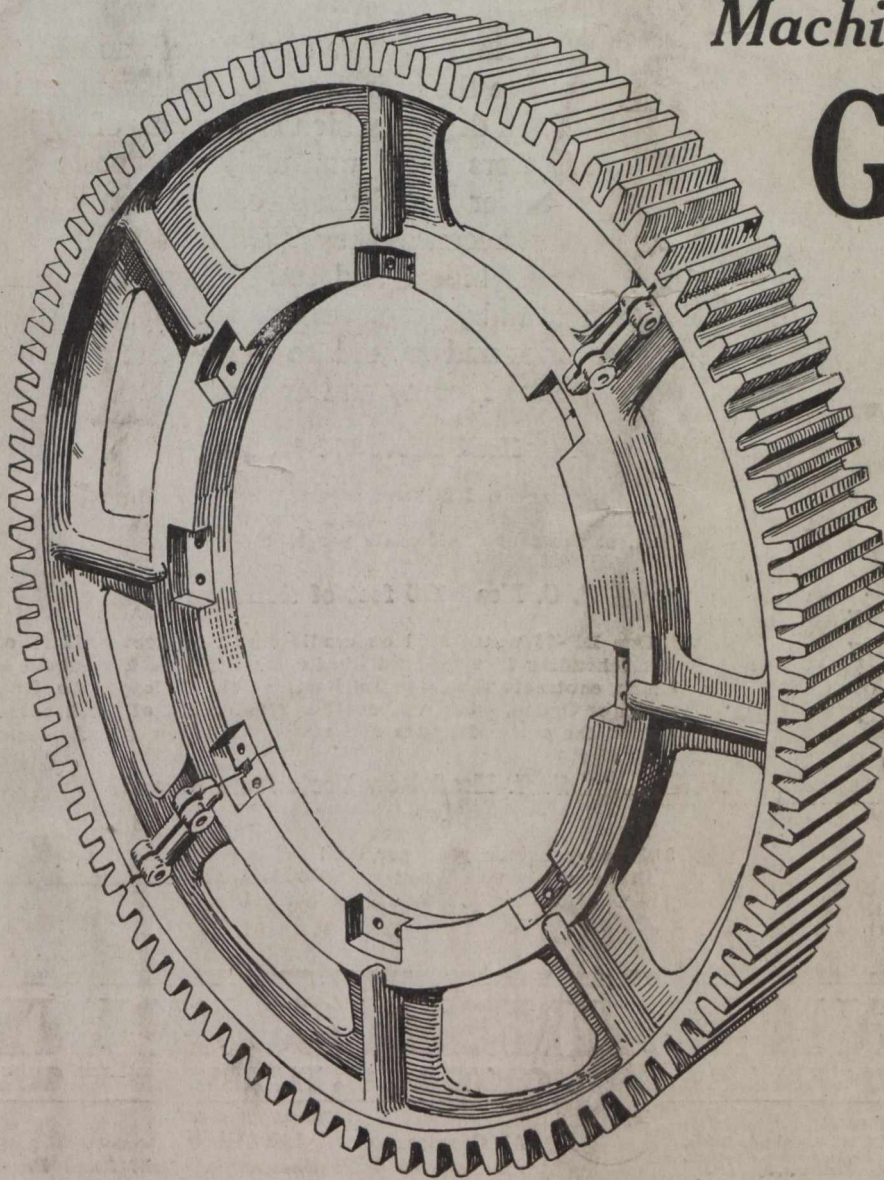


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No. 38.



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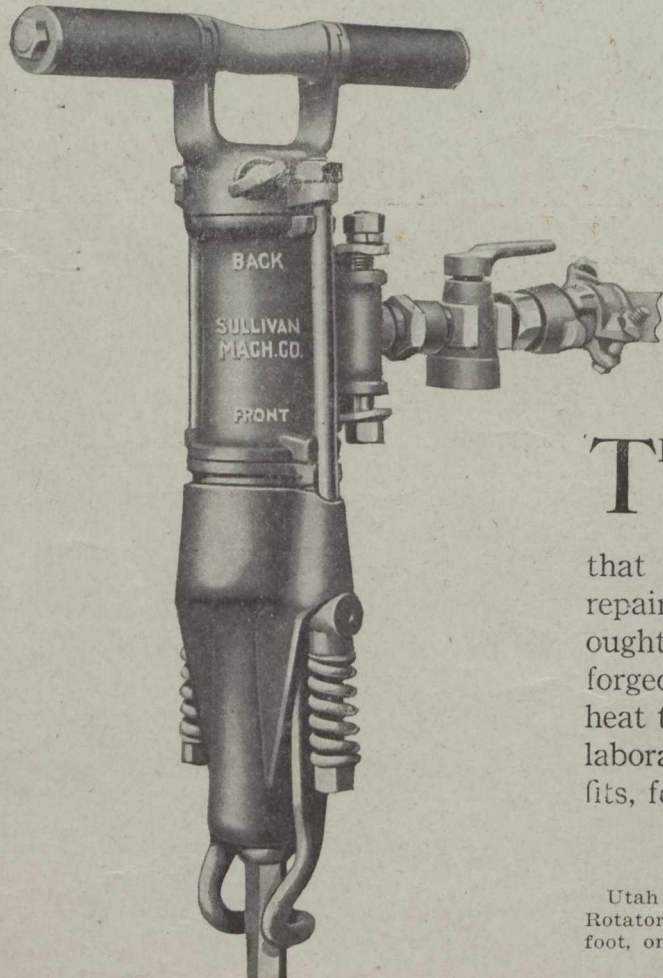
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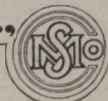
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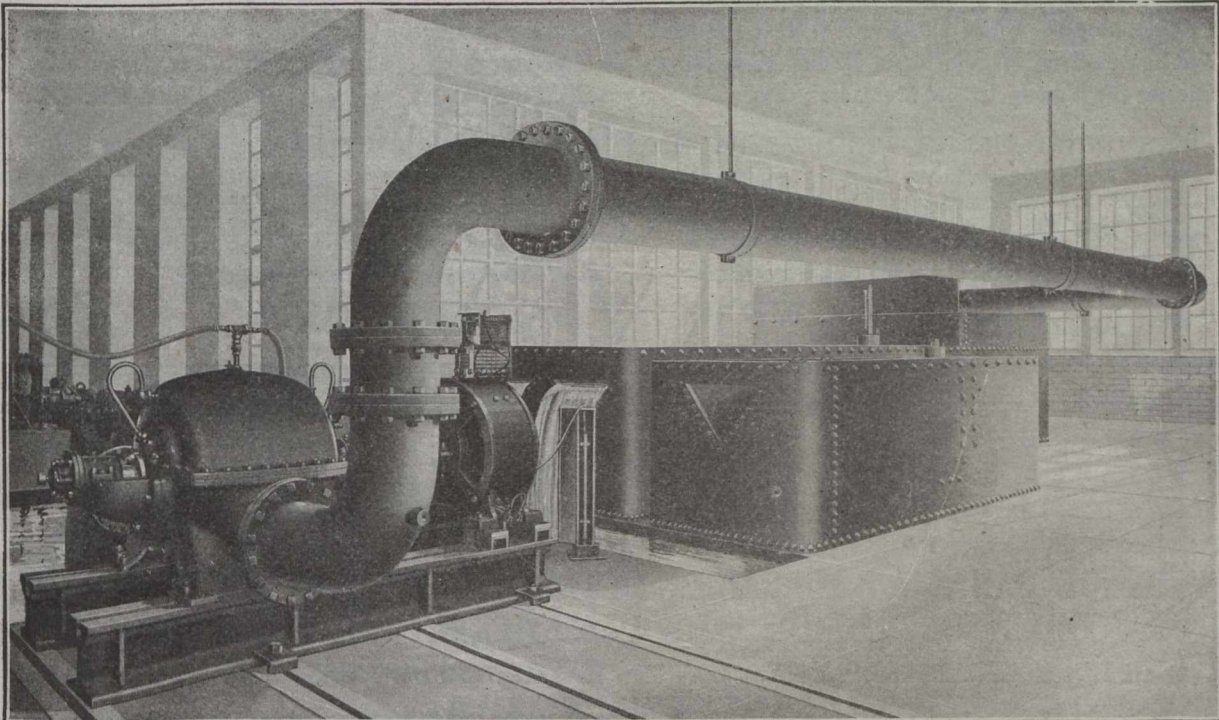
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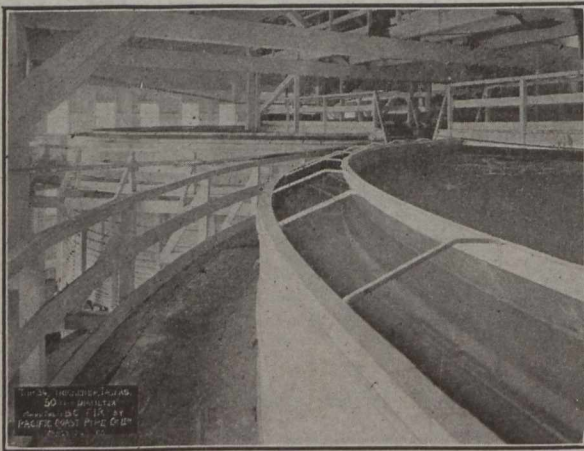
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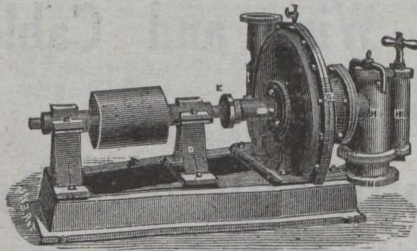
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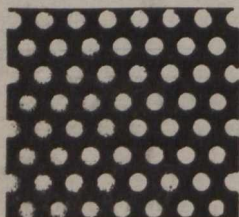
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15	General Electric	625	75	Westinghouse	800
20	Crocker Wheeler	775	75	Westinghouse	475
20	General Electric	975	80	General Electric	750
20	Westinghouse	975	90	Western Elec.	525
20	Sprague	1250	100	General Electric	720
20	Ft. Wayne	660	100	Westinghouse	700
25	Westinghouse	825	120	General Electric	450
25	General Electric	560	125	Crocker Wheeler	650
25	Crocker Wheeler	775	150	Sprague	1050
25	Bullock	600	160	Goodman Elec. Co.	420
30	Westinghouse	400-1500	165	Northern Electric	300
30	Bullock	600	175	Bullock	625
30	General Electric	975	200	Westinghouse	560
30	Westinghouse	975	250	Crocker Wheeler	130

