpected.

The McKinnon Conciliation Board, which was appointed to adjust the differences between the United Mine Workers of Nova Scotia and the Dominion Coal Company, at the beginning of 1920, and was not called upon to sit formally because the two parties got together independently, recently recommended that a Royal Commission be appointed to consider the further request of the Mine Workers for a wage increase effective May first, empowered to deal with the matter as it affected every colliery in Nova Scotia. Such a procedure was, of course, only possible provided all the operators would agree to it, and this has not been the case. The Deputy Minister of Labor has explained the attitude of the Department in the following telegram to the Secretary of the Mine Workers:—"Re differences between coal companies and employees in Nova Scotia. Minister has given careful consideration to question of appointment of royal commission on lines laid down by resolution of McKinnon Board. Such commissions are appointed under the Enquiries Act which makes no provision for procedure on lines suggested. Government alone determines commission membership. It might not however have been impracticable to receive suggestions from parties concerned had companies been associated together as workmen by means of trades union. The minister's efforts to secure joint action by companies has not been successful and if commission is established members must be appointed in usual manner. Minister has understood that renewal of direct negotiations afford some prospect of settlement of grievances without Commission of Enquiry and requests that the latest information on this point be sent him."

The suggestion contained in this telegram that the coal operators should be associated together as the workmen are in a trades union is a singular one considering its source, and the attitude of governments in North America hitherto on the question of joint action of employers. The aim of the United Mine Workers, in which the Minister of Labor apparently concurs, is the establishment of a District Wage Board, upon which operators and union representatives will sit to adjust the whole of the questions affecting the coal mines of Nova Scotia. It is not so very long ago since the coal operators of Nova Scotia were prosecuted at the instance of the present Secretary of the United Mine Workers on an unproven charge of conspiring together to maintain the selling price of coal. It is very difficult for non-judicial minds to see the difference between consultations on questions of wages and questions affecting the selling price of coal, as these two matters are indistinguishable from each other—in their effect at least.

NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES NEW YORK, SEPT. 20-25th, 1920.

The 1920 annual, which is the Sixth National Exposition of Chemical Industries returns to the Grand Central Palace in New York where it will be given during the week September 20th to 25th inclusive.

The Exposition this year will be more pretentious than ever; in fact, it will be the largest distinctly industrial Exposition ever held, and will surpass its own predecessors by one-third.

There are now engaged for the coming Exposition 358 exhibitors which is more than in the last Exposition in Chicago. The growth of this Exposition is remarkable and in a way indicates the growth and development of the chemical industries in America. In 1915 the first Exposition was composed of 83 exhibitors, the second increased to 188, the third to 288, the fourth to 334, and the fifth in which the available space was much restricted and exhibitors were held to a minimum to admit 351 exhibitors, the present number of 358 the managers tell us cannot be much increased in number because of the limited amount of space remaining. Another floor has been added giving four floors of the Grand Central Palace each of which covers a whole square city block so that exhibitors could secure increased space and not suffer the cramping felt in the last Exposition.

This year the Exposition will have three special sections, one, the Electric Furnace Section, another the Fuel Economy Section, and the third a Materials Handling Section, the two latter are new sections; the first will as its name implies be one of electric furnace exhibits; the Fuel Economy Section will consist of exhibits of machinery and apparatus, furnaces, producers, stokers and all devices for the economic utilization or more efficient combustion of fuel. The possible exhaustion of our fuel reserves in the not far distant future and the present high cost of fuel makes this section one of much interest to all industrial plants. The Materials Handling Section will be a series of exhibits of machinery and equipment for the handling of material such as: conveying, transporting, elevating, included in this will be weighing, measuring and power transmission equipment. So important have these mechanical features become for all industrial plants due to the shortage and high-wage for man-power than an unusual interest is expected in this new Section.

? The program for the Exposition will have sessions on subjects the phases of which will be developed in the exhibits of these latter two sections. There will be sessions on chemical engineering for which an elaborate program is planned. Motion pictures which will have a keen interest for technical men will form part of the program, and there will be popular public addresses as well.

A special general meeting of the Vipond-North Thompson Mine has been called for July 14th for the purpose of authorizing the execution of a first mortgage upon the company's property to the Associated Gold Mines of Western Australia, for a sum not to exceed $50,000.

