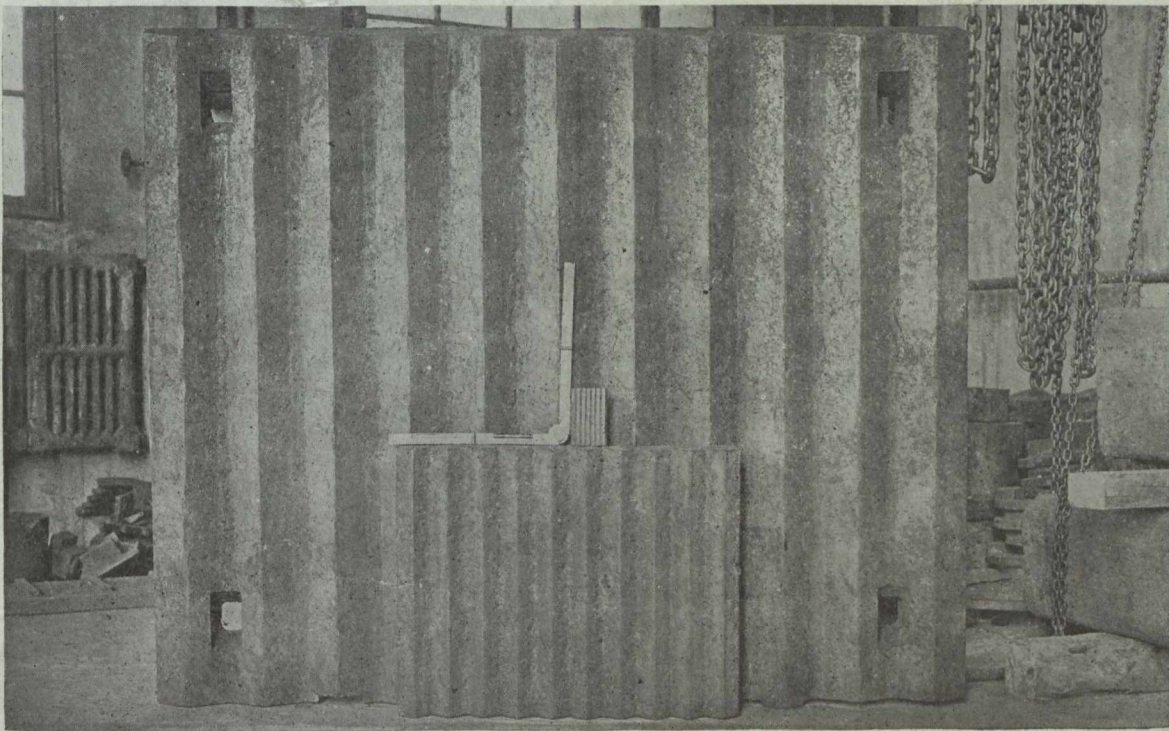


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Gardenvale, P. Q., September 17, 1920.

No. 37.



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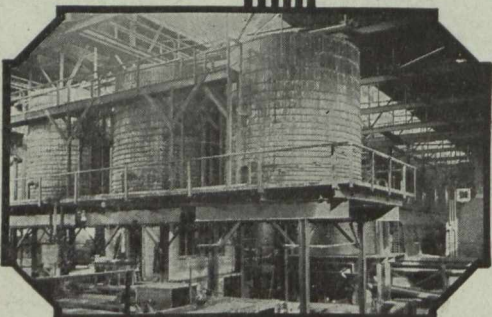
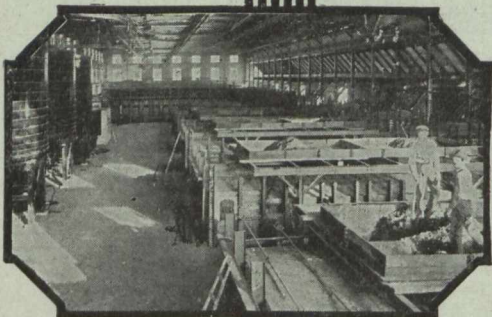
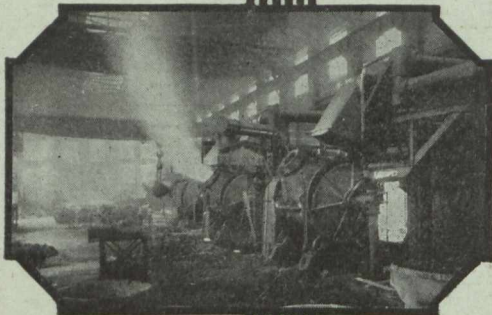
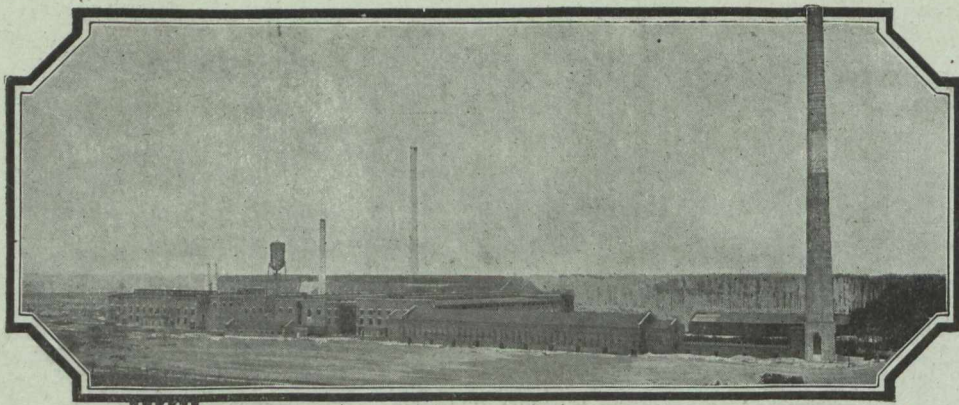
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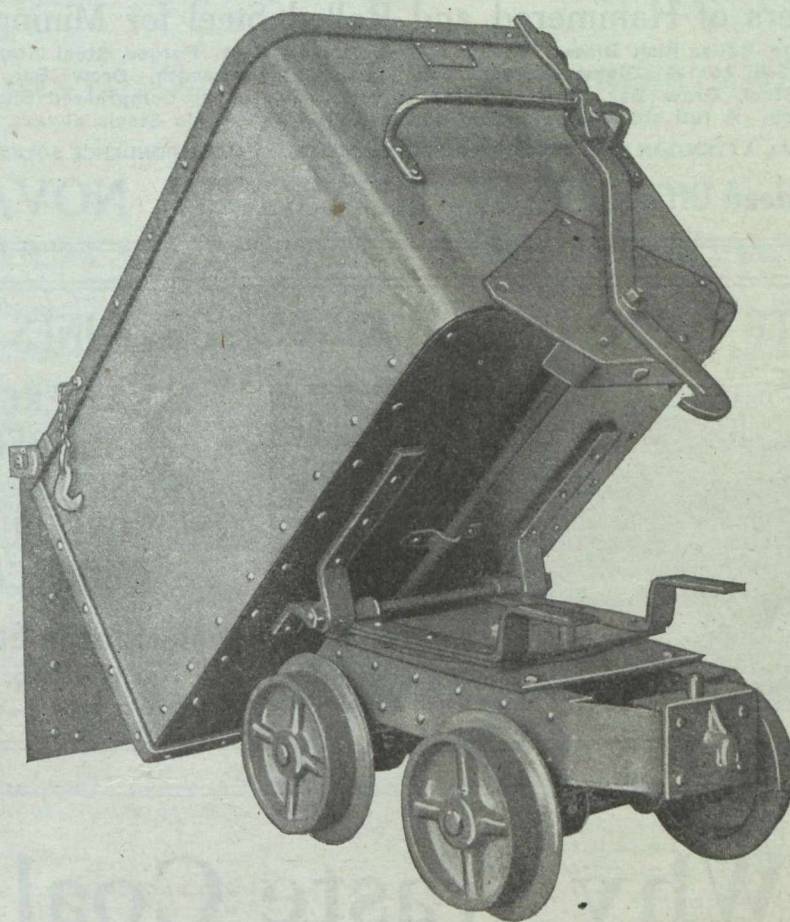
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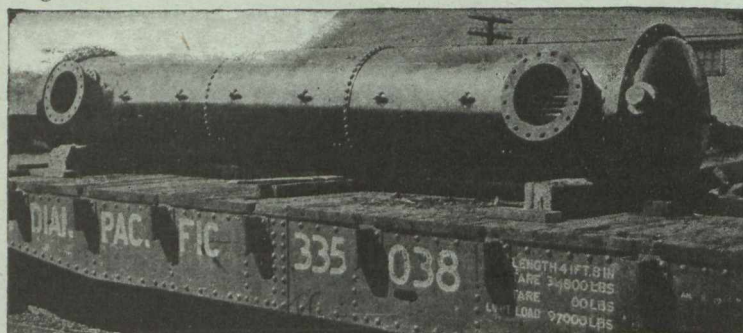
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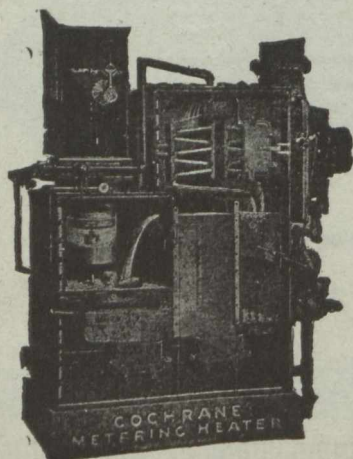
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Recent Publications

Results of forty-one Steaming Tests conducted at the Fuel Testing Station, by John Blizard and E. S. Malloch.

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

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

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

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

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

The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B.Sc.

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

Graphite, by H. S. Spence.

Summary Report of the Mines Branch, 1918.

The Helium Sources of the British Empire, by D. J. McLennan and others.

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

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

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

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

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

GEOLOGICAL SURVEY

Recent Publications

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

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

Memoir 108. The Mackenzie River basin, by Charles Camsell and Wyatt Malcolm.

Memoir 110. Preliminary report on the economic geology of Hazelton district, British Columbia, by J. J. O'Neill.

Memoir 111. The Silurian geology and faunas of Ontario peninsula and Manitoulin and adjacent islands, by M. Y. Williams.

Memoir 113. Geology and mineral deposits on a part of Amherst township, Quebec, by M. E. Wilson.

Memoir 114. Road material surveys in the city and district of Montreal, Quebec, by Henri Gauthier.

Memoir 115. Geology of Matachewan district, Northern Ontario, by H. C. Cooke.

Memoir 116. Investigations in the gas and oil fields of Alberta, Saskatchewan and Manitoba, by D. B. Dowling, S. E. Slipper and F. H. McLearn.

Memoir 117. Geology and ore deposits of Ainsworth mining camp, British Columbia, by S. J. Schofield.

Museum Bulletin 30. Gabbros of East Sooke and Rocky Point, by H. C. Cooke.

Map 164A. St. John, New Brunswick. Topography.

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

Map 185A. Sandon (Slocan and Ainsworth Mining Divisions). Topography.

Map 1584. Blairmore, Alberta. Geology.

Map 1691. Buckingham, Hull and Labelle counties, Quebec. Geology.

Map 1705. Thetford-Black Lake area, Quebec. Topography.

Map 1707. New Glasgow, Pictou county, N.S. Topography.

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

Map 1724. Sheep River, Alberta. Geology.

Map 1726. Athapapuskow Lake region. Geology.

Map 1739. Portions of Bristol, Onslow, McNab, Fitzroy and Torbolton townships, Quebec and Ontario. Geology.

Map 1742. Ainsworth, Kootenay district, B.C. Geology.

Map 1793. Matachewan, Timiskaming district, Ontario. Geology.