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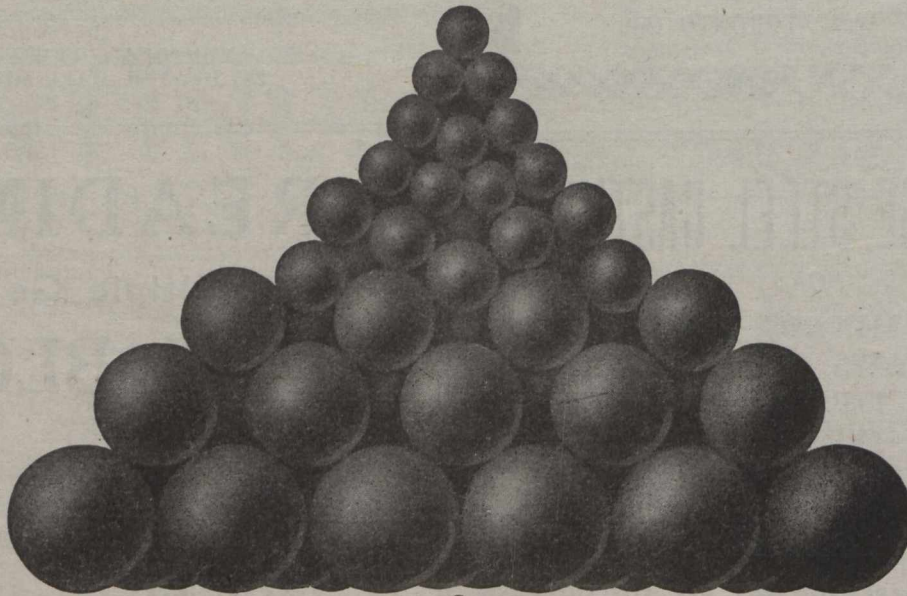
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VOL. XLI.

GARDENVALE, P.Q., September 24, 1920

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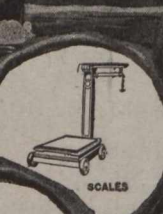
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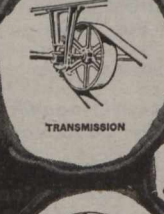
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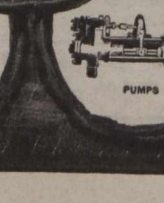
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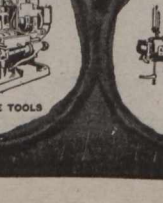
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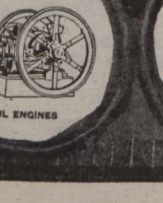
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EDITORIAL

THE MINING INDUSTRY AND THE TARIFF.

THOSE features of the Canadian Tariff which are most objected to by non-industrialists attach to discriminative duties imposed upon imported articles. Those who advocate discriminative tariffs upon manufactured articles and raw materials which compete with a domestic product are loosely termed protectionists.

It has been well stated, however, that the term protection, as now used to describe the commercial policy of a nation, should be so defined, "as to include all "the means by which a country undertakes to secure "through the positive efforts of the government the "complete industrial and commercial development of its "resources, and of its parts." These efforts include not only protective duties, but the system of bounties offered for introduction and establishment of new industries; the policy of restricted immigration of the less desirable class of laborers, botanical and geological surveys, experimental farms, fisheries protection and the re-stocking of rivers, afforestation measures, the building of railways and canals and the deepening of waterways and harbors, and the provision of technical education. The successive administrations of Canada have not been backward in such positive efforts to foster our internal development and external importance.

While in theory it may be held that this general programme of national self-help could be carried out without the inclusion of discriminative imposts upon imported commodities, in practice it has not been considered possible by the successive governments of Canada, none of whom—despite much campaign argument—have ever dared to test the theory by making it a fact when they had the opportunity.

The chief reason for this practical diffidence of non-protectionists has been the proximity of Canada to that nation, which pre-eminently among modern nations has adopted the completest programme of national protection, and has pre-eminently prospered.

No person has ever yet satisfactorily demonstrated how a small and undeveloped nation could protect its economic self-sufficiency or its political independence by pursuing a non-protective policy, if, as is the case of Canada and the United States, the smaller an infant nation were geographically a continental extension of

a large and developed nation, irrevocably committed to the ultimate exposition of the whole theory of national protection.

It is this dominant consideration that explains why no Canadian Government has ever considered it possible to abolish tariffs that are intended to deter the importation of commodities that compete with domestic industry.

THE theory of free-trade is admittedly a cosmopolitan concept, and it is apt to be unsympathetic towards a strictly national viewpoint. The persistence of nationality has been abundantly demonstrated in recent years, for, long before President Wilson put the pregnant word "self-determination" into a memorable state document, the leaven of national aspiration, of national languages and ethnological bonds was disturbing Europe, and played no small part in precipitating the great war. Whether it shall prove to be beneficial or not, it must be admitted that the trend of thought is towards national self-consciousness and the strengthening of nationality as distinguished from cosmopolitanism.

There is simultaneously working another ferment, namely the communistic idea of the world unity of the proletariat, with a somewhat visionary concept called "Capitalism" as the great enemy of mankind. Unfortunately for the world, every conception of civilization, every outward expression of man's long upward climb in invention, every outward expression of the resources of earth, every safeguard that men have thrown around family life and the prudential effort of men who strive to assure the comfort of their offspring, is involved in the social framework known as "Capitalism," and is threatened by barbaric ruin by those who would destroy, in order—as they probably sincerely believe—to build a better world.

It is therefore no coincidence that the concrete expression of national aspiration that we call Protection; the guarded and accumulated wealth of the nation that is called Capitalism, should view with distrust any principle that includes cosmopolitanism, or permits another nation to control the economic life of this country to an extent which, if unchecked, would permit of powerful outside influence being brought to bear upon our political life also.

It is well to be frank about these matters, and to admit that the chief objection which protectionists in Canada have against free-trade is the cosmopolitan tendency of that principle. It is, in the position occupied by Canada, one that always has been, and always must be, corrosive of our nationality.

HOW do these conditions relate to the mining industry? The mining industry, so far as the actual application of the existing tariff is concerned, is not a unit. Using the classification adopted by the Mines Branch, of metallics, non-metallics and structural materials, we find that the metallics are little affected by the tariff, and the same may be said of the non-metallics and structural materials, with the two important exceptions of coal and cement; and with the further exception that there are some minerals, such as cobalt, molybdenite, asbestos, chromite, felspar, gypsum and magnesite, that find their most important market in the United States, of which free entry into that country is desirable. Certain concessions are made to miners in the free admission of drilling and cutting machinery not manufactured in Canada, but, generally speaking, the production of minerals in Canada is not materially affected by tariffs, except as the workers in the industry, in a manner analogous to the agriculturists, pay their quota of the cost of protective duties as borne by the consumer in Canada. With one or two important exceptions, hereinafter referred to, the revision of the tariff is a matter in which the miner is little concerned directly.

Indirectly, however, we believe the mining industry is vitally concerned in the maintenance of tariff protection as one of the main props of our national credit and security, and it is possibly more directly concerned, inasmuch as the product of the mine in Canada looks more and more to domestic manufactures for a market, and for that ultimate profitableness which can only accrue to a mining industry when the substances it produces are worked up into finished products in the country of origin.

We believe, therefore, that the interests of the mining industry lie in a continuation of that wide policy of national protection in which the tariff is but one factor, although admittedly a very important factor, and necessary to the maintenance of the whole.

There are some cases in which the wording of the tariff can be made more specific, and some matters of detail that will no doubt be brought to the attention of the Tariff Enquiry Board during its itinerary, but it is to be hoped that local circumstances will not be allowed to obscure or to vitiate the general dependence of the industry upon a retention of protective duties, which we believe to be synonymous with the maintenance of national prosperity.

THE duties on coal and cement are objected to by the agriculturists on the general ground that they add to the cost of living of the farmer. Generally speaking, the tariff has for the past two years played second-fiddle to the discount on the Canadian dollar. The total consumption of cement in Canada during 1919 was approximately $4\frac{3}{4}$ million barrels valued at about $17\frac{1}{2}$ million dollars. For the first time, the exports of cement from Canada exceeded the imports into Canada. This is the kind of corrective of the exchange situation that all well-wishers of Canada desire, and it may be regarded as the outcome of the policy of fostering a Canadian industry by judicious tariff protection. How much cement was used by agriculturists is not ascertainable, but a comparison of the size and value of agricultural yields in Canada would not indicate that the financial position of agriculture suffered from the cost of protecting the cement industry, whereas, were the protection removed, the cement industry could not persist in Canada.

In regard to coal, the tariff applies to bituminous coal, that used in making coke for metallurgical processes being imported free of duty. Slack bituminous pays a duty of 15 cents per ton, and round bituminous a duty of 53 cents per ton, the duty having been reduced 15 cents per ton at the last revision of the tariff. There was never any justification for that reduction, and as things have turned out, the net result to Canada has been the loss of 15 cents per ton revenue on each ton of bituminous coal imported, without any saving to the Canadian consumer. Where the whole duty remitted on coal, the Canadian consumer would never know it from inspection of his coal bill. Coal is at this time a very excellent example of an import tariff that functions only as a source of revenue to the Government, the duty being entirely too small to act as a protection in favor of the Canadian producer.