The last issue of the Ontario Gazette contains the announcement of the incorporation of the Victory Silver Mines, Limited, with head office at St. Catherines. The incorporators are C. E. Ireland and Victor Nash, real estate agents, W. T. Tait, electrical engineer; David H. Tait and E. H. Moyer, all of St. Catherines. The authorized capital is $2,000,000 and the company is empowered to carry on the general business of mining all its branches.

MINING ENGINEER with broad experience in Mine Development and Examinations open for two months engagement. Prefer Northern Ontario. Address, Box 15, Canadian Mining Journal, Gardenvale, P. Q.

WANTED, MECHANICAL DRAFTSMEN—for work on General plant, Coal Handling Machinery, etc. In reply state full experience, age and salary required. Dominion Coal Company, Limited, Glace Bay, N. S.

The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Canadian Fairbanks-Morse.
Prest-O-Lite Co. of Canada, Ltd.

A.C. Units:
MacGovern & Co.

Agitators:
The Dorr Co.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.

Alloy and Carbon Tool Steel:
H. A. Drury Co., Ltd.
International High Speed Steel Co., Rockaway, N.J.

Alternators:
MacGovern & Co.

Spielman Agencies, Regd.
Aluminium:

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

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Arrester, Locomotive Spark:
Hendrick Manufacturing Co.

Arsenic White Lead:
Coniagas Reduction Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspe tion Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Mead-Morrison Co., Limited

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

Asbestos:
Everitt & Co.

Balls:
Canadian Foundries and Forgings, Ltd
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.
The Hardinge Conical Mill Co.

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

Balances—Heusser:
Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Babbit Metals:
Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.

Ball Mill Feeders:
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.

Ball Mill Linings:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.

Belting—Leather, Rubber and Cotton:
Canadian Fairbanks-Morse Co., Ltd.
Link Belt Co.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd.

Belting—Silent Chain:
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co.

Belting (Conveyor):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
Northern Canada Supply Co.
Canadian Explosives, Ltd.
Giant Powder Co. of Canada, Ltd.

Bluestone:
The Consolidated Mining & Smelting Co

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

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

Blue Vitriol (Coniagas Red):
Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:
Diamond Drill Carbon Co.

Boxes, Cable Junction:
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Link-Belt Co.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Buckets, Elevator:
Hendrick Mfg. Co.

Cable—Aerial and Underground:
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

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

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd
Canada Wire & Cable Co.
Fraser & Chalmers of Canada, Ltd
Northern Electric Co., Ltd.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Cable Railway Systems:
Canadian Mead-Morrison Co., Limited.

Cam Shafts:
Canada Foundries & Forgings, Ltd
Hull Iron & Steel Foundries, Ltd.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
Canadian Foundries and Forgings, Ltd
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
John J. Gartshore
MacKinnon Steel Co., Ltd.
The Electric Steel & Metals Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Marsh Engineering Works
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore
Marsh Engineering Works, Ltd.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd.

Castings (Iron and Steel)
Burnett & Crampton
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works

Cement and Concrete Waterproofing:
Spielman Agencies, Regd.

Cement Machinery:
Northern Canada Supply Co.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
Fraser & Chalmers of Canada, Ltd.
Canadian Fairbanks-Morse Co., Ltd
The Electric Steel & Metals Co.
R. T Gilman & Co.
Burnett & Crampton

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

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Hans Renold of Canada, Limited, Montreal, Que.

Chemical Apparatus:
Mine and Smelter Supply Co.

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

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mine and Smelter Supply Co.
Mussens, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Hans Renold of Canada, Limited, Montreal, Que.

Coal:
Dominoion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.

Coal Crushers:
Canadian Mead-Morrison Co., Limited

Coal Mining Explosives:
Canadian Explosives, Ltd.
Giant Powder Company of Canada, Ltd.

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery
Canadian Mead-Morrison Co., Limited.
Link-Belt Co.

Coal Pockets:
Canadian Mead-Morrison Co., Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Mead-Morrison Co., Limited.

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

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

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

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

Concentrating Tables:
The Mine & Smelter Supply Co
Deister Concentrator Co.
The Wabi Iron Works

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

Conveyors—McCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
The Mine & Smelter Supply Co.
Jones & Glassco (Regd.)

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Hendrick Mfg. Co., Ltd.

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

Conical Mills:
Hardinge Conical Mill Co.

Copper:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Couplings:
Hans Renold of Canada, Limited, Montreal, Que.

Cranes:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Company
R. T. Gilman & Co.
Smart-Turner Machine Co.