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

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

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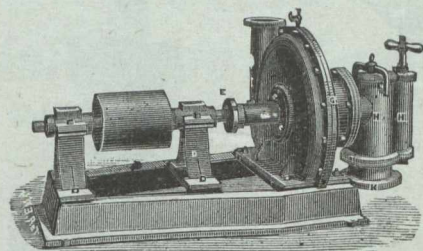
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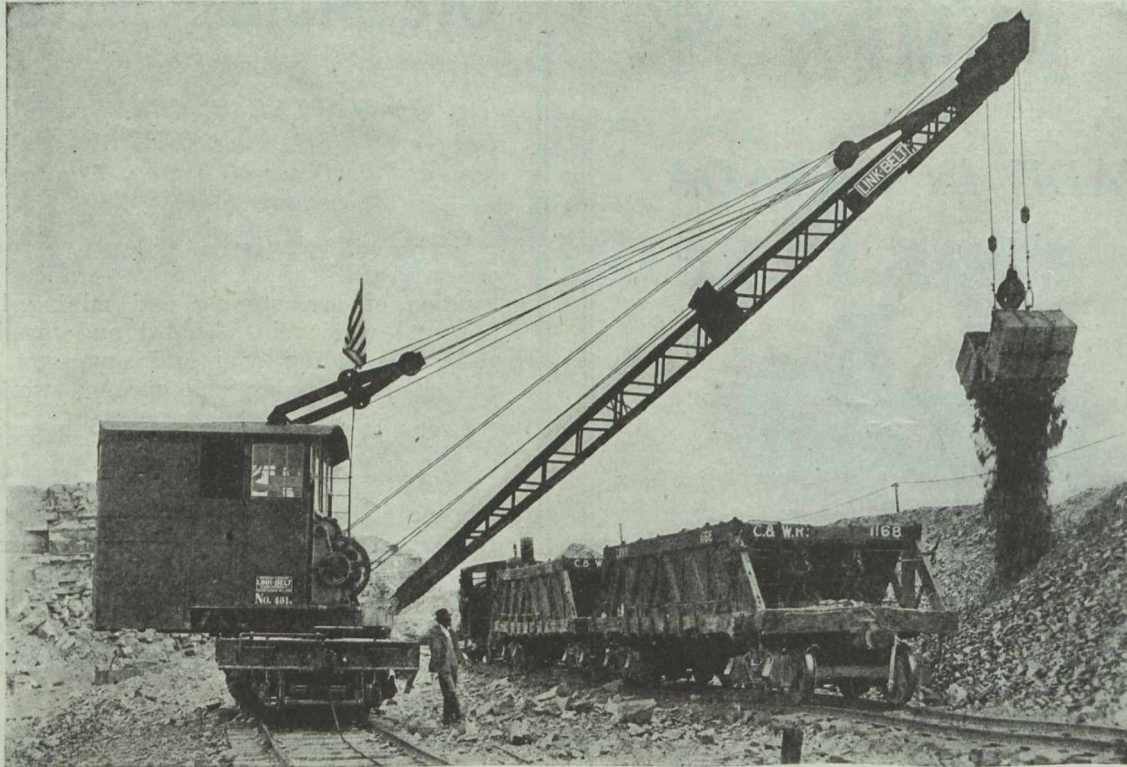
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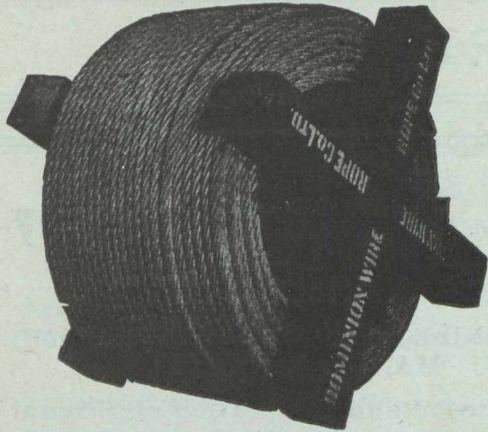
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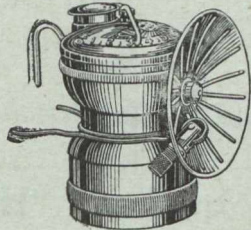
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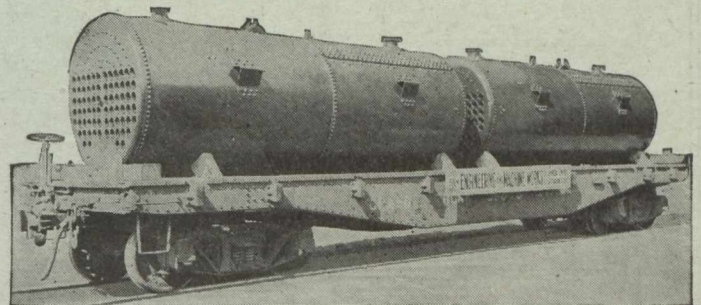
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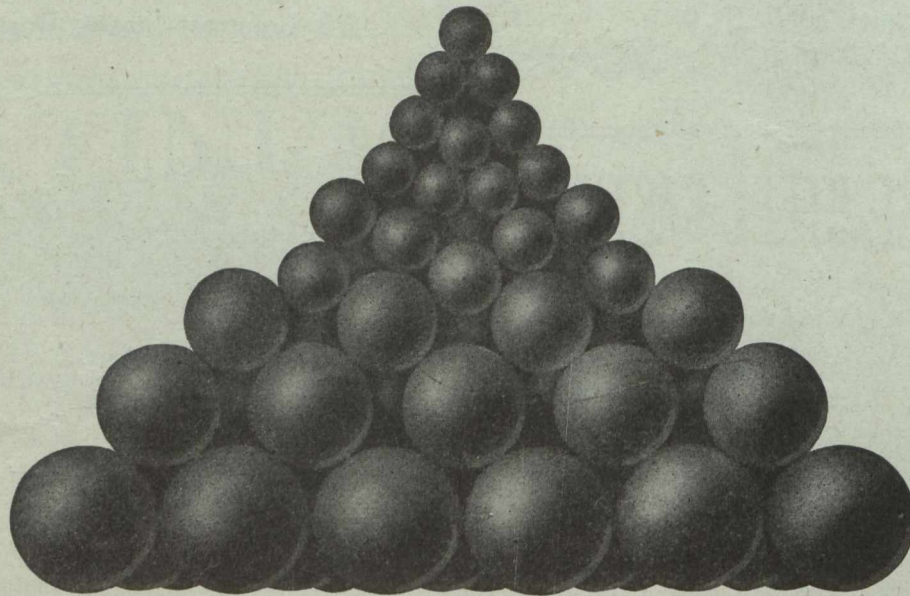
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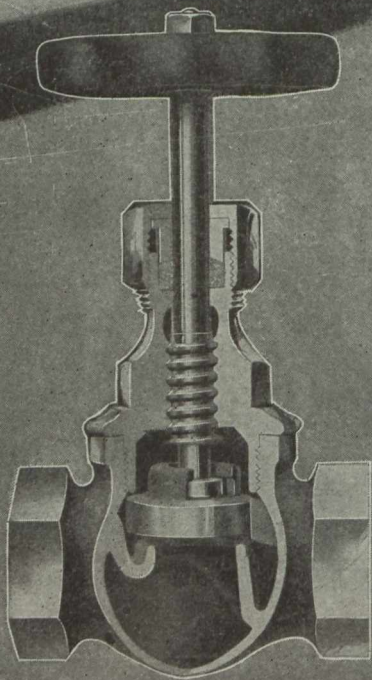
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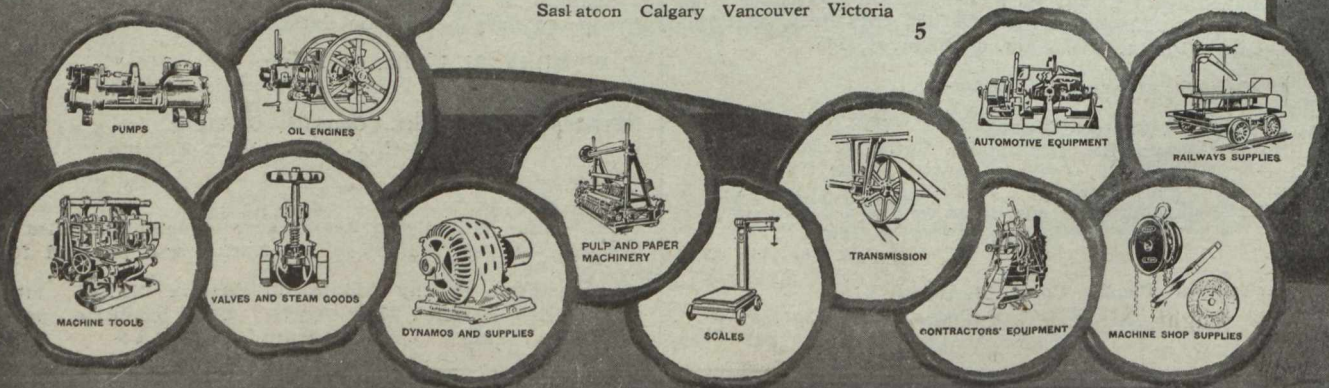
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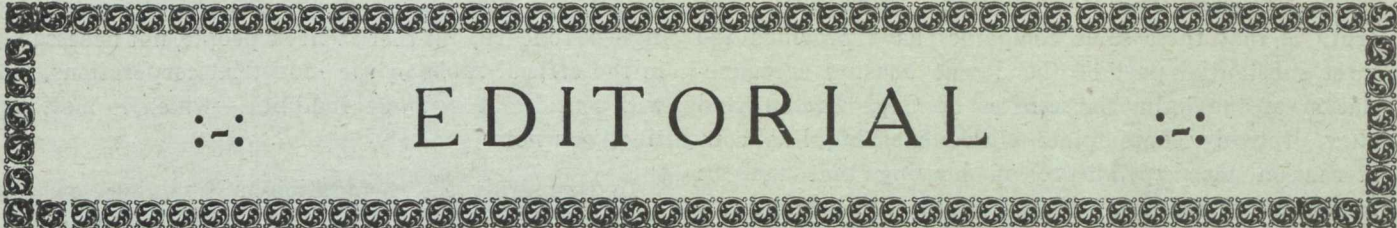
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EDITORIAL

The Provision of Housing by Mining Companies

A statement which has attained such wide publicity as to appear in a Toronto newspaper is attributed to an organizer of the A. F. of L. regarding housing conditions in the Cape Breton colliery districts. This observer's comments contain sufficient truth to give them sting, but he goes too far when he says that conditions are far worse in the mining districts of Cape Breton than in the worst slums of the great cities of America, San Francisco's notorious Chinatown not excepted. The veracity of this much travelled critic is shadowed by a further remark to the effect that after studying the development of the British Empire Steel Corporation he believes it will attempt to import coolie labor into Canada. As the British Empire Steel Corporation has not yet any corporate organization, having no designated officers, it is difficult to see how such an intention can be imputed. The gratuitous assumption reveals a bias that would make impartial criticism from this observer rather difficult.

Yet it is nevertheless true that some undesirable community conditions have concentrated themselves into one or two districts in the vicinity of Sydney. It is difficult to assess the blame, but the chief causes have been those which have usually brought about slum areas in Canada, and elsewhere. Lack of any system of town planning, inexcusable laxity of building regulations, property speculation, non-Canadian elements of population, transplanted habits of dirt and congestion from European countries, and the ignorance of the immigrant, may be mentioned.

Circumstances have forced the industrial companies to become large providers of housing accommodation, and the ideas of these companies have necessarily not advanced faster than the conventions of the times and population in which they evolved. The Dominion Coal Company, for example, was founded upon the financial ruins of a number of independent smaller companies which commenced their chequered careers anywhere between 1857 and 1893, and the new consolidation inherited the plants and housing provision of earlier, but not better days. The style of housing provided in the successive stages of the progress and expansion of the Dominion Coal Company has improved, and the company's houses at the newer collieries are eagerly sought after, being better houses at lower rentals than are elsewhere obtainable.

The Dominion Steel Company in Sydney is not a large landlord, and its houses also are sought as a favor.

At Sydney Mines, a very large proportion of the mine workers own their own houses, and slum conditions do not exist in this colliery town. It is also true that a large number of the steel workers and coal miners in the Sydney District are their own landlords.

The provision of houses for employees has been to the coal and steel companies of Nova Scotia a necessary thing, but also an unprofitable thing, a source of much anxiety. Willy-nilly, the Nova Scotia companies—and this is a statement generally true of mining companies in a new country—have been compelled to become landlords, shopkeepers, provider of all public utilities and communal requirements and of transportation. In doing this they have naturally combined the vulnerability and possible points of attack of this combination of much berated responsibilities.

The slum areas, which undoubtedly exist, have evolved as a parasitical growth, and enquiry would reveal that the worst rack-renter and the genderer of undesirable housing conditions is the former immigrant, now grown rich, who takes advantage of the ignorance and trustfulness of his newly arrived compatriots, and sees no hideousness in slums that are an offence to our Canadian ideas. Some of these men, by their control of sources of illegal liquor supply, and their financial grip upon their fellows, achieved through the supply of housing, food, liquor and every possible source of profit, can exercise a sinister influence on labor matters, nor are they lightly offended by either corporation or municipal officers.

It is this position of vulnerability which accompanies the function of general fatherhood of the community, and the impotence of municipalities and corporations, to prevent the growth of parasitical slum areas and their concentrated evils, that has driven mining corporations in Canada to build "closed" towns, and to oppose municipal incorporation. Labor organizations have imputed other motives, but wrongly so.

A Social Survey was undertaken some years ago of a well-known section of the City of Sydney. The existing conditions were properly criticized, but the

blame was laid upon the industrial companies. The truth is that these same companies have provided the most substantial part of the decent housing accommodation of the industrial centres of Cape Breton, and they probably contemplate with something like consternation the expenditure on housing that will be necessary, at existing building costs, to accommodate all the additional population that mooted expansion of operations will require.

The foregoing gives point to a statement that Mr. Adams, of the Town Planning Division of the Commission of Conservation, is to be asked to advise the Dominion Coal Company, through its newly created Department of Industrial Relations, regarding the plan of a town to serve the workers of a new colliery

near Glace Bay. This, at any rate, shows a willingness to learn, but there will be people, not necessarily in the official ranks of the industrial corporations, who will consider it as fussy faddiness—which it most distinctly is not.

In comparing the corporation-built mining towns in some of the newer fields of the United States, with those of Nova Scotia, it should be remembered that the Nova Scotia companies never had the financial resources to warrant much heavier expenditures on housing than they have actually undertaken, for at no time in its history has any Nova Scotia coal company ever had sufficient funds at its disposal for necessary development work and capital expenditure on new collieries.

More Corporation Baiting

The Toronto "World" animadverting upon our comments on the statements of the Chairman of the Mond Nickel Company in a recent issue, asks: "Is the 'Canadian Mining Journal' with all its claimed professional knowledge, ignorant of the value of the precious metals (platinum, iridium, polonium) the Mond and the International concerns take out of the nickel ore of Sudbury, and of which no return has yet been made?"

Previously dealing with this matter, in the issue of August 27th, the quantities of metals of the platinum group recovered in Canada and in New Jersey from Sudbury mattes was given, as excerpted from the returns of the Ontario Bureau of Mines and the Mines Branch at Ottawa. The latest returns of the Ontario Bureau of Mines mentions the by-product recovery at Port Colborne of "gold, silver, platinum, palladium, rhodium, ruthenium, osmium and iridium. The recovery of polonium is not referred to.

Polonium is an emanation of radium, and was first isolated by Mde Curie, who named it in honor of her native country, Poland. The presence of radioactive substances in the Sudbury ores would not be surprising, as they are widely disseminated in the crust of the earth, but its recovery, and stabilization for sale as an article of commerce, would be extremely interesting to learn about. Perhaps the "World" will vouchsafe more definite particulars regarding this little-reported achievement in metallurgy by the nickel companies?

There is no mystery about the by-product recovery of precious metals from the Sudbury ores, but there has been much definite achievement. It is customary to regard the recovery of the long list of rare metals that are specifically mentioned in the latest figures by the Ontario Bureau of Mines as a *fait accom-*

pli, forgetting the long road of metallurgical research that has made it possible, and forgetting also that chemical and metallurgical achievement are progressive things.

So far as we can gather, our Toronto contemporary accuses the nickel companies of concealing the presence of an element they have probably never found, and certainly never recovered; and of concealing statistics which are public property, and available to any person who will take the trouble to write to Toronto or Ottawa for them. These charges are fairly typical of the complaints made regarding the nickel companies.

Everyone who appreciates the strategic value of Canada's virtual monopoly of nickel and asbestos deposits will desire to see this country obtain full benefit of an advantage that serves, to some extent, to offset our dependency in other and more essential raw materials, and hopes to see in the future more complete refining of nickel and greater domestic fabrication of asbestos goods in Canada; and we take it that the Refinery at Port Colborne and the completely domiciled character of the enterprise of the British-America Nickel Company are concrete realizations arising from this very general and natural sentiment.

The "World," with some lack of elegance, states with reference to Mr. Mond's remarks: "We would fix that gentleman and his corporation so that they "would pay all their taxes to the Dominion of Canada, and the Province of Ontario." Perhaps it would be incorrect to remark—as is remarked of our own observations—that this is "childlike and bland," but the procedure that would ensure this result would be almost as interesting to learn as the achievement of the recovery of polonium from Sudbury mattes.

Western Coal

The progressive and anticipatory spirit that is at this time noticeable in the Western Provinces in regard to the future of the coal mining industry is one of the signs of the times that should gladden the hearts of those who desire prosperity and political permanence to attend Canada in the years to come. Better team work has hardly ever been witnessed than is now being carried on by the combined efforts of the Government of Alberta, the University of Alberta, and the coal operators and dealers.

The first annual convention of coal operators and dealers of Western Canada was held in Calgary during the third week in August, being called at the instance of the Minister of Mines of Alberta. It is an auspicious beginning. The older coalfields of Canada have suffered through lack of such gatherings, and associations of coal operators have been frowned upon, when, had governments been well advised, they would have been encouraged.

The members of the Canadian Institute of Mining & Metallurgy should be pleased to note that the President, Mr. O. E. S. Whiteside, took a prominent part in the convention, and an interesting feature to eastern men was the part taken by men formerly connected with coal mining in Nova Scotia.

Dr. Tory, President of the University of Alberta, stated that two of the ablest and most suitably trained chemists available in Canada had been secured for the University, and that in a year the University expected to have five men employed on research, principally on coal storage, and the peculiar problems of western coal. Dr. Tory correctly pointed out that there was no need to stress the amplitude of the coal resources of Alberta. "We have not found out what 'these are,'" he said, "but we have undoubtedly the 'greatest united body of coal resources to be found 'in any place in the world, with probably one exception, and it is necessary that this great asset 'should be developed.'" Light and leading in matters of public interest is precisely what universities are established to provide, and there is no asset of Alberta, or for that matter of Canada, that is so potential for material welfare and so pregnant with promise for our national security, as the great coalfield of the West.

W. J. Dick, of Winnipeg, said that at the present time Winnipeg was using 200,000 tons of hard coal and 250,000 to 300,000 tons of bituminous coal. If that could be all provided by the West, it would mean up to 600,000 tons, or ten per cent of the present production of Alberta coal. We cannot think of any conceivable reason why Winnipeg should burn coal that is not the produce of Canadian mines. At least not any reason that can be weighed in the balance against the necessity that Canada should be self-

sufficient, and not the final mendicant situated at the point remotest from the source of supply. The monetary value or cost of an imported article is one of the least important factors in these times, as a study of the exchange quotations in the morning paper will disclose.

The decision of the Canadian Institute of Mining & Metallurgy to hold its Annual Western Meeting in Winnipeg towards the end of next month fits in well with the events of the summer. The programme indicates that much attention will be devoted to the fuel question, and, while it is hardly likely that the scope of the papers which will be presented can be wider, or more representative than those which were prepared for the March meeting in Toronto, it is likely, after the experiences of the summer, that more attention will be devoted to their discussion.