The readers of the "Journal" are familiar with the history of the coal industry in Canada, and reiteration becomes irksome, but perhaps we may be allowed to epitomise the justification for a protective duty on coal by remarking that, east of Fort William, the cost of producing coal in Canada is, and always will be, relatively more than in the coalfields of the United States to the immediate south, and that the duty of 53 cents per ton does not begin to balance the differential in production costs.

We desire, in all seriousness, to make the assertion that Canada, in the great continental stretch that includes Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and a large part of Saskatchewan, is most meagerly supplied with coal; and that no mine in Nova Scotia or New Brunswick can produce at a cost that is less than two dollars a ton in excess of the average cost of coal production in Pennsylvania and Virginia. This condition is one that is not related to

questions of wages, labor or management, but arises from the more favorable natural conditions under which coal is mined in the United States, and the infinitely largely quantity of coal available there.

Coal production demands consideration from our government much more from the standpoint of national defence than on purely commercial grounds. It needs not only the maximum protection that the tariff can give without crippling other industries, but, in addition a greater share of those "positive efforts of the government", hereinbefore referred to, than any government in Canada has yet extended to it.

The idea of self-sustenance can be, as the Toronto "Globe" points out, carried to the stage of absurdity, but over indulgence in this idea is the last thing that Canada can be accused of. The "Globe" itself, however, indulges in an indefensible generalization when it says that "a year's working out of the theory that a nation should be 'self-sustained' would put Canada where Soviet Russia is today." Canada will have to be sadly changed before her people go collectively daft, or hazard "the cessation for a considerable time of foreign trade," to which condition the degeneration of Russia is attributed. Most people think there are other contributory factors to the present state of Russia.

There are, however, some "raw materials" (perhaps the "Globe" will excuse the use of what it terms "the jargon of the protectionist") without the internal production of which no nation can be self-sustained or even politically independent. Coal is one of these materials. Iron is another. In both these commodities Canada is unnecessarily dependent on the United States. To the extent that this dependence is unnecessary it is evil and nationally dangerous, and it is Canada's most exigent problem to find out how much of the international trade in coal and iron is unnecessary. It can hardly be stated that Canada has erred on the score of advocacy of the "self-sustained school" in the light of the present rate of production in coal and iron in Canada, both of which in 1919 reached their lowest ebb for many years, and promise during 1920 to show little, if any, improvement. Simultaneously, the production of coal and iron reached heights in the United States that are not only unprecedented, but in the nature of a world portent.

COAL SUPPLY STATISTICS.

IN this issue will be found a review of the coal situation in Canada prepared by the Chief of the Mining Division of the Dominion Bureau of Statistics, Mr. S. J. Cook, which contains the important information that a monthly bulletin on coal supply is proposed to be issued by this department, being a continuation of the work of recording, and publication inaugurated by the Fuel Controller of the Dominion during the period of his administration. This is a

service that will be much appreciated by the public at large, and by the section that is more intimately interested in coal statistics from a connection with the production or distribution of coal. A similar service has for some time been conducted by the United States Geological Survey. The new service is important as indicating a realisation by the Federal Government of the national viewpoint upon coal supply, and it gives rise to the hope that the easier availability of centralised coal statistics, and their more frequent publication, will lead to the formation of some body empowered to take such action as the statistics may indicate to be desirable.

The review surmises that Canadians will not be content to remain so absolutely dependent on the United States coal miner as is the case at this time. We hope not, but they have remained content for a very long time. "Co-ordination of effort, with elimination of obsolete methods and unnecessary local competition" is advocated to improve our coal supply. There is a nearer approach to co-ordination of effort and the elimination of local competition at this time than has ever been observable before in domestic coal mining circles, insofar as the operators are concerned; and while there is not that unanimity between the employers and their workmen that is desirable, we cannot admit that here lies all the reason for the small production of Canadian coal mines at this time. There is a very serious numerical shortage of miners in Canada and only the slimmest hope of new men being obtained. We would suggest to the Bureau of Statistics that a comparison of the number of men now employed in coal mining in Canada with those employed in the period from 1914 to 1916 would show a large decrease in numbers, particularly in the number of men actually engaged in mining coal. One typical coal company in Canada had in its employment in 1918 precisely half the number of men employed at the actual mining of coal in 1916. Since that date, and almost two years after the Armistice, it has succeeded in adding only 150 men, and is still short by approximately 1,500 men in the mining coal section, or in that class of workers which decided what the output shall be. No cleverness of management or adoption of new methods can produce output without producers.

We cannot admit that obsolete mining methods are in existence in the coal mines of Canada. There has been a concerted stand amongst coal miners of which we have noted instances in Canada, the United States, Australia, Great Britain and Germany, to blame the reduction in coal output upon the shortage of modern mining equipment, when, as is very well-known to all readers of technical literature, the equipment of collieries was never so perfected as it is today. It is true that the pit-room has been restricted by shortage of workmen during the war period, which prevented ordinary progress of advance development workings,

but to suggest that the collieries of every important coal-producing country have suddenly become old-fashioned is self-evidently untenable.

There is, admittedly a lack of new collieries, because in coal-mining, as in building, domestic housing and railway construction, the exigencies of the war forced the cessation of new development, and caused the existing openings to be forced beyond the point where a maximum output could be maintained.

The coal industry of Canada is in a state analogous to a person convalescent from disease. It needs building up. More capital expenditure, more workmen, less "controlling" and more encouragement from the powers that be are required. The market needs no enlargement. At no time has the Canadian coal output approached within measurable distance of satisfying the domestic demand.

The Bureau of Statistics Review mentions that production during the first quarter of 1920 exceeded that of 1919 by half a million tons, and that a continuation of this rate of increase would result in the production during 1920 of an output exceeding that of 1913. Unfortunately, the rate of the Spring months has not been maintained. While there would be some satisfaction in seeing the Canadian coal output return to the figures of 1913, it cannot be admitted that even this record year showed a satisfactory production, and there should have been a progressive annual increase since 1913, bringing the output at this date to somewhere around 18,000,000 tons. The production of coal per capita in Canada is about 1½ tons per annum. In the United States and Great Britain it is about 5 tons per capita per annum. The comparison speaks for itself.

THE AFTER-TREATMENT OF INJURED WORKMEN.

The efficacy of massage, electrical treatment and exercises for the limbs and body, have been demonstrated during the war on an unprecedented scale, and certain definite advances in surgery and the cure of physical injuries have resulted therefrom. It is interesting to learn of similar methods being applied on a large and centralized scale to the treatment of physical injuries received in industrial occupations. A Report by Dr. Lister Llewellyn, Medical Officer to the North Staffordshire Coal & Iron Masters, describes in the "Colliery Guardian" for August 20th, the establishment of a massage centre for the intensive after-treatment of injuries by daily massage, suggestion and exercises. The coal and iron operators in the district referred to are united in a mutual indemnity society, and they have established the centre for the free treatment of injured workmen in receipt of workmen's compensation payments. Some striking instances are given by Dr. Llewellyn of the rapid recovery which followed treatment. One important feature of the establishment has been that

many cases of long-standing have been taken over, and that return to work does not necessarily mean a return to old employment. Out of 446 completed cases which have passed through the centre 425 returned to work, 12 settled for a lump sum compensation, 6 were not improved by treatment, and 3 refused treatment.

Dr. Llewellyn states that the loss of function which results from disuse, formation of adhesions in joints and, above all, from the mental inertia that follows most serious injuries can only be satisfactorily treated in large infirmaries, hospitals or specially provided centres. The establishment is stated to be no longer an experiment, and the employers concerned have recently purchased accommodation for a permanent establishment to take place of what was in its initial stages a temporary provision for experimental purposes.

While the actual saving on compensation payments will be sufficient to make such an establishment advisable from a purely financial point of view, there can be but little doubt that the advocacy of medical men and the action of employers has been stimulated by the remarkable results obtained in medical treatment and the civil re-establishment of injured soldiers, and by the knowledge possessed by these men that many a temporary injury has become a permanent one precisely through lack of persistent and patient application, day by day, of the slow but certain curative methods of the modern hospital. The mental inertia referred to by Dr. Llewellyn is a condition that all who have had to do with occupational injuries will recognize.

Where medical aid is afforded under the operation of Workmen's Compensation Acts, it may be anticipated that establishments of this nature will find general adoption, and, under the powers conferred by most of the Compensation Acts now existent in Canada, the provision of such establishments is within the scope of the expenditures and provisions that may be made by the provincial Boards. The provision of artificial limbs, and their proper fitting and adaptation to the requirements of mutilated persons is a service that could conveniently and properly be centralized in similar manner.

CONDITIONS AT NOVA SCOTIA COLLIERIES.

The Royal Commission which has investigated wages, and working and living conditions at the collieries in Nova Scotia, conducted its enquiries with great thoroughness, being indeed accused of a too deliberate procedure, and has made a report that will prove a landmark in the social evolution of the colliery districts.

The Report may be regarded as a constructive document in two very important particulars, namely, in the recommendation that a joint permanent conciliation board be constituted, and that a sliding scale based on the daily per capita production of coal should be

adopted. These are two suggestions that should be workable if both sides will co-operate to make them so.

Certain recommendations regarding the larger use of the radial-post type of undercutter in substitution for the "puncher", and the introduction of the cap-type of portable electric lamp in lieu of the oil-flame safety-lamp; and the extension of washhouse accommodation, merely confirm the policy that the coal companies have been following as funds and opportunity would permit.

The Commission do not appear to have noted that the mining practice at Nova Scotia collieries is in some most important respects burdened with methods that are designed to secure the safety of human life, and it is this fact that to a larger extent than the Commission appears to have realised, increases the cost of coal production in Nova Scotia as compared with the cost under the methods used in the United States. The use of underground electric trolley-haulages, (involving naked power-wires on the haulage roads), black powder for blasting, naked lights, blasting "out of the solid," are all examples of methods that lend themselves to cheap and rapid production of coal on a large scale, and are very generally practised in the United States, but, in Nova Scotia, are prohibited by law and by general sentiment. In no small measure, the preference for safer methods in Nova Scotia, accounts for the lower cost of production in the United States to which the Commission refers as threatening the existence of the Nova Scotia industry.