Crane Ropes:
Allan Whyte & Co.
Greening, B., Wire Co., Ltd.

Crucibles:
Canadian Fairbanks-Morse Co., Ltd.
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull, Que
Osborn, Sam'l (Canada) Limited.

Crude Oil Engines:
Swedish Steel & Importing Co., Ltd.

Crushers:
Canadian Fairbanks-Morse Co., Ltd
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co., Ltd
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited
The Mine & Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Cut Gears:
Hans Renold of Canada, Limited, Montreal, Que.

Cyanide:
American Cyanamid Company.

Cyanide Plant Equipment:
The Dorr Co.
The Mine & Smelter Supply Co.

D. C. Units:
MacGovern Co.

Derricks:
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Mussens, Limited

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

Diamond Tools:
Diamond Drill Carbon Co.

Diamond Importers:
Diamond Drill Carbon Co.

Digesters:
Canadian Chicago Bridge and Iron Works

Dies:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.

Dredger Pins:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited

Dredging Machinery:
Canadian Steel Foundries, Ltd.
Canadian Mead-Morrison Co., Limited.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.

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

Drills, Air and Hammer:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
The Mine & Smelter Supply Co.
Mussens, Limited

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

Drills—Diamond:
Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company

Drill Steel—Mining:
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Drill Steel Sharpeners:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Osborn, Sam'l (Canada) Limited.
The Wabi Iron Works

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

Drills—High Speed and Carbon:
Canadian Fairbanks-Morse Co., Ltd.
Osborn, Sam'l (Canada) Limited.
H. A. Drury Co., Ltd.
Hadfields, Limited

Dynamite:
Canadian Explosives
Giant Powder Company of Canada, Ltd.
Northern Canada Supply Co.

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

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

Elevators:
Canadian Mead-Morrison Co., Limited.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
Jones & Glassco (Regd.)
Mussens, Limited
The Wabi Iron Works

Engineering Instruments:
C. L. Berger & Sons

Engines—Automatic:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Fraser & Chalmers of Canada, Ltd.

Engines—Gas and Gasoline:
Canadian Fairbanks-Morse Co., Ltd.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd.
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
The Mine & Smelter Supply Co

Engines—Haulage:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.

Engines—Marine:
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Swedish Steel & Importing Co., Ltd.

Engines—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.

Engines—Stationery:
Swedish Steel & Importing Co., Ltd.

Engineers:
General Engineering Co., New York
The Dorr Co.

Ferro-Alloys (all Classes):
Everitt & Co.

Feed Water Heaters:
MacGovern & Co.

Fire Fighting Supplies:
Gutta Percha & Rubber, Ltd.

Flashlights—Electric:
Spielman Agencies, Regd.

Flood Lamps:
Northern Electric Co., Ltd.

Flourspar:
The Consolidated Mining & Smelting Co.
Everitt & Co.

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

Forging:
Canadian Mead-Morrison Co., Limited.
Canadian Foundries and Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
Smart-Turner Machine Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.

Frogs:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore

Frequency Changers:
MacGovern & Co., Inc.

Furnaces—Assay:
Canadian Fairbanks-Morse Co., Ltd.
Lymans, Limited
Mine & Smelter Supply Co.

Fuse:
Canalian Explosives
Giant Powder Company of Canada, Ltd.
Northern Canada Supply Co.

Gaskets:
Gutta Percha & Rubber, Ltd.

Gears:
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Gears (Cast):
Hull Iron & Steel Foundries, Ltd.
The Link-Belt Co.

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

Granulators:
Hardinge Conical Mill Co.

Grinding Wheels:
Canadian Fairbanks-Morse Co., Ltd.

Gold Refiners
Goldsmith Bros

Canadian Miners' Buying Directory.—(Continued)

Gold Trays:
Canada Chicago Bridge & Iron Works

Hose (Air Drill):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hose (Fire):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hose (Packings)
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hose (Suction):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hose (Steam):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hose (Water):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hammer Rock Drills:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
The Mine & Smelter Supply Co.

Hangers and Cable:
Standard Underground Cable Co. of Canada, Ltd.

High Speed Steel:
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
International High Speed Steel Co., Rockaway

High Speed Steel Twist Drills:
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.

Hoists—Air, Electric and Steam:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Jones & Glassco
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Link-Belt Co.

Hoisting Engines:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd
The Mine & Smelter Supply Co.