The Convention devoted much time to the consideration of railway rates on coal, and the impression we gain from reading the discussion is that up to this time the railways have not viewed the coal traffic of the West in an understanding manner. That is to say they have not yet apprehended the fact that in days to come the carriage of coal will be the most important function of the western railways, and one, which if it is favored and fostered by the railways, will provide the bulk of the freight revenues. The day is coming when the tonnage of coal, and the tonnage of those things that are made with the assistance of coal, will bulk far larger and be of more financial importance than the grain yields of the prairies. If the railways will cease to regard coal as a necessary nuisance, and will build for that day when Alberta will be the Pennsylvania of Canada, they will get a proper starting viewpoint in arranging appropriations for rolling stock equipment. The carriage of coal, in very large quantities, at all seasons of the year, for very long distances, is going someday to be the principal business of the western railways.

The question of storage was discussed, and it was pretty generally agreed that this was one of the peculiar problems relating to western coal that must be solved before the industry could be really successful. A competent committee was selected to study this question.

The more the various phases of the western coal industry are discussed, the more plainly it is revealed that, at least west of Fort William, Canada can and should be completely self-supplying in coal, whether it be required for domestic heating, steam-raising, metallurgical uses or the production of gas. And, the most pleasing revelation of these days, if the present temper of the West is any indication, is that western Canada has made up its mind to become self-supplying in regard to coal.

THE INCREASE ON FREIGHT RATES FOR COAL.

Mr. Carvell, the Chief Commissioner of the Board of Railway Commissions, states that in consideration of the high cost of coal at this time, the freight rate increase granted to the railways on coal is "less than one-half of what it should have been to be fair to the railways," and he threatens quick action against any coal dealer who uses the freight increase as an excuse for profiteering. We believe the special consideration given to coal freights is well advised, in view of the fundamental nature of coal costs, which are reflected in every stage of manufacture and transportation. Equally well advised is the warning regarding increase of retail costs excused on the ground of increased freight charges, which gives point to the opinion previously expressed in these columns the coal producers should seek as far as possible to control the distribution of coal to its ultimate destination. As in so many other commodities, the price of coal as paid by the ultimate consumer is not necessarily proportionately related to the price obtained by the producing coal company.

"LOST PLACERS."

Those who were present at the Annual Meeting of the Canadian Mining Institute in Toronto last March will recollect that Dr. A. P. Coleman suggested that the debris from the glaciation of the gold and silver bearing rocks of Northern Ontario might conceivably be found under the clays on the way to James Bay. He drew attention to the fact that, with two notable exceptions, placer mining had preceded quartz mining namely South Africa and Ontario. The S. A. Mining & Engineering Journal for 7th August last, contains an article on "Deep Level Alluvial Leads," by "A.D.", who asks: "Is there no alluvial of the present or past age derived from the bankets of the Witwatersrand? Here we have more gold to the square mile than anywhere in the world, reefs outcropping for sixty miles or more. In the past ages there has been enormous erosion from the upturned edges, yet no alluvial gold of any importance has ever been located." The South African writer, as did Dr. Coleman, suggests search under the ice drift along the presumed course of pre-glacial and glacial rivers.

SOUTH AUSTRALIA OFFERS REWARDS FOR DISCOVERIES OF OIL AND GRAPHITE.

The South Australian government, to encourage prospecting for oil, has offered a bonus of £5,000 "to the person or body corporate which first obtains from a bore or well situated in South Australia 100,000 gallons of crude petroleum, containing not less than 90 per cent, of products obtainable by distillation." A bonus of £1 per ton on marketable graphite from a mine in South Australia, on the production, to the approval of the Minister of Mines, of account sales of graphite sold prior to June 30, 1922, is also offered.

MR. CHAS. CAMSELL, THE DEPUTY MINISTER OF MINES, HONORED BY VANCOUVER AT FAREWELL DINNER.

The farewell dinner tendered to the new Deputy Minister of Mines on leaving Vancouver was a notable gathering of prominent Vancouver citizens, and a tribute to the esteem in which Mr. Charles Camsell is held by his many friends in the West.

The Dinner was held under the auspices of the Vancouver Branch of the Canadian Institute of Mining & Metallurgy. Among those assembled to do Mr. Camsell honor were the Hon. William Sloan, the Minister of Mines for British Columbia, W. Fleet Robertson, the Provincial Mineralogist, Mr. Nichol Thompson, chairman of the Mining Bureau of the Board of Trade, Mr. A. E. Hagen, Editor of the "Mining & Engineering Record" and about one hundred other citizens of prominence. Mr. H. Mortimer Lamb, the Secretary Emeritus of the C. I. M. & M. was Toastmaster. Mr. Lamb's remarks, which were in the happiest view, are elsewhere published in this issue. Mr. Camsell was presented with an engraved gold watch, and in his speech evinced that wide knowledge of the mining industry in Canada, and that terseness of phrase that doubtless commended him to the authorities at Ottawa for his new position. Among Mr. Camsell's epigrams may be noted the following: "Canada's resources are only slightly developed, and mining least of all. The only limitations which can be placed on mining in Canada are the boundaries of the country. Today more mineral wealth is being placed on the market than during the Klondyke gold rush." Mr. Camsell expressed his gratitude at the occasion, and for the reception accorded to him, and said that he would strive to do right in the new office he had undertaken.

"Since spending a few days at Ottawa", he said. "I have felt the sense of responsibility more than ever. At first I doubted my ability, but on mixing with those connected with the department and finding my way about I feel now a confidence which will aid me in the work. I have a feeling of optimism in the future of the mining industry of Canada, and when one considers what has been done in this country in a comparatively short time, one is justified in such optimism". Mr. Camsell spoke of the discovery of a new area in which nickel had been discovered in B. C., and said that the report of the finding of oil in the Mackenzie Basin district was of the greatest importance.

The Committee in charge of the arrangements for the dinner included Messrs. H. Mortimer Lamb, Nichol Thompson, G. Middleton of the Dominion Assay Office, J. C. Nettell of the Geological Survey, A. E. Hagen, and F. E. Payson, the Vancouver representative of this journal.

An Appreciation of Charles Camsell at the Farewell Dinner in Vancouver.

H. Mortimer-Lamb.

The Committee in charge of the arrangements for this auspicious event has ordained that lengthy orations this evening shall be taboo. They have handed me a memorandum in this connection, wherein their regulations are set forth. I note therefrom that the Chairman is allowed ten minutes in which to explain "why we are here." Other speakers, with the exception of our guest of honour, are granted three minutes in order to explain why they are here; and

I am particularly desired to request all speakers to stick to the point, and not, even if they be professional politicians, branch off into disquisitions on controversial topics, such as the sex of Dolly Vardon, Ireland, prohibition, why I am a Bolshevik, and so forth. It is reckoned that by adhering to these rules of debate, we shall be able to dispose of all the preliminaries in fairly short order, and thus leave the rest of the evening, say three or four hours, free to us to enjoy and be edified by the address of the Deputy Minister of Mines for Canada, on the theme, "How I rose in Life: or Geology as a Stepping Stone to a Career."

So much by way of official announcement.

To come now to my text: "Why we are here." Gentlemen, this is both a mournful and a joyous occasion. We are here to mourn the translation of a noble and dearly-beloved soul to another more transcendental sphere; and yet to rejoice that one—our own familiar friend—has been called to sit in the seats of the mighty. As "The Province" in an able editorial on Mr. Camsell's elevation so appositely remarked, it is good to have a friend at court, and we all felt that if by giving Mr. Camsell this dinner we could convince him that we were still his friends and place him under an obligation to us on that account, it would be money very well spent. There is a good deal to be said as a business proposition, in favour of throwing bread on the waters. But you may ask, "Why a dinner; wouldn't a trip to the summit of Grouse Mountain, a picnic in Stanley Park, or a garden party at Burnaby Lake, have been equally appropriate and at the same time cheaper." The reply is, "No, emphatically, No. Geologists are not as other men. You can only appeal to them in one way. Feed them. I refer you to the Bulletin of the C.M.M. for July if you would know what privations Mr. Camsell endured in his early career by reason of a lack of proper nourishment, and how for a whole winter on the Skeena he subsisted on a diet of squirrels and frozen blue-berries. He has had a splendid appetite ever since, and has told me confidentially on more than one occasion that nothing pleases him so well as a good dinner. In fact, I question whether Mr. Camsell would have abandoned field-work and its freedom for the worries and responsibilities of his new office, had the gastronomical arrangements of the Department in respect of the former been more satisfactory.

But while we don't want to be too serious this evening, I should like to say a few words in all seriousness. I want to express in the strongest possible terms the acknowledgements of the mining industries of this country to the magnificent services rendered these industries from the time of Logan to the present day of the Department of Mines, and particularly of the Geological Survey; and to pay humble and grateful tribute to the geologists in the public service of Canada, who serve us so ably and so conscientiously. The value to Canada of the labours of the great founder of the Survey, and of the men who have carried on the work he so ably began, the work of Selwyn, Dawson, Fletcher, Adams and Barlow, of Dowling and Faribault, of LeRoy and Broek and Camsell, and Cairnes—to mention only a few notable names—the value of the work of these men to the Dominion is incalculable. And yet there is no class

so poorly, so incommensurably, remunerated. If pecuniary reward were the only inducement to scientific men to enter the service of the Dominion Government, the probabilities are that we should have no Geological Survey. But as we all know the world's best work is not done for the sake of pecuniary reward. If it were, if success and high achievement in life, were to be gauged always by the dollar standard, a Charley Chaplin would rank higher than a Shakespeare, a Mary Pickford than a George Eliott, a Beaverbrook than a Borden, a Lipton than a Lloyd George, a Carnegie than an Abraham Lincoln, or a Vancouver plumber than a geologist of the Canadian Department of Mines. But, thank God, money is not the sole, nor the highest criterion by which to measure merit. Yet it is not to the credit of society that all the very highest forms of labour and services are the least well requited—art and science, pedagogy, statesmanship rank among the most unremunerative of callings; buffoonery, prize-fighting, financial buccaneering among the most profitable.

But while the members of the staff of the Department of Mines are more interested in their work than in their pay, they are now being compelled to think more about the matter of pay. Many, especially those who are married men, find that they can't make ends meet on the wholly inadequate salaries they draw, and so have been practically forced out of the service. The loss to the Survey and to the country has in consequence been most serious. The rectification of this state of affairs is one of the matters with which the Deputy Minister, Mr. Camsell, will naturally concern himself. It is a most vital one. And I can assure him that in this, as in all of his endeavours to maintain the Survey at a high standard of efficiency and usefulness he may depend on the sympathy and active co-operation of not only the mining men, as represented by our Institute, but by all other classes of the country, having its interests at heart. I submit to you that to attain the maximum of efficiency and usefulness, it is not enough that the Technical Departments of Government should be divorced from politics, they should be relieved also of the interference of commissions, Civil Service or otherwise.

Finally, I desire to felicitate our guest on the high honor that has been bestowed on him; and to felicitate the Government on its selection of so capable and worthy an official to fill the exalted position of Deputy Minister of Mines for Canada. It is without doubt the highest honour to which a member of the profession of mining in this country can aspire; and the creditable performance of the duties of that office pre-supposes the possession by the occupant of qualities and talents of no common order. The successor of Logan and Dawson must necessarily be above his fellows in natural ability. The appointment of Mr. Camsell, moreover, is significant and satisfying from another aspect. Political pull had no relation to it. Merit alone determined it. And what is more surprising in this age of advertising, modest and unassuming merit was recognized, and received its just due. I will not embarrass our guest by enumerating all his virtues in his presence, but he will permit me to tell him that those virtues have won our hearts, and that no man in British Columbia is richer than he in the sort of wealth that neither rust nor dust can corrupt—the esteem and respect and affection of his fellow citizens.

Letter to the Editor THE ASBESTOS INDUSTRY.

Editor "Canadian Mining Journal,"

Dear Sir:

I notice the article in your valued paper on Page 722, "Asbestos Fibre of Canadian Origin Supplied to Japan by United States Exporters."

I believe that Mr. Bryan, Canadian Trade Commissioner, was a little hasty in his remarks. Is he aware of the fact that some of the largest asbestos mines in Canada are owned outright by American interests? Is he aware of the fact that some of the Canadian miners have their selling organizations in the United States? The writer personally has been in Japan on various occasions and is interested financially in some of the largest asbestos mines in Canada. The Japanese buyer knows perfectly well that asbestos is not produced in the United States. He cannot help but know this, for the reason that shipments are made to him direct from Canada via Vancouver. The result is that not alone do the Canadian miners dispose of their material, but the Canadian railroads and steamship companies also benefit through the sale.

The remark:—"it is time we became a little more independent of our southern neighbors," does not cause a friendly feeling. The southern neighbors are the largest customers that Canada has and everything should be done to make business relations still more pleasant than they are at the present time. I do not blame Mr. Bryan for advising the Canadian exporters to have their own branch houses in all overseas countries, but he must grant that if the American has already done so, that it is another example of their "pep" and tenacity as he states. I believe that any asbestos miner in Canada will agree with me and state that to a great extent, the prosperity presently enjoyed by the Canadian asbestos miner is due to a great degree to the American exporter and consumer. Trusting that you will give the foregoing your usual courteous consideration I beg to remain,

Very truly Yours,

ASBESTOS & MINERAL CORPORATION.

B. Marcuse,
President.

Note:

We are pleased to have the opportunity of publishing Mr. Marcuse's letter. We think, however, that Mr. Bryan missed the main lesson to be learnt from the policy of the Government of Japan in encouraging the asbestos products industry in Japan. The handling of crude asbestos through New York brokers is in line with the practice of mineral brokerage in North America, and it should not be forgotten that not only is the United States the great market for Canadian asbestos, but many of the asbestos mines in Canada are owned by citizens of the United States, and, as Mr. Marcuse points out, the selling organization of some of the Canadian asbestos producers is placed in New York. This is what would be expected, seeing that the market is there.

It is progress towards utilization of Canadian asbestos in the arts in Canadian factories that is chiefly to be desired, but this is a point that the country has not yet attained. The utilization of asbestos in the industrial arts is very varied, quite specialised, and is spread over many branches of industry. A manu-

facturer of asbestos goods in Canada could only look to Canada for a market, and he would require to make such a variety of articles, that outlay on plant and technical supervision would be disproportionate to the probable sales. That is the existing situation. That this situation will indefinitely continue is not to be expected.—Ed.

Haileybury, Ont.

September 13, 1920.

Editor Canadian Mining Journal.

Dear Sir:—

In the recent issues of Sept. 3rd and 10th, your Northern Ontario Correspondent has referred to the poor road between Elk Lake and Gowganda. That the mining industry of Gowganda has suffered from lack of transportation facility no one will deny. The writer is of the opinion that the present Ontario Government acted wisely in the early part of this year, in holding off the construction of the macadam road begun by the late Government. Such competition as a macadam road would offer, would have very seriously mitigated against the successful operation of a Light Railway, and a part of our Northern Ontario Press advised us a number of times that the Light Railway was assured and would, like the mushroom, develop over night.

The writer understands that the present Government is going to connect Gowganda and the few miles of macadam already laid down with a good gravel road, which can be built in one quarter of the time required for macadam and at one tenth of the cost per mile of road as built by the late Government. In the writer's opinion your correspondent is more interested in adversely criticising the present Government than in the transportation problems of Northern Ontario.

Yours sincerely,

A Prospector.

THE CANADIAN SECTION OF THE BRITISH CHAMBER OF COMMERCE IN PARIS.

Amongst British Chambers of Commerce established abroad, that of Paris is conspicuous for its enterprise in serving the requirements of British Trade and Industry, and, furthermore, possesses a very active Canadian Section.

The Committee of this Section is composed of persons themselves interested in trade with Canada, and consequently is in a position to supply all the requirements of Canadian Members. The membership of the Chamber is restricted to firms of British nationality, it receives no subsidy from the Canadian or British Governments, and carries on its most necessary work entirely through the subscriptions of its members. To enable the Chamber to take up a firm position and thus sufficiently combat foreign competition, it very naturally deserves to continue to add to its membership.

Amongst other things it puts its members into touch with suitable agents in France, obtains information on the Commercial standing of French firms, supplies exact Customs classification of goods, notifies changes in French Customs duties and proposed commercial legislation, communicates enquiries from French buyers of British goods, and, furthermore, publishes a very useful Bulletin of information.