The unqualified condemnation of the general living conditions voiced by the Commission, and the implication that this is something that the companies can remedy, or should have remedied before this, is not exactly fair to the companies, nor is it correct in the assumption the such thoroughly remedial action as is recommended is physically or financially possible. The truth is that there are some of the older collieries, where, if the coal companies had been actuated by purely utilitarian motives, operations would have long since been abandoned and the houses dismantled. In this respect, the coal companies, who have the misfortune to be large landlords, are not better situated or more able to help themselves, than many municipal authorities who contemplate the demolition of slum areas and the erection of new tenements, but are unable to find either the money or the labor to carry out their desires.

The Royal Commission has frankly voiced a viewpoint that is the more understandable because none of its members have ever worked or resided in colliery districts, and so far as it may prove possible, the conditions of which they complain will probably be sought to be remedied, but, to an extent that only the search for a remedy will demonstrate, the Report will be found to be a counsel of perfection so far as the re-

commendations on social conditions are concerned, and it is not possible for the coal companies—unaided—to make the expenditures recommended, combined with the increased wages also recommended, and the capital expenditure that is desperately required to rehabilitate the capacity of the mines for output.

The Commission has not, so far as the Ottawa report indicates, taken cognisance of the numerical shortage of miners, or the necessity to provide new and additional housing for the men and families that must be brought in if the coal production is to be increased to former figures.

All of which, we believe, confirms the opinion we have previously expressed that the expenditure required to put the coal mines of Nova Scotia on a basis commensurate with their potentialities and the country's coal requirements, is beyond the financial ability of the coal companies.

THE MINING LAWS OF QUEBEC. A Defense by the Superintendent of Mines.

An article which appeared in the Northern Ontario newspapers and also in one of the Toronto newspapers, made reference to "the complicated mining laws of Quebec" and the fears felt towards these laws by experienced prospectors. Mr. Théo. Denis, the Superintendent of Mines for Quebec, was quick to traverse this reference, and the following excerpt from his comment may be of general interest to our readers, and should serve to offset what appears to be a widespread impression regarding the mining law of Quebec. The steady uninterrupted growth of mining in Quebec was referred to at length in our issue of August 27th (page 695), and there is some significance—in the light of Mr. Denis's letter—in the growth of the value of the mineral production of Quebec from \$7,323,281 in 1910 to \$20,813,670 in 1920. No other province in Canada can show a better rate of increase in mineral production.

Mr. Denis' remarks are as follows :

"Such fears are quite unfounded, and I believe that they relate to the Old Quebec Mining laws, which ruled before the year 1910. In that year the principles of the Quebec Mining laws were entirely changed, and they are now practically the same as in Ontario; if anything they are more liberal towards the prospector. The enclosed leaflet will convince you, and also the advertisement which is appearing regularly in the "Canadian Mining Journal", in which the basic principles of the laws are clearly set forth.

"As you will see, a prospector is allowed to stake out claims up to 200 acres, or if in surveyed territory 4 half lots of 50 acres each. He records them without having any fees to pay and may keep them six months, (the months of December, January and February being eliminated) without any expense, except doing 25 days work on each claim. At the end of six months, he may apply for the concession or (crown grant) or if not yet convinced that the ground is worth the five dollars or the three dollars an acre (according as to whether he wants to acquire the rights to the higher or lower minerals), he may continue to keep the land by a mining license, for one year, at the rate of 50 cts an acre. During his holding of the titles, as a recorded claim, or as a mining license, or as an applicant for Crown-grant, his property of the claims is absolutely undisputable, if he has complied with the working conditions, which are very lenient.

"Moreover, the Minister of Colonization, Mines and Fisheries, is always open to advice, and as he has at heart the development of Quebec mineral resources, you may be assured that any concrete constructive suggestion to improve the law always receives his earnest consideration."

Hollinger Mines as a Criterion

By ALEXANDER GRAY

There is the authority of a Director of Hollinger Consolidated Gold Mines that no diamond drill has penetrated their property to a vertical depth of 2,400 feet.

Without detracting from the integrity of Hollinger strata, this semi-official denial of a report that a drill-hole definitely determined the continuity of the geological features characteristic of these mines insofar as they have been developed, should set at rest injudicious assumptions that the ore bodies exist here, there and everywhere.

Representations, therefore, that the drilling disclosures "in the western end" of the Hollinger properties will benefit this, that, or the other area, can be dismissed as nothing more than a periodic indulgence in indiscriminate projections designed to attract public participation to impending distributions of shares.

That Hollinger Directors and the Management would welcome the further proof of their geology at greater depth, goes without saying. They have no apprehensions in this respect—but they would not select the "western" section of the former Miller-Middleton area for exploration by means of a diamond drill. It is no secret the "western" end of the Millerton is not altogether in the Hollinger geological horizon, and as the Hollinger Central Shaft may reach 2,000 feet by January 1st, the Management has other employment than drilling "stunts" in doubtful territory.

At this writing the Central Shaft is at or about 1,600 feet vertically. The intention is to carry it down to 2,000 feet, and to inaugurate a development programme at that level. Labor shortage is the greatest deterrent, and the attitude of Ottawa toward relief sought for this, is not reassuring. To the urgent petitions for permission to recruit somewhat unskilled labor overseas, the nonchalant official contention is that "muckers" must be "British". It is not material to Ottawa that the Hollinger output in 1920 may be almost a million dollars less than what it was in 1919, or that other mines are similarly affected. Mines producing an average of \$488,000 in gold per month in the first half of this year, but having a daily average of 161 men less in that period than was employed in 1919, are told "muckers" will have to be "hall-marked" neither "Allies" nor "Neutrals" need apply or expect work. Gold, silver and nickel producers are preferred, this as an alternative—while the politicians clamor for "production" as a panacea for economic ills, "British" Miners and "muckers" and their confrères in the States, are "holidaying". Only the practically unskilled of Italy, Poland and Hungary are available in quantity, and they alone are willing to submit to underground conditions. At their own expense mine owners are prepared to bring what labor they need. Confronted as they are by competition, they counted upon government co-operation. Instead of that, there is official diffidence if not dissent, consequently the Hollinger for example crushed only about 360,000 tons in the first half of this year—assuming that the grade of ore milled averaged about \$9, whereas the hope of the management at one time was that at least a million tons would be put through this year.

Bearing in mind that the average number of men

employed was 1,098, as compared with 1,259 in 1919, and that the average tons broken and milled in the six months ended with June showed a gain of about sixty tons per day, the efficiency in force and effect cannot be questioned. The management accomplished important economies. That, however, failed to achieve anything like what was contemplated in the matter of tonnage milled and development. Crushing to only 60 per cent. of the possible capacity and endeavoring to increase ore reserves, hardly is economical, and yet such companies cannot obtain relief. At this moment, when as much as \$6 per day with board is being offered laborers by pulp and paper companies, it is not to be wondered why gold and silver production is less than what it would be were official solicitude bestowed upon mine owners. Men can get more in "the bush", where no questions are asked as to their "British" antecedents, than precious metal mine owners can afford to pay in justice to shareholders. In the aggregate, Ontario's gold output is growing, but the larger mines cannot maintain their ratio without encroaching upon ore reserves. The decrease in the Hollinger gold output, as indicated by the Ontario Bureau of Mines in the figures covering the first half of the year, is disconcerting if not discouraging. Had the Hollinger contributed as much as its General Manager and the Board anticipated, the Ontario aggregate for 1920 would have favorably compared with any of the United States, where California is leading with a gold production valued at \$17,398,200, Colorado being second with \$10,249,300, and Alaska third with \$9,963,500. These totals relate to 1919 production of the yellow metal by those three states. In that year the Hollinger alone produced \$6,924,214.05, of which \$6,722,266.81 was recovered. Pursuing the comparison, Ontario is accounting for more gold than Colorado, and the Hollinger Mines in 1919 yielded 65.589 per cent. of the total reported by the State of California, the "Golden State", so-called.

Obviously the gold mines of Ontario, having superseded the silver mines—the phenomenal silver mines of Cobalt—merit more than the consideration of the tax-gatherers. Regardless of their handicaps, they will excel those of Colorado and measure up to about 70 per cent. of the California production. This, though, does not warrant the rash assumptions occasionally recorded that Northern Ontario will rival the Witwatersrand Gold Fields, from which approximately £600,000,000 had been extracted to 1920. "Boundless optimism" with regard to the future of Ontario Gold Fields, expensive as they are, is apt to undergo revision after a closer analysis of "the Rand"—the only "Rand", of "Rand" age and uniformity. The sixty-odd miles of the Main Reef Series north, west and east of Johannesburg, and dipping south to great depths, hardly will be paralleled. They need not be, it is no disparagement of Ontario to give precedence to the gold mines between Randfontein and Heidelberg, in the Transvaal. Since 1886 the South African Gold Mines have continued to be the chief source of the world's yellow metal and fifty of the mines still possess 89,000,000 tons in their ore reserves. The first gold from the conglomerate beds of the Witwaters-