Hoisting Towers:
Canadian Mead-Morrison Co., Limited.

Hose:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd
Northern Canada Supply Co

Hose (Steam, Air, Water):
Gutta Percha & Rubber, Ltd.

Hydraulic Machinery:
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Industrial Chemists:
Hersey, M. & Co., Ltd.

Ingot Copper:
Canada Metal Co., Ltd.
Hoyt Metal Co.

Insulating Compounds:
Standard Underground Cable Co. of Canada, Ltd.

Inspection and Testing:
Dominion Engineering & Inspection Co.

Inspectors:
Hersey, M. & Co., Ltd.

Jacks:
Canadian Fairbanks-Morse Co., Ltd.
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
R. T. Gilman & Co.
Mussens, Limited

Jack Screws:
Canadian Foundries and Forgings, Ltd.

Laboratory Machinery:
Mine & Smelter Supply Co.

Lamps—Acetylene:
Dewar Manufacturing Co., Inc.

Lamps—Carbide:
Dewar Manufacturing Co., Inc.

Lamps—Miners:
Canada Carbide Company, Limited
Canadian Fairbanks-Morse Co., Ltd
Dewar Manufacturing Co., Inc.
Northern Electric Co., Ltd.
Mussens, Limited

Lamps:
Dewar Manufacturing Co., Inc.

Lanterns—Electric:
Spielman Agencies, Regd.

Lead (Pig):
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Levels:
C. L. Berger & Sons

Locomotives (Steam, Compressed Air and Storage Steam:
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R T. Gilman & Co
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited

Link Belt
Canadian Fairbanks-Morse Co. Ltd.
Northern Canada Supply Co.
Jones & Glassco

Machinists:
Burnett & Crampton

Machinery—Repair Shop:
Canadian Fairbanks-Morse Co., Ltd.

Machine Shop Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Magnesium Metal:
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.

Manganese Steel:
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Metal Marking Machinery:
Canadian Fairbanks-Morse Co., Ltd.

Metal Merchants:
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canada
Canada Metal Co.
C. L. Constant Co.
Everitt & Co

Metallurgical Engineers:
General Engineering Co., New York
The Dorr Co.

Metallurgical Machinery:
General Engineering Co., New York
The Dorr Co.
The Mine & Smelter Supply Co.

Metal Work, Heavy Plates:
Canada Chicago Bridge & Iron Works

Mica:
Everitt & Co.
Diamond Drill Carbon Co

Mining Engineers:
Hersey, M. Co., Ltd.

Mining Drill Steel:
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
International High Speed Steel Co., Rockaway, N

Mining Requisites:
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Mining Ropes:
Dominion Wire Rope Co., Ltd

Mine Surveying Instruments:
C. L. Berger & Sons

Molybdenite:
Everitt & Co

Monel Metal (Wire, Rod, Sheet and Foundry Metal):
International Nickel Co.

Motors:
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
MacGovern & Co.
The Mine & Smelter Supply Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Motor Generator Sets—A.C. and D.C.
MacGovern & Co.

Nails:
Canada Metal Co.

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

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

Nickel Sheets:
The International Nickel Co. of Canada
The Mond Nickel Co., Ltd.

Nickel Wire:
The Mond Nickel Co., Ltd
The International Nickel Co. of Canada

Oil Analysts:
Constant, C. L. Co.

Ore Handling Equipment:
Canadian Mead-Morrison Co., Limited.

Ore Sacks:
Northern Canada Supply Co.

Ore Testing Works:
Ledoux & Co.
Can. Laboratories
Milton, Hersey Co.
Campbell & Deyell
General Engineering Co., New York
Hoyt Metal Co.

Ores and Metals—Buyers and Sellers of:
C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.

Packing:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd.

Paints—Special:
Spielman Agencies, Regd.

Perforated Metals:
Northern Canada Supply Co.
Hendrick Mfg. Co.
Canada Wire and Iron Goods Company.
Greening, B., Wire Co.

Permissible Explosives:
Giant Powder Company of Canada, Ltd.

Pig Tin:
Canada Metal Co., Ltd.
Hoyt Metal Co.

Pig Lead:
Canada Metal Co., Ltd.
Hoyt Metal Co.
Pennsylvania Manufacturing Co.

Pillow Blocks:
Canadian Link-Belt Company

Pipes:
Canadian Fairbanks-Morse Co., Ltd.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
R. T. Gilman & Co.