Applications for membership should be made to the Secretary of the Canadian Section, British Chamber of Commerce, Incorporated, 6, rue Halevy, Paris.

The Breathing Apparatus Fatalities at the Black Diamond Colliery, Washington State

Report of Accident of Saturday, July 10th, at the Black Diamond Mine of the Pacific Coal Company, State of Washington, in which Three Members of Mine rescue Teams lost their lives.

By JAMES MCGREGOR, Chief Inspector of Mines.

The Hon. William Sloan,
Minister of Mines, Victoria, B.C.

Sir,—In compliance with instructions received from you on the 12th inst. to investigate and, if possible, learn the cause of the accident which occurred at the Pacific Coal Company's Black Diamond Mine, in the State of Washington, in which three men lost their lives while wearing rescue apparatus underground when making an examination of an abandoned slope owned by the Pacific Coal Company, and which had not been operated for four years, I have the honour to make the following report:—

I proceed to Seattle on the above-mentioned date, reaching there at 9.30 p.m. On the morning of the following day I called at the office of James Bagley, State Inspector for the State of Washington. There I learned that the Coroner, Howard McDonald, after questioning some of the men who had been at the scene of the accident, decided that an inquest was unnecessary. From Mr. Bagley I learned the following:

The day previous to the accident Mr. Morgan, the superintendent of the Black Diamond Mine, mentioned to James Murphy, captain of the Black Diamond rescue team, that he would like them to go down the old slope to learn if the water had risen or lowered since their last visit about three months previous, and remarked at the same time that, as they were going to enter the contest which is to take place at Roslyn, Wash., on August 14th, it would be good practice to make the trip through the black-damp area of the slope. It was agreed that they would go on Saturday.

The team was composed of five men—James Murphy (captain), Harry DeWinters, Hugh Hughes, Fred Ponton, and Julian Conda. Mr. Morgan, the superintendent, accompanied the team to the entrance of the slope, where they prepared their apparatus. Before putting them on the superintendent asked them if they had sufficient oxygen. In talking the matter over they were all satisfied they had plenty, remarking that it was only a short trip, the distance down to the water being 1,400 feet from the surface. At about 200 feet from the surface, known as the dead-line, they would be in the gas. They then looked at the gauges and were satisfied they had enough oxygen.

Harry DeWinters, using a Draeger type of apparatus of the 1916 model, had 50 minutes' supply; Hugh Hughes, using the Draeger of the same type, had 50 minutes' supply; James Murphy, captain, using a Gibbs apparatus of the old type with no by-pass, had 45 minutes' supply; Fred Ponton, using a Gibbs of the same pattern, had 60 minutes' supply; and Julian Conda, using a Gibbs apparatus of the same pattern as the others, had 90 minutes' supply.

They started down the slope at about 9.30 a.m. on the 10th instant, the superintendent, Mr. Morgan, going with them to the dead-line about 200 feet underground, where a safety-lamp was left burning. He intended to remain there until they returned and re-

ported. After waiting about twenty-five minutes he became anxious at seeing nothing of them, knowing the trip had been made by the same team three months previous in twenty-seven minutes. In another few minutes he heard a call for help from Hughes. He, being alone and without apparatus, hurried to the phone and phoned the rescue team from the Burnett Mine, also phoning for Mr. Bagley, State Inspector, and Stephen H. Green, the general manager, who both arrived on the scene in about an hour and a half. By this time the Burnett team had arrived and gone underground. The statement made by the survivors of the first team to go down, to the State Inspector, was to this effect:

They went down to the water-line, taking the end of the rope with them to be left there and hauled up after returning to the surface, and there measured to determine the distance to the water. When the water was reached DeWinters showed signs of distress. When the captain examined his apparatus he noticed he was almost out of oxygen and decided to assist him out. After getting De Winters up the slope about 70 feet, Hugh Hughes dropped. When the captain realized by this time that they were all short of oxygen and could not stay longer, he ordered them all to go out and secure help, which was done; being compelled to leave Hughes and DeWinters behind.

The Burnett team, who went to rescue DeWinters and Hughes, were equipped with the Gibbs apparatus. After being underground about twenty minutes one of the party returned in an exhausted condition and was taken to the hospital, where he recovered.

The next to become exhausted and fall was James Hudson, of the Burnett mine-rescue team, who was equipped with a Gibbs apparatus. He was at once brought to the surface and every effort made to resuscitate him. After working with him for one hour and a half there was no sign of life. I was unable to learn whether or not he had any constitutional weakness.

Owing to a scarcity of apparatus to equip the twenty men organized into relief squads, the State Rescue Station having all but three of their apparatus away East to be remodelled, necessitating the use of those which had already been in use that day. Among them was the Gibbs apparatus Hudson had been equipped with. It was taken from him, recharged, and used again without having undergone any repairs, and was apparently in good condition even after having been somewhat roughly handled.

Upon the arrival of James Bagley, State Inspector, and Stephen H. Green, general manager, they organized a corps of twenty men equipped with rescue apparatus, sending four in a team and other teams of four following each other at a distance of 250 feet between teams, and taking a sled with them to where DeWinters was left. Placing the body on the sled and attaching the sled to the rope already mentioned, which had not yet been pulled up, the sled with the

body was hauled by those at the dead-line. The rescue party merely kept the sled in the best course until they met the next party 250 feet farther up, leaving the sled in their care and continuing on out to the surface. Each party did the same until the body was recovered.

I was informed that each apparatus given to the Black Diamond rescue team on the morning of the 10th was tested, before being given out, by the usual method known as the soap test, and appeared to be in good condition. This is confirmed by the same apparatus which Hughes wore being recharged with oxygen and used again the same day without any repairs.

This slope is very difficult to operate in, wearing rescue apparatus, the rails having been removed and many of the old ties having been left, making travelling heavy. The slope pitches about 35 degrees.

The consensus of opinion among the remainder of the first team to go down is that they were too confident and were not well enough supplied with oxygen in case they were delayed, if only for a short time.

The rescuers from the Burnett Mine, upon arriving at the scene of the accident, were somewhat tired and nervous, which accounts for so many of them being unable to proceed far, wearing apparatus.

In all there were three fatalities and five overcome; none of these were shown to be through defective apparatus.

I am greatly indebted to James Bagley, State Inspector, and to S. H. Green, general manager, for what information I have been able to gather. It is unfortunate there was no inquest, which prevented me from securing valuable and important information in detail, which is necessary in such a serious accident as this.

Respectfully submitted.

Victoria, B.C.,
16th July, 1920.

Supplementary Official Comment Re Fatal Accident In Use Of Mine-Rescue Apparatus.

This accident in no way discredits the efficiency and safety of the apparatus when handled properly.

The plain facts of the case are that this team attempted a feat in ordinary practice that most men would have given very serious consideration before allowing it even in a case of emergency.

The place to be travelled was dangerous, being full of carbon-dioxide gas, CO₂. There was no need to take the risk in ordinary practice-work.

The roadway to be travelled by the team was the worst possible for men wearing mine-rescue apparatus, being of heavy grade and very rough.

To go in with such a supply of oxygen, knowing the conditions, was suicidal.

The slope to be travelled by the team is 1,400 feet in length and pitches 35 degrees, and with the rails being lifted was in a very dangerous and rough condition for walking. A person in good physical condition without mine-rescue apparatus would have his work cut out to make this return trip in 30 minutes, yet the men attempted to make it with one of the men only having a 45-minute supply of oxygen, two having 50 minutes' supply, one 60 and one 90 minutes' supply.

It is noticeable that the one with the 45-minute sup-

ply was one of the survivors, the machine he was wearing being a Gibbs. This can be attributed to the automatic feed, which would function according to the wearer's demands. Both men lost were wearing the Draeger type of apparatus, 1916 model, which are not equipped with automatic feed arrangement, the machines giving a constant supply of oxygen and not functioning according to the wearer's demands. This, no doubt, is the reason DeWinters and Hughes, the two wearing this type of machine, came to get in distress on the heavy, rough travelling on the heavy pitch slope. After the accident the machines were all found to be in good condition, and if they had been properly charged before going in the mine there would have been no accident.

The rough conditions encountered on the slope can be imagined when it took five teams of four men each to get out the bodies of the victims.

Why a trial with such risks attached should be selected for ordinary practice is hard to understand, even if the machines had been charged to the limit. But to go in with about one-third full charge is difficult to understand.

PRECAUTIONS IN USE OF OXYGEN RESCUE APPARATUS.

By GEO. S. RICE,
Chief Mining Engineer, Bureau of Mines.

Three men lost their lives in the Black Diamond Coal Mine near Seattle, Wash., recently while wearing oxygen breathing apparatus. The press dispatches stated that these men lost their lives while practicing with the apparatus. Later reports stated that the men died while attempting to make a trip 1,200 feet down a 25 degree slope which was filled with black damp, in order to measure the amount of water that had accumulated at the bottom of the mine, and the trip was attempted with oxygen in the tanks of the apparatus with dials indicating only 45 minutes' supply. The oxygen in the tank was used up and the men therefore lost their lives from a deficiency of air to breathe.

In spite of all the education and training done by the Government to prevent accidents, men are prone occasionally to take unnecessary chances. Every piece of apparatus, no matter how perfect, has its limitations. The Government, through the agency at the Bureau of Mines, has trained many thousands of miners in the use of mine rescue apparatus. The training has been given to all miners who requested it, and the Bureau has gone to the extreme of urging miners to join the rescue and first aid classes. In spite of all the efforts of the Government, men occasionally attempt the impossible.

To go 1,200 feet down a 25 degree slope, make observations, rest, and then return 1,200 feet, thus making a total distance of at least 2,400 feet, in 45 minutes is a quick trip when a man is not encumbered with a heavy load, but to attempt it cumbered by an apparatus weighing about 40 pounds makes it more than a hazardous undertaking.

Modern apparatus when fully charged will furnish oxygen for two to two and one-half hours when used with moderate exertion or with periods of rest, but a person uses four to five times as much oxygen in climbing a steep slope with a load of 40 pounds, than he would when walking at a moderate gait along a level road. It is quite probable therefore, that the

45 minutes charge indicated by the dial will not last 45 minutes with the violent exertion necessary. The Bureau of Mines in its handbook on "Rescue and Recovery Operation in Mines After Fire and Explosions," on page 49 makes the following statement:

"The rescue crews should observe every known precaution for their own safety while travelling in after-damp or other noxious gases. Each crew should be composed of at least five men, including the captain, and the members of the crew should not become separated. If any one member complains of feeling unwell or is observed to be staggering or breathing unnaturally, the entire crew should immediately return to fresh air. In view of the liability of a member receiving some injury or his apparatus being damaged, a crew should never advance such a distance nor travel over such faults or wrecks as would prevent the crew from carrying one of its members back to fresh air. With the types of breathing apparatus now in service, the maximum straightaway unobstructed course should not exceed five thousand feet with a reserve crew at the fresh air base."

While in the foregoing it is to be noted that the maximum distance to be traversed is 5,000 feet, this for a level, unobstructed road, and as previously indicated, a trip of 2,400 feet down a steep incline would be more than equivalent to a 5,000-foot trip on the level and which maximum distance calls for a fully-charged apparatus, that is, with at least three times the amount of oxygen which it was alleged the three men had who made the disastrous trip in the Black Diamond mine. While all of the details of the affair are not known, at least enough has been indicated to send out a caution against men making such a foolhardy attempt, and it is desirable that full facts shall be known so that the public shall not be prejudiced against an apparatus which has greatest value when it is carefully used, and used in accordance with well established rules.—U.S. Bureau of Mines, Reports of Investigations.

OBITUARY.

Mr. Henry Berry, Montreal.

Mr. Henry Berry, the Vice-President and General Manager of the Canadian Asbestos Company died at his residence in Montreal, on the 13th September, after a long illness. The Montreal "Gazette" states that general regret is felt in business circles in Montreal at the passing of Mr. Berry, who had been associated with the asbestos industry most of his life, there having been comparatively few uses for the mineral when he first became interested in it, but in the course of some thirty years of active development work he made it known all over the Dominion. He built up a large business which is now in a flourishing condition.

He had a strong personality, was richly endowed with energy and foresight, and these qualities made themselves felt in the extension of the business, in the interest of which he travelled from coast to coast hundreds of times.

Mr. Berry was 54 years and ten months of age. He was a member of the Montreal Board of Trade, and a member also, of the Masonic Order. In religion, he was an Anglican, belonging to St. Stephen's Church. He leaves a widow, formerly Miss Olive Grout, of Grimsby, Ont., and three sons: John and Frank, of Montreal; and Robert C., B.Sc., C.E. of Ottawa.

NOTES FROM THE NOVA SCOTIA COLLIERIES.

Nova Scotia Steel & Coal Co.

The output for August totalled 47,843 tons, made up as follows, Florence Mine, 16,467 tons, Princess, 13,843 tons, Jubilee, 12,346 tons, Scotia, 5,287 tons. This is slightly less than June and July figures, the lessened production being chiefly due to holidaying. September production will not be high at the Cape Breton collieries, being a short month, and one not generally marked by maximum production.

Labor Matters.

The Royal Commission is stated to have forwarded its findings to Ottawa, and the Department of Labor is expected to make an announcement regarding this during the current week. A significant statement was given to the newspapers by Mr. Wolvin, President of the Dominion Steel Corporation, on his return to Montreal from a visit to the collieries. He expressed the view that owing to the conditions existing in the country at the present time, and with the cost of living on the decline, together with the prospect that there would be considerable unemployment during the coming winter, the commission could not with consistency recommend an increase in wages. The investigation of that body, he stated, would undoubtedly show that the increased wages granted during the past three years had generally resulted in a decrease in the output of coal at the mines.

The miners' leaders have gone out of their way to intimate to the Commission that they not only expect a very substantial increase in wages, but that a new demand will be made immediately following the publication of the findings of the Commission. The original demand of the miners asked for an increase retroactive to 1st May 1920. There is a wide divergence in the declared attitude of the union leaders and the opinion expressed by Mr. Wolvin. It is very much to be doubted whether the increased selling prices obtainable for coal have in the case of the Dominion Coal Company offset the increased costs of production due to decreased outputs, and undiminished—in some cases actually increased overhead expenses, and the lessened turnover of sales. It is generally admitted that one-third additional output could be obtained from the Dominion collieries without adding a single non-productive laborer to the payroll, if the necessary number of coal miners could be placed at work. The attitude of the miners' unions in regard to the distribution of the working forces and general working conditions is a much more serious question than the wage increase question, although that is sufficiently serious to warrant Mr. Wolvin's rather ominous comment.

The Report of the Royal Commission on working and wage conditions at the collieries in Nova Scotia has been forwarded to Ottawa, and it is understood that copies of the recommendations of the Commission are being forwarded to the parties interested. A despatch from Sydney contains what purports to be the gist of the findings of the Commission, which are generally favorable to the case presented by the union, but the Minister of Labor has not as yet announced the nature of the findings.

It is reported the Greenwood Coal Company has been acquired by Montreal purchasers.

Northern Ontario Letter

THE SILVER MINES.

Producers of silver in various instances have come to base their calculations on a minimum of 90 cents silver, with frequent fluctuations up to around \$1.00 an ounce. A decline to around 90 cents is usually marked by a curtailment of bullion sales, while an advance to above 95 brings out more or less large quantities of hoarded metal.

Silver production from Ontario mines during the first half of the current year declined more rapidly than previously estimated, the number of ounces produced amounting to 4,474,322 as compared with 5,744,172 during the first half of 1919. The value of the silver produced during the first half of 1920 amounted to \$5,077,028 as compared with \$5,951,362 during the corresponding period of the preceding year.

In view of the average price of silver having declined still further during the last half of the year, it is quite evident an added decline in the value of the output will result and the value for the whole year may fall below \$10,000,000. This compares with \$12,747,621 during 1919.

Quite a number of prospectors from the Cobalt district have staked out claims on the shore line of Lake Temiskaming, in the vicinity of Paradis Bay. Oil seepage is said to have been found. At best, however, it is believed but a very limited quantity or basin of oil shale could occur in that section owing to the known occurrence of volcanic formation in the surrounding territory.