rand was panned in 1885. In 1886, the year before the first stamp-mill started there, the gold output of the Transvaal was \$420,000, or thereabout. In 1919 the Transvaal contributed \$171,460,123. Nearly \$3,000,000,000 had passed through the mortar boxes of the "Rand" mills at the end of 1919, and there was a further \$600,000,000—or so with more to follow—in the known ore reserves on last New Year day. So horizontal deductions about the similarity of Northern Ontario and Witwatersrand formations, at this stage, partake of an element of "incurable optimism". Deep-seated as the Ontario gold-bearing ore bodies are acknowledged to be; widespread as the Ontario gold-bearing areas are known to be, they are altogether dissimilar to the "banket beds". As to the genesis of the "banket", the conglomerates of the Witwatersrand, geologists and engineers differ. Leading authorities assume the conglomerate beds and enclosing sandstone and quartzites were seashore deposits formed during subsidence of a coast line, that after their deposition and consolidation, the banket bearing strata were folded into anticlines and synclines. While decided differences of opinion always existed, the origin of the gold is held by most scientists to have been by means of impregnation, the gold and pyrites present having been deposited in the beds by infiltrating solutions, which sought the pebble beds as the planes of least resistance. There are other "bankets"—pebble beds—but they are not of Witwatersrand age. Misinterpreted to begin with by mining scientists who doubted the vertical continuity of the so-called "reefs", they are yielding one-half of the world's gold. The "Rand" revolutionized gold mining. Porcupine also reversed the order of things and convinced those who were unfamiliar with the occurrence that Canada had disclosed a gold field of first magnitude. Further explorations lent importance to the development. Now, and notwithstanding the adverse conditions prevailing for six or seven years, there is greater appreciation of the gold-bearing sections of Ontario and Quebec—not to speak of the northwest. It is immaterial whether the veins were formed at high or intermediate temperatures. They are in a country of igneous origin, largely so; rocks of Keewatin, Timiskaming, pre-Algoman and Algoman age, a certain amount of the ore deposits being augmented by metasomatic replacement. As was pointed out by Mr. A. G. Burrows of the Ontario Geological Bureau, a great part of the Keewatin is composed largely of volcanic rocks. Considerable of the Keewatin now is altered schist, "and such terms as grey schist, green schist, hornblende schist, carbonate schist, are used to describe certain rocks in various localities. These rocks do not give much idea of the original mineral composition; for example, a grey schist may have been derived from a hyolite, or from basalt. It does not therefore seem advisable to make any separation of the volcanic rocks of the Keewatin. They can be referred to as a basaltic greenstone series, which may include types of rock from rhyolite to basalt but are now so altered that a division is not advisable. They have all been subjected to vein-forming influences. There are also rocks throughout the Keewatin areas which are diabases and diorites. Rocks which are probably alterations from basalt are of frequent occurrence. They may now properly be called meta-basalts. In various parts of the areas associated with the Keewatin rocks are carbonates to which various terms have been applied,

such as dolomite, ferro-dolomite, ferruginous carbonate and ankerite."

These generalizations need not be carried further. They will suffice to demonstrate that there is nothing in common between Northern Ontario and the Witwatersrand, beyond the fact that precious metal values persist to great depths. Westralian mines relate more closely to those of Northern Ontario, the comparison favoring the latter, as will be more fully demonstrated when labor is more plentiful and development can be prosecuted. Already the Hollinger is in the front rank of the world's greatest mines. It is the richest of the four greatest gold mines. In the matter of grade it is first: in ore reserves it stands fourth, in tonnage, and third in the gross value of its ore reserves. Its development does not call for extravagant conjectures. So extensive is the fissuring there is every reasonable guarantee of longevity. At the same time it is not to be denied that the Government Areas at the Witwatersrand have 10,055,000 tons, worth about \$80,000,000, in their proved reserves; New Modderfontein has 8,800,000 tons, worth \$76,146,000, and Crown Mines, 8,298,000 tons, worth \$52,800,000. Hollinger has the advantage in that it will grow, whereas others of the quartette of greatest mines have their end in sight. Crown Mines have paid between £9,000,000 and £10,000,000 in dividends, and have as much more in the gross value of their reserves. The elastic limits of Hollinger are a long way from being reached; consequently Northern Ontario is deserving of stronger constructive policies at Ottawa and Toronto.

DIAMOND DRILLING AT THE HOLLINGER MINE.

The Sullivan Machinery Company has issued a compact booklet on "Core Drilling by Contract", which gives typical examples of the varied uses to which the diamond drill has been put. Included in the examples is a reduced section of the principal workings of the Hollinger Gold Mine, showing the course of a 2,000 ft. angle prospecting drillhole, traversing the strata from the surface to the 1,400 ft. level, and showing the intersection of the veins encountered, and their extent and character as deduced from the drill-cores. It is this definite ascertainment of the character, stratification, and extent of the rocks encountered that makes the diamond drill so useful in proving the value of a given property.

No confirmation has been given of the report that the Hollinger property has been diamond drilled to a vertical depth of 2,400 ft. It is understood the Main Central Shaft is down to a depth of between 1,600 and 1,700 ft. and that within a few months a depth of 2,000 ft. will be attained by this shaft.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Sept. 24th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	23 ³ / ₄
Copper casting	23 ¹ / ₂
Tin	52 ³ / ₄
Lead	8 ³ / ₄
Zinc	10 ¹ / ₂
Aluminum	36
Antimony	9

Northern Ontario Letter

THE SILVER MINES.

The Cobalt District.

The decision of the Crown Reserve Mining Company to put down a diamond drill hole to a depth of 2,000 feet on the incline from the 500-ft. level of the mine, or a total vertical depth of 2,000 feet from surface, is one of the most interesting exploration efforts ever undertaken in the Cobalt district. The hole is being put down on the theory that another sill of diabase formation may be found.

In order to gather a correct idea of what such a discovery would mean, it is only necessary to keep in mind the fact that the one great diabase sill which passes through and over the productive mines of Cobalt is regarded as the "mother of silver", this having been the agent which carried with it the silver-bearing solution which found its way into the fractures, cracks or crevices of the adjacent rocks where the silver was deposited, thereby forming veins of ore. These veins occur in close proximity to the diabase and have never been known to extend for more than from 500 to 1,000 feet from this formation. Accordingly, it is obvious the silver deposits have quite clearly defined limits.

It is true that many years will be occupied in mining out this zone of mineralization adjacent to the present known diabase sill, but with ore deposition confined to definite limits, the life of the camp may be measured with a reasonable degree of accuracy.

From these facts, and keeping in mind the other details in regard to an output of more than three hundred million ounces of silver from this one great zone, it is clear that very great importance attaches to the effort on the part of the Crown Reserve to prove whether another diabase sill occurs at a lower horizon, or not—or whether or not another Cobalt may be found lying beneath the old.

At the time of writing, advice has just been received, telling of the discovery of silver in a drift at a depth of 60 feet on the Cobalt—53 property situated in the Gillies Limit. Early reports are very good, but until further work is done it will not be possible to correctly estimate the importance of the find, but it will stimulate interest in that very promising section of the Cobalt field.

One of the heaviest individual shipments in recent years went forward from the Nipissing mine during the third week in September, the consignment consisting of 219 bars containing 299,587 fine ounce of silver bullion and being billed to Shanghai, China.

Opinion is swinging to the belief that some difficulty may be experienced in securing the consent of the shareholders of the Temiskaming Mining Company to join the McIntyre Porcupine mine in the purchase and operation of coal lands in Alberta. On the other hand, certain of the officials of the company appear to be confident no such difficulty will be experienced.

The cross-cut at the 100-ft. level of the Conroy-McAndrews property in the Gillies Limit is at a point where it is believed likely to encounter the vein almost any day. This vein at surface was strong and carried encouraging silver values.

During August, the Nipissing mine produced \$238,959 and shipped bullion and residue from Nipissing and custom ores of an estimated net value of \$701,981, according to the regular monthly statement sub-

mitted by Hugh Park, manager, to the president and directors.

The usual amount of development and exploration work as done at all shafts, says the report. No large veins were found, but general operations continued satisfactory.

The low grade mill treated 7,961 tons, a new high record for any one month. The high grade plant treated 222 tons, while the refinery shipped 598,199 fine ounces of bullion.

The following is a summary :

Low grade mill	\$158,654
Washing plant	80,305

Total \$238,959

Ore and Bullion Shipments.

During the week ended September 17th, two companies shipped ore from Cobalt, a feature being exceptionally heavy shipments from the Nipissing mine, which company alone sent seven cars containing 610,235 pounds of ore. The only other shipper was the McKinley-Darragh with one car containing 84,874 pounds.

The Elk Lake Field.

According to official advice just obtained, the management of the White Reserve mine, in the Maple Mountain section of the Elk Lake silver area, has received an offer from English interests which appears attractive to the White Reserve, and also advantageous to the other contracting parties. As a part of the negotiations and terms, mining operations are to give place to exploration work by diamond drilling. Accordingly the mine has been closed down and contracts are to be let shortly for diamond-drill work.

Considerable high-grade ore is being taken out from the surface of the veins on the Cane Silver Mines, and it is believed a medium-sized shipment may be made just as soon as sleigh roads make hauling easy. The distance to the railway is about four miles. As a part of the scheme to work the property, additional camp-buildings are to be erected, and arrangements will be made to carry on aggressive underground operations during the coming winter.

A deal is being negotiated on the Legault property, lying along the north boundary of the township of Auld, and close to the Triangle Silver Mines, and it is intimated there are fair prospects of the deal going through, with prospects of this property also being worked during the winter. The Cane Silver Mines as well as the Triangle Silver Mines, may be reached by mail at Kenabeek, Ont.

The Gowganda Area.

The mining plant on the Silver Bullion property, at Leroy Lake in the Gowganda district, has been installed, and will expedite the underground work which has been outlined. Shaft sinking will be continued on the incline from an old 50-ft. shaft which previously yielded encouraging quantities of silver ore.

The mining plant on the Walsh property has not yet been removed from the mainland to an island in Miller Lake owing to financial arrangements not having been completed whereby operations, could be conducted on a large scale. It is believed, however, a satisfactory arrangement may be made at a reasonably early date.

The latest example of "class consciousness" is the Undertakers' Association of St. John, New Brunswick, which has protested against burial at sea,

THE GOLD MINES. The Porcupine District.

The great merit of the mineral deposits of the Porcupine gold area has been most satisfactorily demonstrated by deep mining operations on the leading properties, and, also, by the geological data gathered by the Northcrown Mines during the course of drilling its Porcupine Crown mine to a depth of close to 2,300 feet.