Pipe Fittings:
Canadian Fairbanks-Morse Co., Ltd.

Pipe—Wood Stave:
Pacific Coast Pipe Co.
Mine & Smelter Supply Co.

Piston Rock Drills:
Mussens, Limited
Mine & Smelter Supply Co.

Plate Works:
John Inglis Co., Ltd.
Hendrick Mfg. Co.
The Wabi Iron Works
MacKinnon Steel Co., Ltd.

Platinum Refiners:
Goldsmith Bros.

Pneumatic Tools:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.

Powder:
Giant Powder Company of Canada, Ltd.

Prospecting Mills and Machinery:
The Electric Steel & Metals Co.
E. J. Longyear Company
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, L
The Wabi Iron Works

Pumps—Pneumatic:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Sullivan Machinery Co.

Pumps—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
The Mine & Smelter Supply Co.
Mussens, Limited
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Turbine:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Vacuum:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
The Wabi Iron Works

Pumps—Valves:
Canadian Fairbanks-Morse Co., Ltd.

Pulleys, Shaftings and Hangings:
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
The Wabi Iron Works

Pulverizers—Laboratory:
Mine & Smelter Supply Co.
The Wabi Iron Works
Hardinge Conical Mill Co.

Pumps—Boiler Feed:
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Mine & Smelter Supply Co.

Pumps—Centrifugal:
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Diaphragm
The Dorr Company

Pumps—Electric
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Smart-Turner Machine Co.

Pumps—Sand and Slime:
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mine & Smelter Supply Co.
The Electric Steel & Metals Co.
The Wabi Iron Works
mart-Turner Machine Co.

Quarrying Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields, Limited
Mussens, Limited
R. T. Gilman Co.

Rails:
Hadfields, Limited
John J. Gartshore
R. T. Gilman & Co.
Mussens, Limited

Railway Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

Roller Chain:
Hans Renold of Canada, Limited, Montreal, Que.

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

Rope—Manilla:
Osborn, Sam'l (Canada) Limited.
Mussens, Limited

Rope—Manilla and Jute:
Jones & Glassco
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Allan, Whyte & Co.

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:
Allan, Whyte & Co.
Dominion Wire Rope Co., Ltd.
Greening, B. Wire Co.
Northern Canada Supply Co.
Mussens, Limited

Rolls—Crushing
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
The Electric Steel & Metals Co.
Mussens, Limited
The Wabi Iron Works

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

Scales—(all kinds):
Canadian Fairbanks-Morse Co., Ltd.

Screens:
Greening, B. Wire Co.
Hendrick Mfg. Co.
Mine & Smelter Supply Co.
Canada Wire and Iron Goods Company.
Link-Belt Co.

Screens—Cross Patent Flanged Lip:
Hendrick Mfg. Co.

Screens—Perforated Metal:
Hendrick Mfg. Co.

Screens—Shaking:
Hendrick Mfg. Co.

Screens—Revolving:
Hendrick Mfg. Co.

Scheelite:
Everitt & Co.

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

Shaft Contractors:
Hendrick Mfg. Co.

Sheet Metal Work:
Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:
Hendrick Mfg. Co.

Shoes and Dies:
Canadian Foundries and Forgings, Ltd.
H. A. Drury Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Shovels—Steam:
Canadian Foundries and Forgings, Ltd.
Canadian Mead-Morrison Co., Limited.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Ship Bunkering Equipment:
Canadian Mead-Morrison Co., Limited.

Silent Chain:
Hans Renold of Canada, Limited, Montreal, Que.

Silent and Steel Roller:
Jones & Glassco (Regd.)

Siline:
Coniagas Reduction Co.

Saline Refiners:
Goldsmith Bros.

Smelters:
Goldsmith Bros.

Sledges:
Canada Foundries & Forgings, Ltd.

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

Special Machinery:
John Inglis Co., Ltd.

Spelter:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Sprockets:
Hans Renold of Canada, Limited, Montreal, Que.
Link-Belt Co.
Jones & Glassco (Regd.)

Spring Coil and Clips Electrico:
Canadian Steel Foundries, Ltd.

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

Stamp Forgings:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.

Steel Castings:
Canadian Brakeshoe Co., Ltd.
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
The Wabi Iron Works

Steel Drills:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northen Canada Supply Co.
The Electric Steel & Metals Co.
Osborn, Sam'l (Canada) Limited.
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Steel Drums:
Smart-Turner Machine Co.