The annual report for the fiscal year ended August 31st on the Kerr Lake mine is already in the hands of the printer and will be ready to present to the annual meeting which has been called for September 27th. This is believed to be a record, in regard to the brief time occupied in placing full information before the stockholders, following the closing of the company's year.

Cyril Knight, Ontario Government Geologist, is making excellent progress in the geological survey of the Cobalt field. The Beaver-Temiskaming areas in south-east Coleman has been completed, as also has the south-eastern part of the township of Bucke. Mr. Knight will continue the work up until November, and will be obliged to leave the finishing of the task until the Summer of 1921. Part of the current month will be spent in the Kirkland Lake gold area in making an examination of conditions met with at the 900-ft. level on the Kirkland Lake gold mines.

A cross-cut at a depth of 425 feet on the Keeley Silver Mines in South Lorraine has reached the "Beaver Lake" vein, according to a report just received. In view of work in the upper levels having opened up ore in this vein all the way from the surface down to a depth of about 300 feet, the present development is believed to indicate the occurrence of ore all the way from surface to the contact between the overlying Keewatin and the underlying diabase, or a total depth of between 425 and 500 feet.

On October 20th, the Nipissing Mining Company will disburse \$600,000 to its shareholders. This will make a total of \$1,200,000 in dividends, plus \$600,000 in bonuses paid during the current year by this company. The financial statement recently issued, showed a balance of over \$5,200,000. In following out its usual

policy, the company will likely make another disbursement in January, amounting to \$300,000 in a regular dividend of 5 per cent. and a bonus of equal amount.

Announcement has been made that financial arrangements have been made to operate the property of the Cane Silver Mines, situated in the township of Cane on the Elk Lake branch of the T. and N. O. Railway. It is planned to assemble as much high-grade ore as possible from the surface showings with a view to making a shipment early in the winter. The development program includes the sinking of a shaft on vein known as No. 1, and after reaching a depth of a hundred feet or so, to drift east to where the diabase comes in contact with the quartzite formation. In connection with the financial arrangements, it is learned that interests closely identified with the Abitibi Power and Paper Company have become associated in the enterprise, and that earlier reports that one of the Cobalt mining companies had been requested to participate in the venture were erroneous. The silver on the Cane property occurs in veins in the diabase formation, spectacular patches of the metal being found at surface.

The Gowganda District.

During the first six months of the current year, the mines of the Gowganda district produced 225,513 ounces of silver. This was made up chiefly of silver from the Miller Lake O'Brien, the balance coming from the Castle property of the Trethewey Company. The output is somewhat lower than for the corresponding period last year.

The prediction last spring, made by the promoters of the Canadian Light Railways Construction Company that Gowganda would be provided with a narrow-gauge railway within a month or so following the granting of a charter has not been made good, and there is a growing relief that the camp is once more to be disappointed in regard to the question of a solution of its transportation problem.

With the approach of winter, the mines will be able to lay plans to advantage of the sleigh roads for hauling the material and supplies, as well as sending out ore. The freight rate, however, promises to be high and will amount to at least a dollar a hundred, all of which tends to constitute a serious handicap in the development of the district's mineral resources.

Ore and Bullion Shipments.

During the week ended Sept. 10th, five Cobalt companies shipped an aggregate of eleven cars containing not far under a million pounds of ore.

The Nipissing alone sent out six cars containing over half a million pounds, which is shown in the following summary:—

Shipper	Cars	Pounds
Nipissing	6	581,311
Coniagas	2	151,000
La Rose	1	83,902
Hudson Bay	1	62,640
Beaver	1	60,000
Totals	11	948,853

During the corresponding period the Nipissing made two large bullion shipments, the combined consignments amounting to 225 bars containing 299,352 ounces. In addition to this, a large shipment is reported from the Mining Corporation which was not recorded in last week's statement. This shipment amounted to

158 bars containing 162,247 ounces and added to the Nipissing shipments makes a total of 383 bars containing 461,599 for this week's report.

The Nipissing also reports a shipment of 66 bars containing 69,116 ounces, apparently omitted from former bulletin reports. In adding this to the above statement, the total report for this week amounts to 449 bars containing the enormous total of 550,715 ozs.

Figuring the metal at 12 cents to the pound, that sent out by these two big producers amounts to nearly twenty-three tons of pure silver.

THE GOLD MINES.

Next to the nickel mines, the gold mining industry of Ontario is the greatest factor in the mining industry of this province. In the order of importance the three metals produced are nickel, gold and silver. The figures compare as follows for the first half of 1920:—

Nickel matte	\$5,338,120
Nickel (metal)	1,696,687
Gold	5,690,504
Silver	5,077,028

This clearly illustrates the relative importance of each, but also requires a note of explanation.

The known silver deposits have been worked extensively for about sixteen years and are declining. The nickel deposits are large, and although worked for many years, are likely to maintain an output for many years, in fact many decades at the present rate. The gold deposits are comparatively new and the industry is growing rapidly. This tends to indicate that gold production is definitely in the lead of the silver mines, and may in time exceed the record of the nickel mines.

As a consequence of this, interest in gold mining is increasing and money for development work in the vast prospective area outside of the proven districts seems certain to flow in larger volume when it becomes fully realized that the prospects are excellent for new important gold mining districts being opened up.

For the first half of 1920 the Hollinger mine alone produced \$2,928,079, in addition to carrying out a large amount of exploration and development work.

The McIntyre-Porcupine was the second largest gold producer in Ontario for the first half of 1920, its output amounting to \$1,085,298 for the period. This company is also proceeding with the development of its recently acquired coal lands in Alberta, and is placing orders in the East for additional machinery to be shipped to the property. It is believed to be the intention of the company to make as good a showing as possible on its coal lands, so as to impress the stockholders of the Temiskaming Mining Company with the importance of the project and in that way enlist the financial co-operation of that company.

The Dome Mines easily occupied third position among the gold producers for the first half of the current year, the output from the this mine amounting to \$989,566. The Dome has definitely arranged to take over the Dome Extension property and assets, both contracting companies having ratified the deal, and thereby leaving it only necessary to carry out the details. This will mean the transfer of one share of Dome for each thirty shares of Dome Extension, the total of the latter to be taken over amounting to 2,300,000 shares.

A feature in connection with the gold mines of the Porcupine district is the increase in the value of the ore as found at depth on the Dome. The indications are said to point to the likelihood of the Dome's average gradually working up to a point almost on a par with the Hollinger.

Cross-cutting is under way at the 250-ft. level of the Porcupine-Keora property. This work is for the purpose of proving up the ore bodies indicated previously by diamond drilling.

A mining plant has been installed on the North Davidson property in north-eastern Tisdale, and the work of shaft sinking will be speeded up. At a depth of over fifty feet, values are said to run high over a width of between four and five feet. The work has so far been financed chiefly by Toronto men, although finances have been subscribed by English interests, the money only being held in England pending a reasonable adjustment of exchange rates.

A statement has been issued by the president of the Clifton-Porcupine Mines for year ending June 30th, 1920, in part as follows:

"During the period under review we have made encouraging progress in the development of the Clifton property. An electrically-driven Mining Plant, of adequate capacity for the complete development of the property has been installed. The main shaft has been sunk to a depth of 225 feet, and several hundred feet of lateral work has been carried out on two levels with encouraging results.

"We have recently embarked on a policy of diamond drilling. It is expected that the information which will be gained from this work will make it possible to conduct further underground development at a considerable saving."

The Annual Meeting of shareholders is called for September 14th.

The Kirkland Lake Field.

Excavations for the foundation of a new 100-ton mill commenced this week on the Ontario-Kirkland Gold Mines. It is planned to get the foundations ready this fall before cold weather sets in, after which the winter months will be occupied in hauling machinery to the property so as to proceed with the installation of the plant in the early spring. Underground developments continue favorable, the grade of the ore at the 450-ft. level showing still further improvement over that opened up at the 300-ft. level.

For the first half of 1920, the Lake Shore mine produced \$243,977, while the Kirkland Lake Gold Mines produced \$137,676 and with an output of \$125,137 from the Teck-Hughes.

The Ontario Government has notified the mining interests of Kirkland Lake that in view of the Government having complied with their request for a macadam road, and on account of the Associated Goldfields of Larder Lake not having been willing to submit its property to an examination by engineers appointed by the Government, it has been considered best not to proceed with the construction of a railway through that district at the present time.

In the meantime, it is learned that some of the heavy shareholders in the Associated Goldfields are planning some move to secure an independent report on the property. They have expressed dissatisfaction over the attitude of the management of the enterprise.

On the Bidgood, King-Kirkland, Wood-Kirkland, Lebel Oro and Moffat-Hall properties in the Eastern part of the Kirkland Lake district, some very satisfactory progress is being made, and the results achieved have been highly encouraging. The correspondent of the "Canadian Mining Journal" has concluded a visit to that district and finds considerable justification for the present enthusiasm over the outlook.

THE GOLD OUTPUT.

Statistics have been published recently by the United States Geological Survey and others showing how the production of gold throughout the world has fallen off during the past eight years. In 1912 the world's output of gold was £95.9 million. Last year the total was only £72 millions, while this year it is likely to be still lower. This is a fact that will probably surprise many people, and it is assuredly a fact that leads to most serious reflections, not only upon its causes, but upon its consequences.

The war has been largely, but not entirely, responsible for this falling off. Labour has been withdrawn from the mines, there have been transport difficulties, high costs and so forth, while some mines have become exhausted and there have been no discoveries of importance. While the output of the precious metal has been diminishing the world's need of gold has increased, and will continue to increase, so that an enlarged production of gold for an indefinite time to come, if this be possible, is imperative. But we see to-day famous mines on the Witwatersrand having to close down because, owing to high costs of working, in which high wages play a great part, they cannot make ends meet. And when once a mine closes down it is difficult to restart it. The greater the number of mines that close down the less employment is there for miners and others who depend for their livelihood upon the mining industry.

We see all the great countries of Europe struggling with immense difficulties owing to the great manufacture of paper money and the resulting inflation. Great Britain's difficulties are bad enough, but those of many other European countries are infinitely worse. The United States is in this respect the most favored of all, and it is practically the only country that can be said to have a free market for gold. The great mass of paper is in most countries no longer linked with gold, but is linked with debt only, and before paper money can become linked with gold once more these massive debts must be removed or considerably reduced. This applies, for instance, to our own mountainous floating debt and likewise to our indebtedness abroad, especially to America.

But a greatly increased output of gold will not remove the difficulties against which these debt-laden, currency-inflated countries labour if they will not make the fullest use of their energies in increasing their natural wealth. Gold from the mines will not irresistibly flow towards any unless they can attract it by the magnet of wealth production. The more rapidly they and ourselves produce wealth the sooner shall we be able once again to link our paper currency with gold—in other words, to re-establish the gold standard. And while producing wealth, nations must likewise economise. In short, they must not consume more than they produce and attempt to exist as a parasitic individual does.—"Financier," London.

CONTINUED DECLINE OF GOLD PRODUCTION IN UNITED STATES.

The gold mining industry of the United States will be completely shut down unless constructive aid is provided without delay, according to H. N. Lawrie, mining engineer and economist of the American Mining Congress of Washington. Mr. Lawrie has just returned from an extended tour of all the mining districts of the United States and says that conditions in the gold mining camps are much worse than he had expected to find them.

"Gold production in the United States has declined from \$101,000,000 in 1915 to \$58,500,000 in 1919, and from present indications will probably still further decline to about \$40,000,000 this year," said Mr. Lawrie. "Now, added to that, the gold stock is being depleted by excessive exportation and industrial use, and this will seriously impair the public confidence in the nation's finance and currency during the present period of credit and currency contraction unless a normal gold output is very shortly insured. The mines are reducing production or closing down, and if this is allowed to continue it will take years to again develop a normal output, and at a tremendously increased expense. Moreover, to shut down the deep mines means that they will become filled with water.

"Industrial gold is the only commodity which manufacturers can obtain today at pre-war prices. The average wholesale price of all commodities for the year 1919 was 112 per cent greater than for the year 1914. The Government is selling gold without limitation for industrial consumption at \$20.67 an ounce, the pre-war price, which is less than the cost of production. An ounce of gold had during 1919 a purchasing price of only \$9.70. Now the economic pressure which has forced the decline in the purchasing power of the dollar and thereby created the pressure upon the gold mining industry has operated to increase the purchasing power of the public to such an extent that they have been buying luxuries, especially jewelry, and that has made a great increase in the demand for industrial gold.

"The gold produced is in the same position today as a person who received the same income in 1919 as in 1914 and finds that \$1,000 has shrunk to a purchasing power of \$485. It is an interesting condition when the production of gold has become so expensive that it does not pay to mine it, and the shutdown of our mines for that reason is imminent. The people of this country must recognize the situation and must urge constructive legislation to relieve it if they wish confidence in our finance, currency and the gold standard to be retained in this country and abroad."

PERSONAL.

Mr. Arthur A. Cole, Mining Engineer, T. & N. O. Railway Commission, who was recently operated on at the Mines Hospital at Cobalt, is rapidly convalescing, and was able to leave the hospital for home on Saturday the 4th instant.

MINING INSTITUTE INCREASES FEES.

The several mining societies in Britain, which are federated into the Institution of Mining Engineers, have decided to raise the annual fees to a minimum of three guineas for members and associate members. This is the second increase in some instances since the beginning of the war.

TORONTO MINING STOCKS.

Following are the average quotations for gold, silver and miscellaneous stocks on the Standard Stock Exchange, for week ending Sept. 11th 1920.

Silver	Hlgh	Low	Last
Bailey	5	4½	5
Beaver Consolidated	43	41	41
Cobalt Provincial	44½	43	43½
Crown Reserve	28½	27	26
Gifford	1¼	1¼	1¼
Hargraves	2	2	2
La Rose	35	33	35
Lorraine Con. M. Ltd.	5	5	5
McKin.-Dar.-Savage	58	57	57
Mining Corp. of Canada	1.65	1.65	1.65
Nipissing	11.00	10.75	10.75
Peterson Lake	14¾	13¾	14¾
Silver Leaf	1½	1½	1½
Temiskaming	35	34	35
Trethewey	26	25	25¾
Wettlaufer	3	3	3
Gold.			
Apex	1¾	1½	1½
Boston Creek Mines	15½	15½	15½
Dome Extension	38	37	38
Dome Lake	4	4	4
Dome Mines	12.25	12.25	12.25
Gold Reef	3¼	3	3
Hollinger Cons.	5.90	5.75	5.79
Inspiration	3½	3½	3½
Keora	15½	15	15
Kirkland Lake	52	50½	51
Lake Shore M. Ltd.	1.15	1.08	1.08
McIntyre	2.01	1.94	2.00
Moneta	11½	11	11½
Newray Mines, Ltd.	9	9	9
Poreupine V. N. T.	24½	24	24½
Schumacher	18	17½	17½
Teck-Hughes	9	9	9
Thompson Krist	8	7	7
West Dome	6½	6½	6½
West Tree Mines Ltd.	5½	5	5
Wasapika Gold M. Ltd.	13	12	12½
Miscellaneous.			
Rockwood Oil, Gas	3¼	3	3
Vacuum G.	24½	24	24

TORONTO COAL PRICES.

Toronto, Sept. 14.—Hard coal continues to be particularly tight and although a slight softening in bituminous was noticeable the advance in freight rates just about offset the slight drop. Mine run is quoted at \$14.25 to \$14.50 f.o.b. Toronto; smokeless coal \$14.50 to \$15.00; hard coal \$8.00 to \$16.00 gross tons at mines American funds.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Sept. 17th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	23¾
Copper castings	23½
Tin	53
Lead	9¼
Zinc	10¼
Aluminum	35
Antimony	8¾

ASSOCIATED GOLDFIELDS MINING COMPANY PROPOSES BUILDING OWN RAILWAY FROM BOSTON CREEK TO LARDER LAKE.