It has been found that the greenstone formation broadens out at depth and that much of the porphyry area as found on surface is actually underlain with greenstone. As it is in this last-named formation where the gold-bearing veins occur in close proximity to the porphyry, the broadening out of the greenstone area at depth is of exceedingly great importance to the properties lying on porphyry formation, but on the edge of greenstone as shown on surface.

The Northcrown Mines has outlined an extensive exploration and development program on both of its properties, the Porcupine Crown and Thompson-Krist. This includes driving a cross-cut about 1,900 feet from the 500-ft. level of the Porcupine Crown, calculated to cut the entire prospective area through 700 feet of Porcupine Crown ground and 1,200 feet of Thompson-Krist. The object is to cut the one known ore-bearing vein on the Thompson-Krist, some 1,900 feet away, and to learn what lies in the intervening distance. It is believed quite reasonable to expect that other veins will be opened up in this work. In addition to this cross-cut, as well as operating the mill steadily at from 75 to 100 tons of ore daily, it is planned to drive three diamond-drill holes along the west part of the Porcupine Crown.

A matter of interest to stockholders of the Northcrown Mines is the intimation that some move may be made to increase the capitalization so as to provide funds for even more extensive work. This matter, of course, is merely under discussion as yet, and has not been definitely decided upon.

It is said the main central shaft of the Hollinger Consolidated is to be put down to a depth of 2,000 feet, and that diamond drill results have shown no change in geological conditions at this depth. Some years ago, core was drawn from a depth of 1,800 feet on the Hollinger, while recently core has been taken from a depth of nearly 2,400 feet. In connection with this latter report, some of the officials are reported to have denied its accuracy, but in Porcupine it is generally accepted as being correct. It is said the hole was put down at a point some little distance removed from the main central shaft of the Hollinger.

As a result of success at depth on the Hollinger, as well as the geological data gathered on the Porcupine Crown, interests identified with the Moneta mine appear to have just cause for optimism. The property lies adjacent to the Hollinger on the west, and has greenstone formation along part of its property. The data which shown this formation as likely to broaden out at depth is regarded as being important to the Moneta mine, especially so on account of the general trend of the orebodies of the Hollinger being toward the Moneta.

The annual report on the McIntyre-Porcupine for the fiscal year ended June 30, is entirely favorable and shows an increase of about \$1,000,000 in the ore reserves, as well as showing a total production of \$2,080,178 for the year. An average of \$11.02 was recovered from each ton of ore treated, as compared

with \$9.76 during the preceding year. Operating costs increased to \$900,495 as compared with \$825,998. Net profit, before providing for depreciation of plant, amounted to \$818,020, compared with \$683,350 for the year preceding.

The Kirkland Lake District.

Litigation is again involving the Orr Gold Mines, and the minority interests have taken action to endeavor to restrain the directors from issuing 800,000 treasury shares to Hamilton B. Wills. The now defunct Kirkland-Porphyry Company which was formed some two or three years ago by Mr. Wills, purchased the control of the Orr Gold Mines, and spent a large amount of money on development work. The Kirkland-Porphyry later went into voluntary liquidation, its assets being purchased by Mr. Wills, and Mr. Wetlaufer. As near as can be ascertained, the object of Mr. Wills, is to obtain reimbursement for the money spent, and in view of the details likely to be thrashed out in the courts, it might be injurious to certain of the litigants were a brief and necessarily incomplete analysis of the affair to be presented in these columns. It is clear, however, the minority interests have made the financial arrangements to carry the case through the full course of litigation, if necessary, in an endeavor to prove their opinion.

The work of deepening the shaft of the Lake Shore mine from the 400-ft. level to a depth of 800 feet has commenced.

In connection with the proposed merger between the Kirkland Lake, Teck-Hughes and Orr Gold Mines, such a possibility is now regarded as more or less remote. The Teck-Hughes is generally conceded to be in favor of remaining out of such a consolidation, and the pending litigation on the Orr property is believed as likely to hold up definite negotiations on this property.

Mining operations have been suspended on the Peerless property, formerly the Mondeau, at Boston Creek. The "Journal" has been officially advised the reason for curtailment was not due to lack of merit in the property, but has to do with other matters, one of which has been a failure to get reasonable efficiency from the mine workers engaged. The curtailment is stated to be only temporary, and that the favorable results met with on the property warrant aggressive work.

Progress in the Label township area at Kirkland Lake continues to be very satisfactory and the work of the coming winter is expected to prove up resources of much value. At least such is the opinion of those operating in that district, who base their opinion on the logic that where this series of rock formation has been opened up in the central part of Kirkland Lake it has been found to be rich, and that where it is now being opened up under equally favorable conditions it is reasonable to expect good results. Already the number of gold discoveries made are bearing out this opinion.

LESS TRANSVAAL GOLD.

London, Sept. 16.—(Special Star Cable).—The monthly return of the Transvaal Chamber of Mines for August giving the gold output of the Witwatersrand and the outside districts is 702,083 ounces, as compared with 736,099 ounces for July, a decrease of 34,016 ounces. The daily production was 22,647 ounces as compared with 23,745 ounces in July.

British Columbia Letter

Hazelton, B. C.

After having examined a mica property situated about seven miles from Tete Jaune Cache, John D. Galloway, resident engineer for northeast British Columbia, has returned to his headquarters at Hazelton. Regarding the mica he says that it is owned by a Calgary Syndicate and that considerable development has been done. Four miles of road have been constructed and a number of cabins also have been built for the employees. The material is of high grade and there appears to be a good market. Mr. Galloway also examined the Taltapin Property on Bahine Lake, which is being opened up with promising results. It is the intention of the government engineer to visit the Driftwood Creek Country where a number of claims have been staked and where the government has spent a considerable sum in trail and bridge construction. The Babine Bonanza Property also will be inspected. Operations there now are being carried on at depth.

Greenwood, B. C.

The need of added financial support has led to the re-organization of the Canadian Copper Co., what is known as the Readjustment Committee having decided on a plan which provides for the formation of a Company under the laws of the Dominion of Canada or one of its Provinces. The total authorized capital of the new Company would be 2,000,000 shares of no par value or of the par value of \$5 each as the Committee may determine. This is the same number as the authorized shares of the present Company. The new Company is to acquire all the property and assets of the old Company and to assume all its liabilities. The plan also provides for the issue of 1,088,209 shares of the new company and the setting aside of 833,333 shares for conversion of first mortgage bonds, leaving 78,458 shares to be held for future corporate purposes. Under the plan the stockholders have the right to participate on the following basis: The payment of 50 cents with each share of stock deposited and surrendered to the Readjustment Committee under the plan and agreement on or before September 1st, 1920, as hereinafter provided, will entitle the owner thereof to one share of stock of the new company, or in the alternative, without any payment, each three shares deposited and surrendered to the Committee under the plan and agreement on or before the 1st September, 1920, entitles the owner to a share of stock of the new company. Half of the payment was to be made on the 1st September and the other half on or before October 1 to the Readjustment Committee.

Vancouver, B. C.

The position of General Manager of the Britannia Mining Company now is occupied by A. J. Donahue, for some years its secretary-treasurer. He has been promoted to the post recently vacated by J. W. D. Moodie.

Victoria, B. C.

In order to obtain full and exact data regarding the market possibilities on the Pacific Coast for the product of Blast Furnaces, Steel Rolling Mills, etc., established in British Columbia a tour of central and western parts of the United States now is being made by members of what is termed the "Steel Committee" of the Provincial Department of Industries. Major

D. B. Martyn, the Chairman, has gone to Chicago accompanied by James H. McVety, one of his associates. Thence they will proceed to California. There they will be joined by Nicol Thompson, another of the Committee, to whom has been assigned the special duty of investigating market conditions in respect of steel and steel products in that and other Coast States. When the Committee returns to Victoria it is expected to be in a position to submit an informative report and it is likely that on their findings will be based the policy of the Provincial Government in regard to the proposed enterprise. That British Columbia possesses the magnetite necessary, together with the needed fluxes, and that general conditions are favorable appears to be generally conceded, so that the question of the market must be determined to assure private enterprise or the government of the attractiveness of such an investment.

The Shipton Steel Smelting Co., of Vancouver, has announced its intention to instal a plant at North Vancouver. Negotiations now are in progress with the municipal authorities with respect to the fixing of the assessment on their proposed site and with a view to the securing of certain inconsiderable concessions.

THE COLLIERIES.

Litigation has developed in British Columbia the issue of which involves title to some 237 acres of coal bearing land on Vancouver Island now held by the Granby Consolidated Mining and Smelting Co., Ltd., and being a part of the area being exploited by what are known as the Cassidy Collieries.

The result of the first hearing, which took place before Mr. Justice Gregory, of the Supreme Court, was a judgment for the plaintiffs, viz., the Esquimalt and Nanaimo Ry. Co. This Company sets up the claim that the coal rights in these lands were conveyed to the railway by the Province through the Dominion at the time of the construction of the Vancouver Island Railway and by way of a bonus to those who undertook the completion of that at then considerable enterprise. In bringing this suit it is surmised that the railway company is actuated by the desire to see that no part of its alleged coal interests on the Island, which comparatively recently passed to the Canadian Collieries (D) Ltd., are lost to that Company.

The position of the defendants who are given as Messrs. Wilson and McKenzie is that, as executors of the estate of the late Joseph Ganner and Mrs. Dunlap, original holders of the land, they were granted a Provincial Crown Grant to the coal rights thereon by virtue of the Provincial Settlers' Rights Act. This provincial title they passed to the Granby Consolidated Mining and Smelting Co., and the coal rights so acquired are, as stated, a part of what that Company has been engaged in developing at Cassidy. It is well known that the power of the British Columbia Government to enact such legislation has been questioned and that, as a matter of fact, the Dominion Government has disallowed the Settlers' Rights Acts of the local legislature. This disallowance, however, did not take place until after the Ganner and Dunlap leases were issued.