Steel—Tool:
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
N. S. Steel & Coal Co.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
Swedish Steel & Importing Co., Ltd.

Structural Steel Work (Light):
Hendrick Mfg. Co.

Stone Breakers:
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Sulphate of Copper:
The Mond Nickel Co., Ltd.
Coniagas Reduction Co.

Sulphate of Nickel:
The Mond Nickel Co., Ltd.

Surveying Instruments:
C. L. Berger

Switches and Switch Stand:
Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:
John J. Gartshore

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

Tanks:
R. T. Gilman & Co.

Tanks—Acid:
Canadian Chicago Bridge & Iron Works
The Mine & Smelter Supply Co.

Tanks (Wooden):
Canadian Fairbanks-Morse Co., Ltd.
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.
Mine & Smelter Supply Co.
The Wabi Iron Works

Tanks—Cyanide, Etc.:
Hendrick Mfg. Co.
Pacific Coast Pipe Co.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
Mine & Smelter Supply Co.
The Wabi Iron Works

Tanks—Steel:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Chicago Bridge & Iron Works
Marsh Engineering Works
Osborn, Sam'l (Canada) Limited.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Hendrick Mfg. Co.
The Wabi Iron Works

Tanks—Oil Storage:
Canadian Chicago Bridge & Iron Works
The Mine & Smelter Supply Co.

Tanks (water) and Steel Towers:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Chicago Bdidge & Iron Works
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
Mine & Smelter Supply Co.
The Wabi Iron Works

Tires—Auto, Truck and Bicycle:
Gutta Percha & Rubber, Ltd.

Canadian Miners' Buying Directory.—(Continued)

Tramway Points and Crossings:
Canadian Steel Foundries, Ltd.
Hadfields, Limited

Transits:
C. L. Berger & Sons

Transformers:
Canadian Fairbanks-Morse Co., Ltd
R. T. Gilman & Co.
Northern Electric Co., Ltd.

Transmission Appuiances:
Jones & Glassco (Regd.)

Transmission Machinery:
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Troughs (Conveyor):
Hendrick Manufacturing Co.

Trucks—Electric:
Canadian Fairbanks-Morse Co., Ltd.

Trucks—Hand:
Canadian Fairbanks-Morse Co., Ltd.

TTrucks:
Canadian Fairbanks-Morse Co., Ltd.

Tubs:
Hadfields, Limited

Tube Mills:
The Electric Steel & Metals Co.
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.

Tube Mill Balls:
Canada Foundries & Forgings, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.

Tube Mill Liners:
Burnett & Crampton
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.

Turbines—Water Wheel:
MacGovern & Co.

Turbines—Steam:
Fraser & Chalmers of Canada, Ltd.
MacGovern & Co.

Twincones:
Canada Foundries & Forgings, Ltd.

Uranium:
Everitt & Co.

Weighing Larries:
Canadian Mead-Morrison Co., Limited.

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.
Canadian Fairbanks-Morse Co., Ltd.
Imperial Brass Mfg. Co.

Wheels and Axles:
Canadian Steel Foundries, Ltd.
Hadfields, Limited
The Electric Steel & Metals Co.
The Wabi Iron Works

Winches—Power Driven:
Canadian Mead-Morrison Co., Limited.

Winding Engines—Steam and Electric:
Canadian Fairbanks-Morse Co., Ltd
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Wire:
Canada Wire & Cable Co., Ltd.
Greening, B. Wire Co.

Wire Rope:
R. T. Gilman & Co.
Canada Wire and Iron Goods Company.
Dominion Wire Rope Co., Ltd.

Wire Rope Fittings:
Canada Wire and Iron Goods Company.

Wire Cloth:
Northern Canada Supply Co.
Greening, B. Wire Co.
Canada Wire & Iron Goods Company

Wire (Bars and Insulated):
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Wolfram Ore:
Everitt & Co.

Woodworking Machinery:
Canadian Fairbanks-Morse Co., Ltd.

Zirconium:
Everitt & Co.

Zinc:
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Zinc Spelter:
Canada Metal Co., Ltd.
Hoyt Metal Co., Ltd.