The Toronto "Globe" publishes the following letter from the President of the Associated Goldfields Mining Company stated by him to have been forwarded to the Minister of Mines for Ontario under date of 27th July. The letter is as follows:

"In pursuance of our conversation of to-day, and our interview with the Premier a few days ago, I may say that I have taken up the matter with the directors of Associated Goldfields Mining Company, Limited, and those of the Porcupine-Rand Belt Railway, which charter, as you know, this company owns.

"It was originally the opinion of our directors that our transportations needs would be served more quickly if our company were to build its own line of railway, and at the same time we would be able to locate it at such points as would serve our interests best, and it was only with the idea of serving as many of the other deserving operators in the district as possible that the course of the road was more or less diverted to the Kirkland Lake-Swastika route.

"It is the opinion of our directors that only a very comprehensive investigation of our ore bodies would be fair to the Province, and figuring all the assistance which we would be able to give the men in charge, this investigation would still entail several month's time. Coupling this with the fact that the Kirkland Lake-Swastika route would be more than twice as long our directors feel that our requirements would be more speedily served by the company constructing its own line of railway from the point at or near Boston Creek to Larder Lake.

"Presuming from our conversation that your Government has no objection to our following this course, we have decided to send our engineers at once over the short route and give us facts and figures as to the cost of this line.

"Thanking you and your Government for their kind consideration in this matter, I beg to remain, yours respectfully,

Geo. A. MacKay."

BOOK REVIEW.

Compressed Air Power. A Treatise on the Development and Transmission of Power by Compressed Air, by A. & Z. Daw. Sir Isaac Pitman & Sons, London and New York. Cloth Boards. 5½ by 8½ ins. by 5 inch. \$7.50.

This volume does not treat so much on the applications of compressed air, as on the development and application of the principles of the compression, expansion, exhaust and flow of air and gases. The mathematical theories underlying the design of compressed-air devices are very fully developed and the steps by which formulae are deduced are exhaustively detailed. The book is designed to fit the requirements of designing engineers and draughtsmen, and students of applied science, and it is not an elementary treatise. The tables and diagrams are particularly numerous. The Air Lift Pump is very thoroughly investigated, and their authors believe that their presentation of the Displacement Theory of the Air Lift Pump is the most complete mathematical analysis of its action yet offered. The functions of the receiver and inter-cooler in designing a really efficient compressed-air power-plant are extensively discussed, as are controlling and unloading devices.

VIRGIN COAL AREAS IN THE ROCKY MOUNTAIN AND FOOTHILL SECTIONS OF ALBERTA.

The Summary Report of the Geological Survey for 1919, Part C., contains reports of explorations in unworked coal areas of Alberta, all lying in remote and mountainous territory, and unlikely for many years to become the scene of coal mining on a commercial scale. The occurrences are all shown on the maps attached to Mr. D. B. Dowling's Report on the Coal Resources of Canada, the essential correctness of which is strikingly illustrated by more intensive subsequent explorations.

Coal Areas Northwest of Brule Lake, Alberta.

This area was examined by John MacVicar in the field season of 1919, with the main object of determining what further Kootenay coals might be found, and also to ascertain the feasibility of a railway line to them, and the coal areas of the Smoky River, by way of the foothill country. The territory examined lies northwest of the Jasper Park area, and consists of a tongue of coal-bearing strata roughly paralleling the crest of the Rocky Mountains. A number of coal seams that will yield bituminous coals, suitable for steam, metallurgical and domestic uses were noticed, but no anthracitic coal, similar to that on the Smoky River was found.

It was found that the country did not present great obstacles to railway building, and a route is suggested, starting from Solomon Creek on the Canadian National Railway, following the water courses to the junction of the Smoky and Muskeg rivers (an airline of about 70 miles), with grades that will not exceed two per cent.

The coal resources of the region have not been prospected, and in this hurried reconnaissance no attempt was made to prospect them in detail. Coal seams were ascertained to occur at three horizons, namely in the Montana, Colorado and Kootenay formations, but only the last-named is important as likely to contain workable coal seams. Outcrops in the Kootenay are sparingly represented, probably because the seams are covered by glacial drift, or only the barren parts of the Kootenay are exposed. A number of seams, varying from 3 ft. to 5 ft. were noted, containing coal generally friable in character. No analyses are given.

Little Smoky River, Alberta.

The field season of 1919 was spent in a reconnaissance examination of the valley of the Little Smoky river, but owing to lack of time and scarcity of outcrops the results were unimportant. Lignitic seams were noticed. The area lies within the general sub-bituminous district.

Highwood Coal Area, Alberta.

The Highwood area is a continuation of the Crows nest field, and has similar rock successions and structural features. The report is made by Bruce Rose, who has been engaged since 1915 in examining Rocky Mountain coal areas. Mr. Rose is linking up the stratigraphy northwards along the range.

At one point, on Cat Creek on the H. A. Ford holdings, fourteen seams are located in a distance of approximately three-quarters of a mile across the meadows. The seams vary from 4 ft. to 38 feet in thickness, and give a total of coal thickness of 151 feet. The seams have been prospected by tunnelling, and analyses are given showing fixed carbon contents of from 60 to 76 per cent. Volatile matter is low, running from 14 to 15 per cent, but the ash is comparatively high, although it is explained that some of the sam-

ples analysed included portions of shale parting and roof stone. Making allowances for loss of moisture in transit, and corrections for shale content that would be eliminated in commercial mining, an average analyses of these Highwood district coals is given as follows:

	Per Cent.
Moisture	1
Ash	8
Volatile Matter	16
Fixed Carbon	75

DEMAND FOR GYPSUM PLASTER IN CUBA.

Major H. A. Chsholm, Canadian Government Trade Commissioner in Havana, Cuba, writes as follows:—

"If Canada manufactured sufficient gypsum plaster the Cuban market could consume many times the quantity imported from Canada at the present time, which amounts to some 2,000 or 3,000 barrels a month. It appears that a good deal of the building plaster imported into Cuba from the United States is manufactured from gypsum mined in Canada. I should think that Canada has a good opportunity to build up a new industry in the manufacture of gypsum building plaster for Latin-American countries."

There should be no difficulty in supplying any outside market with either crude or calcined gypsum from Canada, provided shipping facilities were convenient and reasonably priced. Of 304,532 tons of gypsum mines in Canada during 1919 there were calcined 121,499 tons. 148,394 tons of crude gypsum were exported mainly to the United States, and gypsum products were exported to the value of \$140,235. There were quite important imports of gypsum, crude and ground, and of plaster of paris. Canada's ability to produce gypsum and gypsum products of high grade is much larger than any market that has as yet been obtained, and during the cessation of building during the war period many of the gypsum quarries and calcining plants in Canada have been idle, and many are yet.

Cheticamp Gypsum Quarries Reported Likely To Resume Operations.

Before the war a gypsum property at Cheticamp, Inverness County, Cape Breton Island, had been quite extensively developed. The gypsum is present in large quantities, and it provides the raw material for plaster-of-paris of very good quality. A good demand for this material came from the Montreal district, before the war stopped building operations, and some of the larger buildings, such as the Ritz-Carlton, used this Cape Breton plaster in large quantities. The quarries are conveniently situated for water transportation to Montreal by small steamers.

It is now stated there is a probability that this property, which includes a short railway line, rolling stock, and factory for making plaster of paris, will operate again in the Spring of 1921. There are a number of excellent gypsum properties in Cape Breton Island, but they have all been idle during the war, and are idle now, with the exception of the quarries of the Iona Gypsum Company, situated near the point where the Canadian National Railway crosses the Bras d'Or Lake at the Grand Narrows.

British Columbia Letter

Dawson, Y. T.

The placer camps of the Yukon Valley, it is estimated, will yield \$4,485,000 for the season of 1920. Practically every camp in the North suffered a heavy decline for the reason that it has been a very dry season. Hydraulic operations consequently have been much curtailed. Yields by camps of the Interior of Alaska and the Yukon for the season drawing to a close are estimated by competent authorities as follows: Dawson, \$1,500,000; Fairbanks, \$750,000; Tolovana, \$750,000; Iditarod, \$500,000; Tacotna and Ophir, \$500,000; Hot Springs, \$100,000; Ruby, \$100,000; Koyukuk, \$75,000; Circle, \$70,000; Marshall, \$50,000; Forty Mile, \$50,000; Rampart, \$20,000; Chandler, \$20,000. Total, \$4,485,000. In commenting on the situation thus disclosed the Dawson "Daily News" observes that, if the decline in gold production is to be arrested, it will be necessary to restore the purchasing power of gold by bonus or otherwise as low-grade alluvial gravel cannot be worked under present conditions.

Stewart, B. C.

It is reported that the present bond holders of the Big Missouri Group of Mineral Claims, Salmon River, Portland Canal District, do not intend to continue development work. Operations have been under way for some time by a syndicate known as the Pacific Coast Exploration Co. prominently identified with which is Sir Donald Mann, of Toronto, Ont. Both diamond drills with which exploration work has been in progress have been withdrawn. The only information made public, and it is unofficial, is that the Big Missouri presents an unusual problem, that the small amount of drilling done has not given satisfactory results, and that the complete exploration of the entire mineralized zone is a work of such magnitude that the Company does not feel disposed at present to continue.

The Dunwell Group of Mineral Claims, adjoining the Lakeview on Glacier Creek, is being developed with promising indications. The ledge has been stripped for 300 feet and cross-cut in places. It is five feet in width and averages \$20 in gold, silver and lead.

Stringers of native silver have been struck on the Silver Tip Claims, Salmon River, the samples seen closely resembling those of the high-grade ore of the Premier Mine. This property is under bond to a Vancouver City Syndicate.

The Algonican Development Co. has decided to do some diamond drilling on the Spider Group of Claims. Work of this kind has been in progress on the Northern Light Property.

A recent heavy rain did considerable damage to various avenues of transportation in the Portland Canal District, chiefly in the carrying out of bridges. The Bear River, however, again has been bridged with cables permitting the crossing of prospectors and their supplies.

The Portland Canal Branch of the Canadian Mining Institute held a meeting at Stewart, on September 1.

Alice Arm, B. C.

There are now 250 men employed at the Dolly Varden Mine, Kitsault River, and the output of ore for the

month of July totalled 5,600 tons, all of which was sent to the smelter at Anyox. In addition a quantity of high-grade ore was forwarded direct to the Tacoma Smelter. The force indicated has been divided during the summer equally between the Mine and the Railroad and, if the snow of the forthcoming winter makes the continued operation of the railway impossible, only some 65 men will be kept on, their work being the prosecution of development. At present power for the air compressors is secured from oil engines but a hydro-electric plant is being installed on the Wolf Claims which will be used for all purposes. It will be capable of providing 500 horse power for the operation of a 12-drill compressor. The Wolf, which is situated three miles up the river from the Dolly Varden, is reported to have given gratifying indications in diamond drilling and tunnelling is to be commenced without delay.

Good reports have been received of other properties of the Alice Arm Section, notably of the Esperanza Group, from which a quantity of high grade native and ruby silver ore has been taken and now is awaiting shipment to the Tacoma Smelter. There also are the Silver Tip Extension, the Moose, and the La Rose Properties all of which are showing up well and on all of which considerable development has been done this summer.

Hazelton, B. C.

The construction of a waggon road to the Silver Standard Mine by the Provincial Government meets with the warm approbation of those interested in the development of the mineral of the district. It is stated that the road when completed will be a "regular speedway."

The Peerless Mine, Kleanza Creek, is attracting much attention. Last year some 150 tons of ore were taken out and this season there have been shipped 100 tons. The work at present consists for the most part of development and the ore blocked out, it is stated, runs about \$100 to the ton in values. That the property has merit is indicated by the fact that the Provincial Government is improving the trails to it.

Other prospects on which development has been done are the Continental on the north side of Bornite Mountain, the New Era Group, the Montana, and the Golden Crown. The latter was purchased recently by the Kleanza Mining & Development Co.

Slocan, B. C.

The "Evening Star Mine," Dayton Creek, is being opened up and there is every reason to believe that it will be shipping again soon. Pumps and other plant necessary for the unwatering of the shaft and workings of the No. 3 Cameron Group were installed some time ago and have done their work well, it being stated that a body of high class ore has been uncovered. Work has commenced on the construction of a 50-ton flotation mill for the Ottawa Mine, Springer Creek, near Slocan City. L. H. Biggar and A. L. McPhee hold this property under bond from the Consolidated Mining & Smelting Co. and the mill referred to has been designed by Mr. Biggar, who is an Eastern Canadian engineer. A tramway from the mine to the mill is to be built, the distance being about half a mile and a pipeline also is to be installed. It is planned to have the mill ready for operation in the course of a month or more, but the heavy machinery is to be taken over the snow.

Nelson, B. C.

The Perrier Mine, situated on Cotton Wood Creek on the slope of Morning Mountain and close to the line of the Great Northern Ry., which recently was taken over by a re-organized Company with a capital of \$250,000 and the officers of which are: C. E. Crossley, president; R. W. Hinton, vice-president; W. M. Cunliffe, secretary-treasurer; and A. H. W. Crossley, George Leece, T. H. Turner, and Ralph Young, directors, was discovered in 1910 and named after the late King Edward's famous horse. Mr. Turner, one of the original discoverers, states that the property is and always has been owned by those responsible for its staking. The main shaft of the Mine has been sunk 120 feet and there are two others on the vein, one 40 and the other 20 feet. The present plant consists of a small Huntington three-foot mill of five-ton capacity for taking care of ore from the drift. From this mill \$3,300 in gold has been taken, other values not having as yet been recovered. There also are a Rand drill, a Rand hammer-stopper and a three-drill Rand compressor driven by a Pelton wheel. There is an abundance of water, and Messrs Crossley and Turner claim they have invented an automatic pump to keep the mine free from water which will work for 12 months without attention. It is planned to put in a stamp mill and a modern hoist equipment. There is to be considerable more underground development. About 80 per cent of the ore is free milling.

A second vein has been discovered by surface stripping on the property of the Mountain Chief Copper Mine, Renata, on the lower Arrow Lake. A tunnel has been driven exposing considerable mineralization, the ore for the most part being oxidized.

Another property on which a new vein is reported to have been found is the Barnett Silver-Lead Group at the head of Lemon Creek. The new lead is very similar to that on which work has been done and runs parallel to it. Already ore from this source is being sacked for shipment. The Barnett Mine was re-opened by R. G. McLeod some four or five weeks ago. It has been a shipper in past years.

Ymir, B. C.

Good progress is being made in the opening of the Yankee-Girl Mine. Operations underground are proceeding satisfactorily. Considerable new development has been done and a substantial body of ore has been blocked out. John W. Shaw, superintendent, has left for Toronto, Ont., to submit a report to the Mining Corporation of Canada which is behind the enterprise and in the meantime A. W. Newberry, of New York, is in charge. Development is being prosecuted upwards on No. 5 Level by means of two raises and each now are up a distance of some 300 feet on the dip vein, both being in ore. There still is about 400 feet to go before No. 2 Level, the next in the vein, is reached. Exploration of the ore body has been carried on from No. 2 Level and at present four hammer-drills and two piston drills are being used.

Trail, B. C.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada for the last 10 days of the month of August totalled 11,257 tons, making the aggregate for the year 221,312 tons. The feature of this period was the return of the Iron Mask Mine, of Kamloops, to the list of shippers.

THE HISTORY OF SILVER MINING IN ONTARIO. An Address to the Imperial Press Conference by the Secretary of the Ontario Mining Association.

On the occasion of the recent visit to Cobalt of the members of the Imperial Press Conference, an address was given by Balmer Neilly, secretary of the Ontario Mining Association, voicing the opinion of mine operators of Ontario in general, and dealing specifically with the silver mines.

Particular emphasis was laid on the necessity for mining men to deprecate and challenge any suggestion made by any public man in Ontario that would cast suspicion on past and present relationships, between the Department of Mines and the mining operators of the province. It should be kept clearly in mind that Mr. Neilly made reference to mining operators, and did not mention in any way promoters or stock operators.