Mr. Justice Gregory having found for the Esquimalt and Railway Co. the defendants immediately applied to Mr. Justice Gallihier, of the Court of Appeal, for a stay of execution which was granted, it being stipulated that they should pay into Court \$75,000 as secur-

ity and should not take from the lands in question more than 100,000 tons of coal without an order obtained from the Court of Appeal.

The importance of this case becomes clear when it is explained that its outcome will affect, favorably or adversely, a considerable section of the holdings of the Granby Consolidated Mining and Smelting Co., which has expended large sums in the development of Vancouver Island Coal Lands and has established at Cassidy Collieries so well and modernly equipped as to have won the favorable comment of all who have been privileged to visit them. The same statement applies to the town, the buildings of which, both those for the accommodation of the men and of the officers, are the last word in point of their conveniences and living comforts.

Influenced by the somewhat alarming accounts published by the newspapers in regard to the situation the officials of the Company have authorized the statement that the townsite of Cassidy is in no way affected by Mr. Justice Gregory's judgment and that "it is not anticipated that there will be any diminution of work at Cassidy pending the appeal and the judgment of the British Columbia Court will not be likely to affect operations of the Coke Plant or the Smelter at Anyox."

The coal production of Vancouver Island Collieries for the month of August was 117,194 tons as compared with 140,512 tons for July, a decline of 23,318 tons.

To the Coal Mine Operators of British Columbia the decrease in output is a serious matter. They state that, notwithstanding their desire and their efforts to see the total increase, it has been found impossible to obtain such a result. The explanation given is labor conditions. The coal is needed, in fact is imperatively required. Never was there so strong a market for the product of the coal mines of this Province.

One prominent operator described the situation as exceedingly aggravating. Just when the fuel can be placed without trouble it is found difficult to induce the miners to bend themselves to the task of getting the material above ground. Orders are being received from foreign sources in shoals but it is doubtful whether the provincial mines, especially as the winter season is approaching, will be able to take care of much more than the local domestic and bunker trade. And never was British Columbia more advantageously placed in respect of overseas commercial possibilities because of the embargo against the export of eastern Canadian coal.

It is likely, however, that the miners will get down to serious work in the course of a few weeks. That should be the tendency at any rate with the advent of the wet weather of the Fall. Fine summer weather, it is assumed, has been too great a temptation to the underground workers to take more time off than is usual although it may be expected, as far as the miners of the Island are concerned, that many will be devoting considerable time to outdoor life during the shooting season.

In a word the problem of the coal mine operator is one of labor, which is the same as that of most of those charged with the administration of mining properties in British Columbia at present.

Figures giving the production of the leading col-

lieries of the Province for the past three months tell the story in striking fashion. The Crow's Nest Pass Coal Co., of Fernie and Michel, produced 62,770 tons in June and 60,245 tons in July; the Canadian Western Fuel Co.'s output for June was 56,474 tons; for July, 55,399 tons; and for August, 34,381 tons; the Canadian Collieries* (D) Ltd. had a production of 62,400 tons in June; 65,335 tons in July; and in August it dropped to 60,696 tons.

Detailed production of the collieries of British Columbia for July follows:

Crow's Nest Pass Field.

	Tons.
Crow's Nest Pass Coal Co. Ltd., Coal Creek	38,073
Crow's Nest Pass Coal Co. Ltd., Michel	22,172
Corbin Coal and Coke Co., Corbin	15,763
	76,008

Nicola-Princeton Field.

Middlesboro Collieries, Middlesboro	6,918
Fleming Coal Co., Merritt	2,616
Coalmont Collieries, Coalmont	1,984
Princeton Coal Co., Princeton	2,114
	13,632

Vancouver Island Field.

Canadian Western Fuel Co., Nanaimo	55,399
Canadian Collieries (D) Ltd., Comox	41,098
Canadian Collieries (D) Ltd., S. Wellington	8,904
Canadian Collieries (D) Ltd., Extension	15,342
Pacific Coast Coal Mines, S. Wellington	7,680
Nanoose-Wellington Co., S. Wellington	3,079
Granby Cons. Mng., Smltg., & p. Co., Cassidy	9,019
	140,512

The statistics for the month of August as far as they are available follow:

Nicola-Princeton Field.

	Tons.
Middlesboro Collieries, Middlesboro	7,341
Coalmont Collieries, Coalmont	2,056
	9,397

Vancouver Island Field.

Canadian Western Fuel Co., Nanaimo	34,381
Canadian Collieries (D) Ltd., Comox	38,051
Canadian Collieries (D) Ltd., S. Wellington	7,943
Canadian Collieries (D) Ltd., Extension	14,732
Pacific Coast Coal Mines, S. Wellington	8,110
Nanoose-Wellington, S. Wellington	4,683
Granby Cons. Mng., Smytg., & P. Co. Cassidy	9,330
	117,194

Present Output of Alberta Coal Mines is Far Below Capacity.

Official figures recently issued dealing with the coal output of the Province of Alberta, for the first six months of the present year, indicate that compared with the production of the same period for 1919, that considerable progress is being made in speeding up the development of the coal fields of the prairie Province.

The official figures up to the end of June this year gives an output of 3,043,940 tons, compared with 2,-

068,907 last year. This is for both the bituminous and lignite product. It is doubtful, however, in the face of the paucity of orders that have been coming since the end of the period mentioned that the showing will be exceptionally good.

That is a matter over which the operators have no control; in other words, if these has been a falling off in orders the whole bonus must be thrown on the public. The operators maintain that as far as actual quantities are concerned that the fringe of the industry has as yet been but touched.

Summed up in a nutshell, operators state, however, that there has been more coal up to this time in the history of coal producing in Alberta. It should also be pointed out that more coal will be required from these mines than ever before on account of the shortage of coal from the United States.

The present prospects as far as the Winnipeg market is concerned, operators state, is most encouraging. The actual output, however, to that market, and to further eastern points will solely depend upon freight rates. If these are prohibitive, it will mean that a staggering blow will be dealt the industry.

The provincial government has recently been carrying on with some measure of success a very active propaganda in Manitoba and Saskatchewan. This has been greatly helped by the shortage of coal from the United States.

While the bituminous mines in Alberta have been working fairly to capacity, the lignite fields, owing to lack of orders have for some time now fallen far short of this; indeed, in the majority of cases their output has only been about half of what they could turn out.

It is pointed out that the coal deposits of the province are enormous, and that 10,000,000 tons a year could be but a fraction of what could be produced. It is asserted that the tippable capacity at the present time could take care of more than the figure mentioned.

The ChuChua Mine situated near Kamloops has been placed on a shipping basis according to Glenville A. Collins, consulting engineer of Seattle. This property covers about 5000 acres of ground, is situated in the new coal area and it is said is capable of producing a large amount of coal of an excellent quality. There are at present 20 men employed, and the output it is expected will be 2 cars a week. By November it is thought that the employees will be doubled, and the output materially increased. Fred. Jarrett of North Vancouver is the Superintendent. Since he took charge the property has been developed to its present point, and it is believed that the local market will absorb the entire output for a time. Before long, however, it is figured that Chu Chua Coal will find its way into Vancouver and other coast centres.

A new coal mine is being opened up at Coalspur, Alberta, on the mountain park branch of the Grand Trunk Pacific Railway. There are employed at present 35 men and 75 tons of coal are being produced per day. Thomas Davis, formerly of the Michel Colliery is in charge of operation.

Much is expected of the new Collieries being opened up at Coalmont, in the Nicola-Princeton field. This property has been taken over by an energetic and enterprising syndicate, at the head of which is W. J. Blake Wilson, and with whom are associated a number of prominent Vancouver business men. The property is not new as a coal producer, but under the new

management, its plant is being so augmented and development so extended that it is expected to take a leading part among the coal producing properties of the interior of the Province. Initial shipment will approximate 250 tons a day, but this amount is expected to reach at least 1000 tons in the course of a few months. The greater part of this will find its way into Vancouver.

The coal is declared by experts to be superior to any mined in the province. It is an metamorphosed bituminous coal extremely rich in resin, making it valuable as a steam coal, and profitable for domestic use, burning as it does with but little ash. It is free from shale and rock, being mined from the centre of a seam averaging about ten feet in thickness. This is only one of the many rich seams in the property.

Engineers have estimated that between the lower seam in which operations are now being carried on and the surface, there is a thickness of more than 200 feet of coal in seams of unusual thickness. At one point a layer shows 28 feet of clear coal. The narrow divisions between the various seams are bands of clay which separates easily from the coal. The remarkable feature of the coal, particularly noticeable in the workings, is the fact that it is free from dust. When powdered it does not "flower" but breaks into small distinct particles, a quality which is most desirable for industrial use where powdered coal is used as fuel. This and the formation of the coal makes it the safest coal in British Columbia to handle. It is free from dangerous gas. Analysis show it to be: Fixed carbon, 55 per cent; volatile matter, 36.5 per cent; ash, 7 per cent; moisture 1.5 per cent.

The property which is immediately behind the small town of Coalmont, 12 miles from Princeton, was first opened up by the Columbia Coal and Coke Company, a tunnel being started from above the Tulameen River. Later another tunnel was commenced from the other side of the mountain above Granite Creed, the small stream famous thirty-five years ago as the scene of a gold rush. After operating for a time the property was closed. In 1917 it was acquired by local capitalists, headed by Mr. Wilson, on the advice of Mr. Alexander Sharp, M.E., who is consulting engineer for the company. Mr. Sharp was convinced that the property had not been properly worked, and on his advice the driving of the long tunnel from the Coalmont side was abandoned.