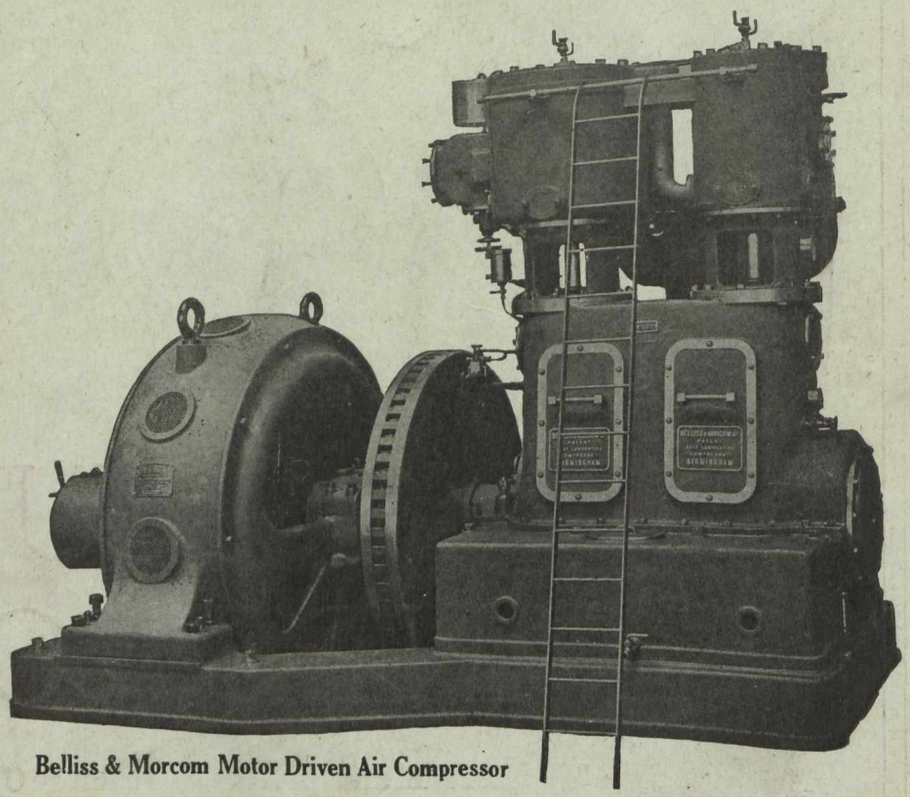
ALPHABETICAL INDEX TO ADVERTISERS

BELLISS & MORCOM

Air Compressors
Diesel Engines
Steam Turbines
Steam Engines
Condensers

LAURIE & LAMB

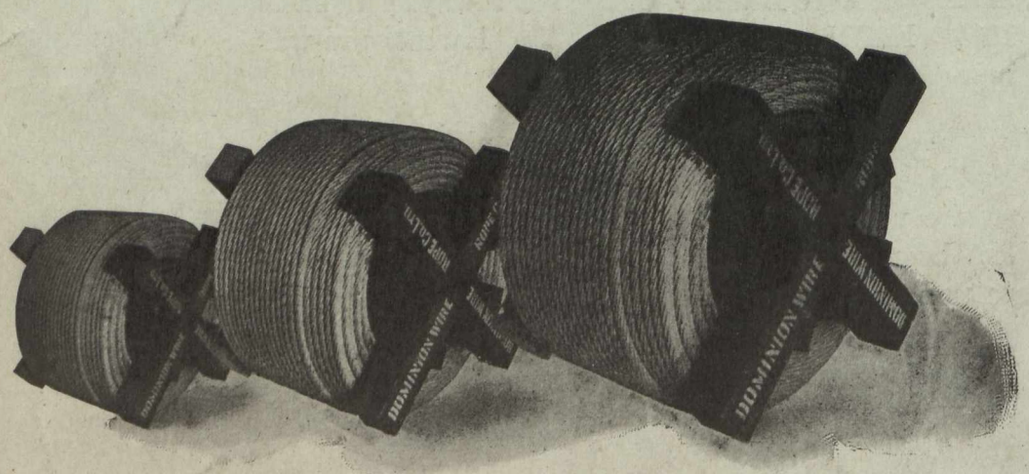
211 Board of Trade Bldg.
MONTREAL



Belliss & Morcom Motor Driven Air Compressor

"MADE IN CANADA"

"DOMINION" WIRE ROPE



for
Mining,
Hoisting,
Haulage.

for
Cableways,
Tramways.

The Dominion Wire Rope Company, Limited

Head Office: MONTREAL

Stocks carried at: TORONTO
WINNIPEG