Following is a verbatim record of Mr. Neilly's address reported by our correspondent:

"The time at our disposal tonight is limited by arrangement and our guests must be indeed tired of speeches and possibly of speakers. However I would here tender to the Delegates to the Imperial Press Conference on behalf of those more particularly interested in the Mining Industry, our very keen appreciation of the honor they do us with their presence here tonight. Their presence in Canada is of peculiar significance to us, because we look upon them as British Prospectors in the fullest sense, and just as mining cannot hope to prosper without keen energetic and intelligent prospectors to prepare the way, neither can our British Empire develop as it should, without prospectors such as these.

"We have undertaken to sketch in the briefest possible way tonight the history of Silver Mining in Ontario, with particular reference to the Cobalt Camp.

EARLY HISTORY OF SILVER MINING.

"Back in the early sixties some small and unimportant discoveries of silver had been made along the north shore of Lake Superior, but in the Spring of 1868 the first real discovery was made on Silver Islet, a small bare rock 25 miles from Port Arthur and having dimensions of only 80 x 100 feet.

"In these days Ontario, then known as Upper Canada, gave little promise of its world position of to-day. The Government attached little importance to the Mining Industry and insisted, where the prospector desired to back his opinion with his money, that he should take up a mining claim 5 miles long and 2 miles wide and pay for the land at the rate of 4 shillings per acre. Moreover all rights for gold and silver were reserved to the Crown.

After the discovery at Silver Islet the Government decided to encourage real mining by giving up their rights to Gold and Silver, but as an offset levied a royalty of from 2 to 10 per cent. No royalty accrued to the Crown and the year following the royalty was struck off and real mining commenced.

The first round of holes blasted on Silver Islet blew out all the silver ore above water, but it was rich and they continued to mine under the water and during their first summer mined ore to the value of 6,751 dollars.

During the succeeding summer 10 men in 14 days took out another \$16,364, and the engineer in charge feeling sure they had a real mine, asked the British owners for \$50,000 to install plant and equipment. However the reports as to the richness of the ore sounded too good to be true and they preferred to sell and did sell their entire interest to Americans for the sum of \$225,000.

For the next few years the company were most successful. The island by breakwater was built up to 2 acres, splendid accommodation was provided for the men, and in the mainland schools, churches and hospitals were built and a thriving community established. Such was the history of the first silver discovery of importance, in Ontario down until 1883, up to which time ore valued at \$3,500,000 had been produced. In that year the ore mined was low grade and a cargo of coal failing to arrive before the close of navigation, the Company were forced to pull their pumps and the mine was closed down.

Why have I taken your time in describing the work at Silver Islet?

HISTORY REPEATS ITSELF.

Because there is an old saying that history repeats itself and it is true with respect to Cobalt.

In 1903 the Ontario Government were engaged in constructing a railway now known as the T. N. O., between North Bay and New Liskeard. This was projected as purely a colonization railway with the idea of linking up what is now known as the Great Clay Belt, with the older portions of the Province.

A blacksmith named LaRose in the employ of one of the railway contractors found or had brought to his attention a peculiar piece of ore which he proceeded to melt in his forge then situated on the present LaRose property at the north end of this town. This was the beginning and soon Dr. Miller, Provincial Geologist, pronounced the find genuine. To stimulate interest he had samples of this extremely rich ore prominently displayed in the Parliament Buildings. However, like the original owners of Silver Islet, the public refused to believe the ore was anything like as rich as was represented. Moreover they had just passed through the Rainey River Gold Boom and were they thought sufficiently acquainted with mines and mining men. Even experienced mining men from other countries considered the high grade samples, but a freak of nature and were sure the deposits so rich would prove mere pockets as to size and of little real importance.

In 1904 some four veins produced important quantities of silver but the public remained uninterested and good ground in the productive area still remained open to the prospector.

However, during the winter of 1904-1905 a real mining fever developed in this province and by spring not only were the original reports believed, but many men who had visited the North Country or had had a friend visit this district, not only confirmed original reports, but were reading and willing to enlarge on these reports to the extent of their imagination. Cobalt was on the map as a mining province.

The Cobalt silver deposits were confined to veins comparatively narrow—measured in inches—but prenomentially rich. The better surface deposits would average well over 3000 ozs. silver to the ton and about 7 cubic feet of this ore would weigh a ton. The outcrop of the ore shoots was on the surface and the crudest of mining methods enabled the lucky discoverers to produce a fortune with practically no necessity for capital. Never since the placer booms of California and the Yukon had the mining prospector had such a chance.

A railroad with pullman accommodation, a night's run from Toronto, provided transportation of every kind. Fuel grew on the property and good water was everywhere. Labor was plentiful, law and order were well maintained and the Geological Department had published a map showing the geology of the country pointing out the special significance of the different formations with respect to the known ore deposits. Surely never was a setting better prepared for a mining boom on a large scale.

By the spring of 1905 the fame of the camp had spread far and wide. Prospectors started to arrive by the train load and one is probably safe in saying that practically every known country had its representative here.

The price of silver had jumped from an average of 58c. per fine oz. in 1904 to 61c. per oz. in 1905. Buyers were paying 65 to 70 cents a pound for Cobalt—12—15c. per lb. for nickel and 1c. a lb. for arsenic. If a prospector had located a claim with none of these minerals exposed in quantity, but able to show even a little Cobalt bloom in a narrow crack, his property could be and often was sold for outrageous sums.

265 new Mining Companies with a gross capitalization of \$185,357,000 were chartered by the Province in 1906. Promising mining locations were at a premium.

Government Helped.

The Provincial Government were interested, insisting on a policy of fair treatment to all. The Mines Department offered their assistance in many ways supplying geological maps of Cobalt and the surrounding country and advice to prospectors that proved most useful. Since the early days of Silver Islet the size of a mining claim had been reduced from 10 sq. miles to 40 acres and again so far as the Township of Coleman was concerned, the area that could be staked on one discovery was reduced to 20 acres.

This condition of feverish activity continued until the apex of production was reached in Cobalt in 1911. In this year 31,507,791 ozs. were produced, or well over 14 per cent. of the whole world's production during that year.

While production from that time forward has steadily decreased Cobalt in 1918 still produced 17,661,694 ozs. and the increased market price of the product still gave returns \$1,387,943 in excess of the amount received in 1911, when the greatest production in ozs. is reported.

Summing up then Cobalt has produced, up to the end of 1919, silver to the value of \$182,145,699 and at the same time

has paid to the shareholders of the different mines \$80,780,513, or nearly 50 per cent. of the total value of the output. Naturally you will ask how long can Cobalt continue at its present rate. The only way in which this question can be answered is by asking another, viz, what is likely to be the future price of silver per ounce?

British and Canadian Capital Shied at Cobalt.

At the outset and after having sketched the somewhat early history of the Silver Islet, the statement was made that history repeats itself. In the case of Cobalt, as also in the case of Silver Islet, the value of the early discoveries was doubted and when British and Canadian capital refused to come through, American capital stepped in and reaped much of the reward and properly so. The same condition holds true with respect to Cobalt.

Permanent industry has been established to the mining operations carried on here and a new portion of the great Northland opened up and settled by a stable, industrious people. The gross production of the Cobalt Camp will exceed the Silver Islet production many times and again let us say, history repeats itself and I believe I am perfectly safe in predicting that at some time, some place and perhaps in the no distant future, new Cobalts will be discovered that in their final production will be as much larger than Cobalt, as Cobalt is larger than Silver Islet.

The Result.

Now we have traced the growth of the Cobalt Silver Camp and one naturally asks what good have the people of this Province derived directly and indirectly from this most fortunate and profitable discovery.

1.—The T. N. O. Railway, projected as a Colonization road at great expense to the people has been continued to Cochrane with branches each and west and instead of a weekly service as at first proposed, three first class trains run daily in each direction and the line forms an important link in our National Transcontinental Railway System.

2.—Populous centers have been established all along the Railway and towns of importance have been established for all time.

3.—Hydro electric power has been developed and is now available here to the extent of 23,000 H.P.

4.—Men who made their fortunes have struck out to develop new districts and the result is that to-day we have very important camps at Porcupine, Kirkland Lake, Boston Creek and Gowganda. Canada was one of the few countries to show an increased gold production in 1919 and there is some reason to expect that this year the value of gold produced will equal that of silver.

5.—Our mining success has directed to the Northern District men interested principally in other industries and to-day for example on this T. N. O. we have the largest paper mill on the American Continent. The country is growing rapidly, but the great expanse of territory yet to be prospected and settled is so vast that what we have already accomplished seems small indeed.

6.—To give you some idea of the direct benefits derived in terms of money let me state that in the years 1917-1918 the different Governments received from the silver mining industry, by way of taxes and fees of one nature and another, almost \$1,000,000 and the expenditures of the silver operators represented a purchasing power in Canada equal to \$24,257,000.

7.—Finally if a circle with a radius 70 miles long be thrown over a certain portion of this Province, it will include within this area three and possibly four wonderful mining camps. On the west we have Sudbury, producing 85 per cent. of the world's nickel supply. On the north we have Porcupine producing, during the first six months of this year, gold the value of almost \$6,000,000 and showing an increased production over the same period last year of 22 per cent. South-east of Porcupine we have Kirkland Lake, already now producing and probably destined to become another very important Camp. Last of all we have the Camp under consideration, which may properly be described as the world's greatest silver camp.

Our past progress must be taken as some slight indication of what may be expected in the future and when we say that since 1903 the gross wages paid miners in Ontario have increased over 400 per cent. the average annual wage per miner over 325 per cent. and the gross production over 490 per cent. who is optimistic enough to properly estimate the conditions likely to exist in, say 1930?

Critics Are Challenged.

There can be no doubt as to Ontario's ability to greatly increase this production, under careful and intelligent guidance? We require and will continue to require for many years to come, both capital and labor and in our effort to

obtain them we would deprecate and do everything in our power to discourage any attempt to tell anything but the truth and the whole truth and we will deprecate and continue to challenge any suggestion made by any public man in Ontario that would cast suspicion on the relationship that has existed and does exist between the Department of Mines and the mining operators of this Province.

The message we would leave with our Guests this evening is that Northern Ontario is the Land of Promise to all who are willing to work. Drones we don't want and will not support. Capital invested with the same care as that given to investments in other lines, must in the end bring a fair reward and we would therefore ask these Delegates to the Imperial Press Conference to stake out Northern Ontario in their minds and advise their people at home to give this district proper and careful consideration when they are formulating their future plans for development within the British Empire.

DIFFICULTIES OF DEEP MINING.

In the course of his presidential address before the South African Institution of Engineers, Mr. James Whitehouse dealt with the problems of ventilation, underground temperatures, and pressures encountered in the Rand mines.

The rock temperatures continue to rise at the rate of one degree for every 253.9 ft. of depth. From determinations made recently in the Village Deep Mine, the rock temperature at a depth of 5,487 ft. has been found to be 89.4 deg. Fah. The temperature of the air current which reaches to this depth is 72.6 deg. Fah. dry bulb, and 71.6 wet bulb. This low rise of rock temperature is probably unique, and compares favorably with the temperatures experienced in the St. John del Rey Mine, which is the only mine in the world which is deeper than the Village Deep, and where the air temperature is 109 deg. Fah. dry bulb, and the rock temperature is 114.4 deg. Fah. The depth of this mine is 6,126 ft. vertically. At depths between 5,000 and 6,000 ft. it is necessary to install equipment for circulating large volumes of air.

Whilst the effect of depth on the temperature of underground workings is less serious at the Village Deep Mine than, perhaps, in any mining field, this cannot be said of the resulting pressure, and the difficulty which this causes in deep workings. From a comparison of the actual cost of support of working on a deep-level mine today and in 1914, it is found that the cost of timbering and rock-walling in 1914 was 10d per ton crushed, and in 1919 this charge had increased to 2s 5.4d. On the basis of wages paid in 1914 and the cost of raw material at that time, the cost for this work in 1919 would have been 1s 9.6d per ton, that is an increase equal to more than double the 1914 cost. This represents the increase which is entirely due to depth, the difference between the present cost is 1s 9.6d per ton, which is 7.8d per ton, being due to the increase in wages and cost of materials. Similarly the cost of winding has risen from 1s 8.6d in 1914 to 2s 9.7d for 1919, of which increase 8.5d is due to depth, so that the cost for this work, apart from charges due to the war, would today have been 2s 5.1d per ton. From the above figures, and, quite apart from the increase in operating costs due to the war, the conditions obtaining in deep mines today are very different from those of 1914. To overcome some of the difficulties of increasing depths many suggestions have been made, and these include one that the reduction works should be removed at once from the surface and erected underground in order to save the cost of hoisting.

The Electrical Location of Lodes from the Surface

For many years past, periodical attempts have been made to evolve a practical method or system of applying electricity in one form or other to the locating of lodes and metalliferous ore deposits which are believed to exist underground, but of which there are no surface indications.

Until recently nobody thought the ideal system had a chance of realization, but with the rapid advance of electrical science during the past decade a new vista has been opened up and many things hitherto thought to be dreams have become accomplished facts.

Therefore, it is not surprising to learn that Mr. Victor Nightingall, a well-known electrical engineer and wireless expert of Melbourne, has worked out and patented an up-to-date system which, after a long series of experimental operations in the Laboratory and practical tests on mining fields, it is claimed, surpasses everything previously attempted in this direction, in that, by combined telephone and scale-readings, a chart or graph of underground deposits may now be prepared with a great degree of accuracy.

Mr. J. A. Dawson, also a well-known electrical engineer, who for some years occupied the Chair of Electrical Engineering at the Ballarat School of Mines, was associated with Mr. Nightingall in the developmental and experimental field-work, and is undertaking the management and working of the system—registered as "Electrical Mine Surveys Pty., Ltd.," 339 Collins-street.

Practical Application: Quite recently these gentlemen were afforded an opportunity of proving their system in a practical manner—being engaged by the Indooroopilly Silver-Lead Mines N.L. (a Bendigo company) to go to Brisbane and make an electrical survey of the company's extensive mining leases.

This company, we are informed, had sunk a shaft about 100 ft. north of the G.O.M. mine—in which a rich body of ore was being worked—but the continuation of this lode was not picked up as anticipated in the shaft, the crosscut to the east of the winze, hence the directors decided upon having an electric survey made in order to locate the exact position of the ore. This was done, and a crosscut put in in the opposite direction soon revealed the ore coming in from the west, as the instruments indicated that the main body was on that side of the shaft. The entire survey, by the recorded indications, show that extensive silver-lead ore bodies traverse the Indooroopilly Co.'s leases from near the shaft for a distance of half a mile.

It is interesting to note that the instruments also accurately indicated the position of the lode on which the adjoining (G.O.M.) mine was working—though this position was unknown to the electrical surveyors, who, on inspecting the underground workings afterwards, found the ore body exactly below the points indicated on the surface.

Far-Reaching Effects.

The plan we reproduce, showing the results of Messrs. Nightingall and Dawson's survey, is not only interesting but is certainly unique in the annals of mining, for probably never before has a plan been published purporting as this does to show the position and extent of ore bodies which lie hidden underground.

This, indeed, is "seeing the end from the begin-

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ning!" The general application of such a scientific system, provided it proves successful, will usher in the dawn of a new era for the mining industry, and should do for the miner what the X-ray does for the surgeon, who sees the exact location of the metal in the human body before commencing his operation, likewise the miner will practically be enabled to see an "X-ray" chart of his metal underground before commencing mining operations.

Such a system comes at an opportune time, and will be welcomed by the mining world, for mining at the present time is in need of a stimulus.

The application of electricity in some such form offers a key to unlock the underground mineral wealth of the world, and the system under review appears to go far towards the accomplishment of that aim. With experience in practical working and further development, it should prove a most valuable adjunct to mining.

Personnel: Mr. W. H. Cundy, of Bendigo, is associated with Messrs. Nightingall and Dawson as Geological Survey and Mining Engineer.

Electrical Mine Survey work is to be undertaken at once, and in the hands of these three gentlemen, who—together with Mr. W. F. Spry—are directors of the company, the system should soon give a good account of itself by reporting practical results of commercial value.

Description of the System.

The system may be described as an application of high-potential electricity applied to the earth's surface by special generating and transmitting apparatus. The presence, position and approximate depths of reefs, lodes, and metalliferous deposits underground may be ascertained and mapped out.

It is based on sound, fundamental principles and electrical laws. An electric current producing a certain sound is propagated through the earth's crust by special electrodes connected with the transmitting instruments, which operates to almost any desired depth and through any given area.

By means of special telephone receivers and graduated visual indicators, worked in conjunction by the electrical surveyor, who "stethoscopes" the earth's surface, this note can be picked up anywhere within the area under test, his ear detecting and interpreting any variations which may occur as indicating the presence, or otherwise, of any lode or metalliferous deposit, either near the surface or to considerable depths below, enabling its position, area and continuity, or otherwise, to be marked out on the surface.

Advantages: A moment's reflection on these facts is sufficient to show the far-reaching effects such a scientific system must have upon the whole system of mining when it is put into regular practical operation, with experience and further development.

Giving information within a few days that, with boring or shaft sinking, would take months to ascertain.

Directing operations as to the best sites when shafts are being sunk, by giving the position, length and width of the lodes.

Locating the position of known valuable lodes lost through faults.

Ascertaining whether a given lode continues through extended leases.

Indicating the presence of hitherto unsuspected parallel lines of lode on the same lease, etc.

In Fact, scientifically prospecting the interior of the earth from the surface, inexpensively, prior to undertaking costly mining operations to search for minerals or lodes which may or may not be there.

Effects on Mining:—The *Electric Mines Survey System* hopes to reduce mining to something like an exact science, so that all operations will be undertaken scientifically and all work—sinking, driving, or cross-cutting—be directed towards a given objective at a pre-determined point, so that every penny will be expended on useful, definite work instead of the old empirical, wasteful method of haphazard exploring underground—with the pick, shovel, and candle as the only instruments and guide—in the endeavour to "pick up" a valuable lost lode, and for want of scientific knowledge often ceasing operations within a few feet of it.

The substitution of scientific methods for the old methods eliminating almost entirely the elements of risk and uncertainty, should place mining on more of an industrial than a speculative basis and as a consequence, attract more capital for development of gold and metal mining generally and bring about a general revival of the industry.

The capital saved by cutting out the wasteful expenditure involved in unsuccessful underground work would naturally be diverted to the development of new or old lodes the position of which has been located electrically.

Scope of the System: It is not claimed that this system will do everything and find everything underground, but sufficient practical work has been done to prove that it is sound in principle and will indicate the position of ordinary quartz reefs, which are worse conductors, and silver, copper, lead or similar deposits, which are better conductors, than the surrounding earth.

The method does not consist of a single instrument or indicator only, but is a flexible system, and such that the electrical impulses transmitted into the earth can be radiated, focussed or directed as desired in any plane entirely on the surface or entirely underground, where the workings are accessible, or in the vertical plane connected from the surface to the lower levels of a mine to suit varying conditions.

It should also with development and experience give valuable information to the miner in ascertaining whether a bore is anywhere near its objective or not, and generally be a scientific aid, in expert hands, to the mine manager in solving difficult problems in connection with developmental and prospecting work, and should be the means of saving annually large sums of money now expended in useless, unproductive work.

Note: The foregoing is taken from "Industrial Australian and Mining Standard" issue of 5th August last. It is important—if true.

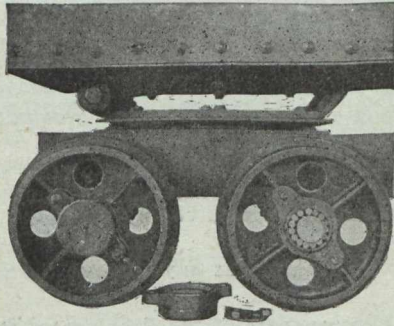
NEW BRUNSWICK COLLIERY CHANGES HANDS.

John Henderson, formerly Manager of the Minto Coal Company, and lately operating an independent mine at Minto, N.B., and Harvey Welton of Minto who has for some years been interested in coal mining in the Minto area, are stated to have purchased the Coakley Mine, in the Grand Lake area. The price is understood to have been about \$35,000.

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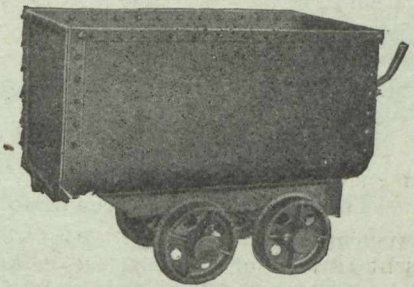
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This view shows the oil or grease retaining cap removed to show the Roller Bearings supplied on our Mine Cars.



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FOR SALE—Property adjoining the great Premier Mine in the Stewart District of British Columbia located on strike of the vein. Apply, Box 19, Canadian Mining Journal.

PRESIDENT OF IMPERIAL OIL COMPANY REPORTS ON FORT NORMAN OIL WELL.

Mr. C. O. Stillman, President of the Imperial Oil Company, recently returned to Toronto from a western trip and confirmed the statements that have been made regarding the finding of oil at Fort Norman. President Stillman said that while the quantity of oil so far tapped only runs about eight barrels per day it is oil of promising quality. He stated further:

“What we have uncovered at Fort Norman is as good commercial oil as has ever been produced in Canada and runs about 40 Beaume gravity. This is the character of oil the world is looking for as it appears to contain large yields and refined contents.

“Our Fort Norman rigs first struck oil at 80 feet and again at 200 feet and the third strike at 425 feet. We hope to put the hole down 1,000 ft. this fall, which will be sufficient to test the territory.”

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PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

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

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

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

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

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

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

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

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

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

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

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

HONOURABLE J. E. PERRAULT,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

BRITISH COLUMBIA

The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, \$75,722,603; Lode Gold, \$100,272,431; Silver, \$50,432,304; Lead, \$43,821,106; Copper, \$153,680,965; Zinc, \$16,818,487; Coal and Coke, \$199,123,323; Building Stone, Brick, Cement, etc., \$29,991,757; Miscellaneous Minerals, \$786,918; making its mineral production to the end of 1919 show an

Aggregate Value of \$670,649,894

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, \$94,547,241; for five years, 1896-1900, \$57,605,967; for five years, 1901-1905, \$96,509,968; for five years, 1906-1910, \$125,534,474; for five years, 1911-1915, \$142,072,603; for the year 1916, \$42,290,462; for the year 1917, \$37,010,392; for the year 1918, \$41,782,474; for the year 1919, \$33,296,313.

Production During last ten years, \$322,829,310

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

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

Mineral locations are granted to discoverers for nominal fees.

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

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing

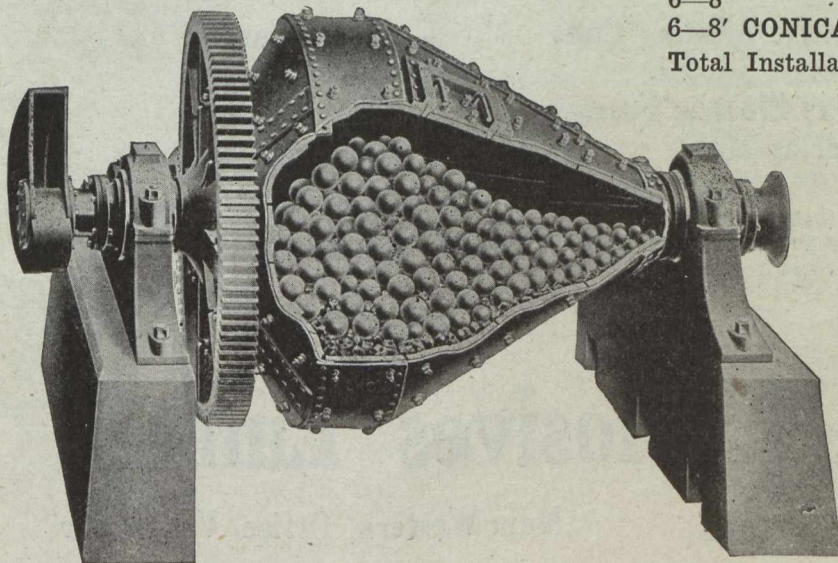
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And Nevada Con. Takes Six More

Another "Crushing Victory" for Hardinge Mills is recorded by the fourth repeat order just received from the Nevada Consolidated Copper Company.

2-8'	CONICAL BALL MILLS	December	1915
2-8'	" " " "	July	1916
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6-8'	CONICAL BALL MILLS	JUNE	1920
Total Installation — 18 Hardinge Conical Mills.			



The first repeat order was the result of a direct competitive test.

The last repeat order (just placed) is the result of another competitive test under different conditions.

It is the proven superiority of Hardinge Conical Mills—as demonstrated at the Nevada Consolidated and scores of other plants—that has made them the standard equipment for preliminary and fine grinding in plants all over the world.

Our "Grinding Data" leaflets give specific figures and information that will enable you to judge just what Hardinge Mills can do for you. We will be glad to send them.

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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.
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.
- Belting:**
R. T. Gilman & Co.
Gutta Percha & Rubber, Ltd.
- Belting—Silent Chain:**
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glasco (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 (Congoas 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.
Canadian Link-Belt Co., Ltd.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Buckets, Elevator:**
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
- Cable—Aerial and Underground:**
Canada Wire & Cable Co.
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

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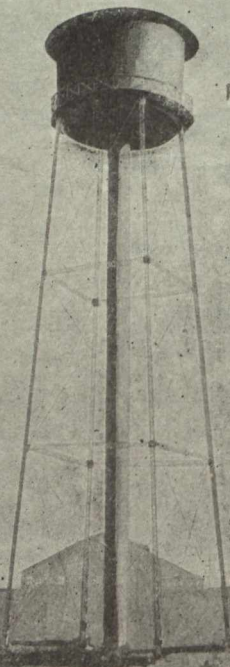
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Canadian Miners' Buying Directory.—(Continued)

- 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:**
Canada Wire & Cable Co.
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 & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.
- Chain Drives:**
Jones & Glassco (Regd.)
- Chain Drives—Silent and Steel Roller:**
Canadian Link-Belt Co., Ltd.
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:**
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.
- Coal:**
Dominion 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
Canadian Link-Belt Co., Ltd.
- 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.
Canadian Link-Belt Co., Ltd.
- Coal Pockets:**
Canadian Mead-Morrison Co., Limited.
- Coal Pick Machines:**
Sullivan Machinery Co.
- Coal Screening Plants:**
Canadian Link-Belt Co., Ltd.
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:**
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Jones & Glassco (Regd.)
- Conveyor Belts:**
Gutta Percha & Rubber, Ltd.
- Conveyor Flights:**
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd.
- Conveyor—Trough—Belt:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Link-Belt Co., Ltd.
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.
Canada Wire & Cable 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.
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.
Lyman, Ltd.
Mussens, Limited

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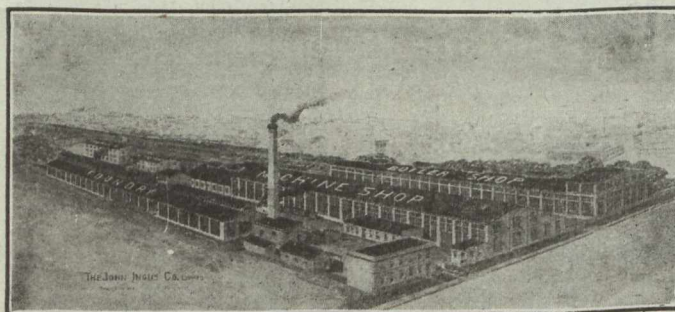
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Canadian Miners' Buying Directory.—(Continued)

- The Mine & Smelter Supply Co.**
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- 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
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.
Canadian Link-Belt Co., Ltd.
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.
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—Stationary:**
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:**
Canadian 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.
Canadian Link-Belt Co., Ltd.
- 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
Canadian Link-Belt Co., Ltd.
- 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
Hoyt Metal Company.
- 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
Canadian Link-Belt 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
Hoyt Metal Company.
- Metallurgical Engineers:**
General Engineering Co., New York
The Durr Co.
- Metallurgical Machinery:**
General Engineering Co., New York
The Durr 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:
Censtant, C. L. Co.

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

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.

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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
Smart-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.

Balls:
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Mussens, Limited

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

Refiners:
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Riddles:
Hendrick Mfg. Co.

Roller Chain:
Hans Renold of Canada, Limited, Montreal, Que.
Canadian Link-Belt Co., Ltd.

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

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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.
Canada Wire & Cable 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.
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The Wabi Iron Works

Samplers:

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

Scales—(all kinds):

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Mine & Smelter Supply Co.
Canada Wire and Iron Goods Company.
Canadian Link-Belt Co., Ltd.

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Hendrick Mfg. Co.

Screens—Revolving:

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Hendrick Mfg. Co.

Scheelite:

Everitt & Co.

Separators:

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Mine & Smelter Supply Co.

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Hendrick Mfg. Co.

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Sheets—Genuine Manganese Bronze:

Hendrick Mfg. Co.

Shoes and Dies:

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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:

Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.

Silent and Steel Roller:

Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

Siline:

Coniagas Reduction Co.

Saline Refiners:

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Smelters:

Goldsmith Bros.

Sledges:

Canada Foundries & Forgings, Ltd.

Smoke Stacks:

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

Solder—Bar and Wire:

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Special Machinery:

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Consolidated Mining & Smelting Co.

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Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

Spring Coil and Clips Electric:

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.
Northern 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:

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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:

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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:

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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 Bridge & 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 Apparances:
Jones & Glassco (Regd.)

Transmission Machinery:
Canadian Link-Belt Co., Ltd.
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.

Trucks:
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:
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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:
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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:
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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—Bare and Insulated:
Canada Wire & Cable Co.

Wire Rope:
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Canada Wire and Iron Goods Company
Canada Wire & Cable Co.
Dominion Wire Rope Co., Ltd.

Wire Rope Fittings:
Canada Wire and Iron Goods Company
Canada Wire & Cable Co.

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:
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Consolidated Mining & Smelting Co.

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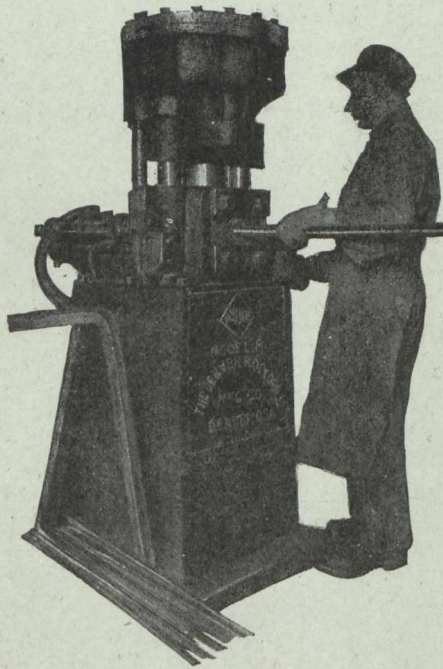
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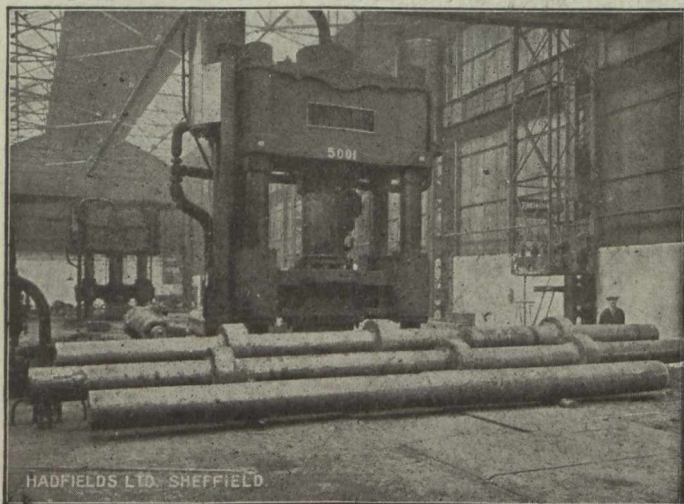
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