The tunnel, which had been started on the other side of the mountain, was examined, and it was found that it had been badly planned, being driven just beneath the big coal measure. Its direction was changed, and Mr. Donald McLean, a mining expert of long experience in the Vancouver Island collieries, was installed as superintendent. Under his direction the work has advanced with such good effects that the seam was soon encountered. The tunnel was driven ahead in solid coal, and upraises were driven on the dip of the body, with new levels being started. At the present time there are about two miles of workings and all in solid rock.

Estimates of the coal body made by the Dominion Geological Department before the big seam was proved, placed the reserve at 98,000,000 tons. Other computations have suggested a higher figure without anticipating any additional seams in the ground below the present workings.

The present production is 140 tons daily, this being

all that can be taken care of by the motor trucks, which haul the coal four and a half miles down the winding mountain road to the temporary loading station at the railroad tracks. The output is absorbed by the Kettle Valley and Great Northern railroads, the engineers of which declare it to be the best steaming coal used in the West.

A big force of men are at work constructing an aerial tramway from the tunnel mouth to the big tippie now building at Coalmont while another force of mechanics are engaged in building a big power house adjacent to the tippie. As soon as the power plant, which is on the ground, is installed, a pole line will be run up the hill, the right-of-way for which has already been cleared. The power plant will develop 600 horsepower, with the machinery ready for installation. It will be added to as the requirements of the mine demand more power. It is expected that another 50 horsepower will be developed from the tramway, which operates on gravity. This tram will transport 100 tons per hour.

A special mine car has been designed for use in the tunnels and for transportation to the tippie. The box of the car unlocks from the trucks and becomes the bucket of the aerial. This is carried direct to the tippie for loading, or bunkering. By this method not only will considerable time be saved, but the breakage of coal will be reduced to a minimum. It is expected that the tramway and tippie will be in operation by October 15. As soon as this has been done the output of the mine will be increased and shipments to the Coast will commence. Work is being pushed ahead as rapidly as possible by Mr. J. T. Johnstone, outside manager, and by Superintendent McLean.

The mine is being put in readiness to double the present production almost at a day's notice. Mr. Alexander Bryden, a well known Vancouver Island mine man has recently been appointed assistant superintendent and is personally directing operations underground.

The operators of the Coalmont mine are fortunate in having an immense supply of timber close at hand for mine purposes. This is cut in the company's mill which has at present a capacity of 800 feet of lumber daily. Timbering in the different levels, of which there are four, is of a most substantial character.

A big fan is being installed and will be in operation in a few days. It is located at the mouth of a tunnel, driven for the purpose, and will distribute 38,000 cubic feet of air, at one-inch water gauge, through the workings every minute. Another fan, a Sirocco, will be installed in a few months. This will have a capacity of 100,000 cubic feet. The underground conditions are exceptional. The mine is absolutely free from gas, and is being worked with naked lights while the coal roof is exceptionally firm, the absence of the usual dust of other British Columbia pits being appreciated by the workers.

Every possible comfort is being provided for the employees of the company. A new dining hall has just been completed at the camp, while a new rooming house is also being commissioned. A boiler will be set up in a few days to serve as a central steam heating plant for the little camp. Every room in the large rooming house will be fitted with radiators, while the dining hall will be made thoroughly comfortable.

Associated with Mr. Wilson, as president of the company, are W. L. Parrish, M.L.A., Winnipeg, vice-presi-

dent; A. H. Douglas, secretary-treasurer, and R. S. Lennie, J. T. Johnstone, D. Donald, J. A. Whittier and J. T. Haig, M.L.A., Winnipeg, as directors. Messrs. Lennie and Clark are solicitors.

PORT ARTHUR NOTES.

By J. J. O'Connor.

The Silver Islet Syndicate has closed down the Silver Islet mine temporarily, pending a reorganization on an extensive scale, preparatory to the prosecution of active mining operations on Silver Islet, and thoroughly prospecting the veins on the mainland of the Woods Location, comprising some ten square miles.

The Silver Islet Consolidated Mining and Lands Company, the former owners and operators of this property, carried out considerable prospecting by open cuts and shaft sinking on these veins many years ago, in which they disclosed very encouraging values. This work will be taken up and carried to a point where definite conclusions may be arrived at.

The unwatering of Silver Islet was carried down to the second level. Large bodies of high-grade "macfarlanite" were uncovered, thoroughly sampled and assayed, with such gratifying results, that the present operators have determined to prosecute an active campaign of mining on this famous old mine. Silver values were laid bare in the old workings that are far in excess of the cost of recovery.

Reorganization is not sufficiently advanced, as yet, to say whether active operations will begin this Autumn, or be deferred until the Spring of 1921.

Iron ore shipments from Lake Superior for the season of 1920, to September 1st were 35,349,874 gross tons, an increase of 5,751,826 tons, or 19.43 per cent. increase over the same date in 1919. A strenuous effort will be made to reach a shipment of 55,000,000 tons off this Lake, before the close of navigation.

It is expected that there will be a marked shortage of lake tonnage for the balance of this season, and that wild rates for iron-ore, coal and grain will be increased as a natural sequence to the shortage of boat tonnage. Owing to the great delays experienced by boats at Lake Erie ports, caused by car shortage, many transportation companies are behind in their contracts. These delays were so great as to seriously threaten the coal supply of both the Canadian and United States north-west. Coal is now coming forward more freely, with an advance of rates. Already numerous charters have commanded 75 cents per ton for coal from Lake Erie to the head of Lake Superior, and it is reported that in one special instance \$1 was paid. The season rate for coal is 50 cents per ton. The season contract for iron ore is \$1.10 per ton in at least one instance \$1.50 per ton has been bid for wild tonnage. Wild boats in the coarse freight trade are likely to command the highest rates in any season since the development of larger sized ships, and their advent has not displaced dollar ore, or 5-cent wheat, which was confidently predicted when they made their appearance in the ore, coal and grain trade.

PERSONAL.

Mr. Carl Marsh, Chief Engineer, and Mr. W. H. Graham, Superintendent of Construction, of the Dominion Steel Corporation, have had their duties extended to cover the similar work of the Dominion Coal Company at the collieries and associated plants.

Royal Commission Reports on Wages and Working Conditions at the Collieries in Nova Scotia

The Royal Commission which for some weeks has been investigating conditions at the coal mines in Nova Scotia, and considering the request made by the United Mine Workers for increased wages and modifications of working conditions, has reported to the Minister of Labor.

The recommendations made may be summarised as follows: That the wage increase asked of one dollar per day for day-paid workmen, and twenty-five cents per ton on contract getting-rates, be granted, effective 1st July (the miners' demand was that the increase should be effective 1st May), subject to the adoption of a sliding scale by which the remuneration paid to workmen shall increase in proportion to any increase obtained in the per capita production of coal. A year is given to work out this sliding scale.

The Commission recommends the formation of a joint conciliation board to act as a permanent medium for the adjustment of disputes as they arise.

A summarised report of the recommendations of the Commission, given out by the Minister of Labor at Ottawa, is as follows:

1.—That the wage increases demanded (broadly \$1 per day for datal men and 25 cents per ton on all tonnage rates) be granted. "The recommendation is, however, subject to the condition that it is to be distinctly understood and agreed that operators and men will agree to co-operate and bring about the adjustment referred to, and within twelve months, or say on or before the first September, 1921, adopt the partial advance and sliding scale scheme" with a view to increasing coal production.

2.—General living conditions of Nova Scotia miners, "with few exceptions, absolutely wretched," and "a menace to themselves and their families." Recommends that companies take necessary steps to remove all conditions referred to, and provide proper sanitary arrangements, men to pay increased rental per month per \$100 or fraction of \$100 expended in improvements, this increased rental to provide for extraordinary repairs after recommended improvements have been made.

3.—At some points both operators and men are prejudiced by inadequate equipment. In some instances, wash houses are inadequate. Recommends special attention by companies to this general question of equipment and sanitation.

4.—Recommends the more universal instalment of radial machines, in fitting places.

5.—Recommends, that where practicable, electric lights should be installed by operators, "as a means to greater efficiency and larger production."

6.—"The present," says the commission, "is not a time for increasing expenditure, but, in view of the requirements for reconstruction and repair of the damages of warfare, is rather a time for increased energy and carefully guarded thrift."

7.—Deprecates practice of men taking "vacations" and "holidays" over minor grievances and asks U.M. W. officials to condemn and discourage such practices.

8.—Points out advantage of United States coal in competitive market, due to lower cost of production, as against Nova Scotia coal, and asks miners to put forth every effort to true the balance "as a matter of self preservation."

9.—Recommends establishment of an "adjustment board" of co-operation between men and operators, "to determine all disputes which may occur during the life of this contract, such adjustment board to be regarded as "the most effective and businesslike method of settling any minor disputes that might arise."

10.—Increases are made retroactive, dating from July 1st, 1920.

Housing Conditions Bad

Regarding living conditions in the colliery districts the report has the following to say:

"That in view of the fact that the housing, domestic surroundings and sanitary conditions of the miners are, with few exceptions, absolutely wretched and that such conditions have a deterrent effect on the miners ability to produce coal and are a menace to themselves and families, and, further, that children brought up in such an environment have not the same chances of life and health as children reared under better conditions, as proven by government statistics as to infant mortality, it is therefore recommended that the companies that own the houses, put and keep them in proper repair, and that a sewerage system be devised and inaugurated whereby surface closets will be eliminated, or that installation of a modern septic sewerage system be provided where it is found that the ordinary sewerage system is not feasible. Suitable kitchens should also be provided where they do not now exist.

"In the matter of water facilities for the houses of mine workers, your commission recommends that an adequate supply be furnished and so conveniently located that the miners and their families may avail themselves of it. Pure water, which is an essential, should be supplied each family in a quantity sufficient for all purposes of domestic use.

"In making the foregoing recommendations the commission is actuated by the conviction that for humanitarian reasons, for the present and future well being of the miners and their families (it being from the miners' families of today that the miners of tomorrow will be drawn) and to assure to the industry the necessary recruits to maintain the force required to achieve the success of the industry, it is essential that such improvements be effected."

NEW YORK ADVICES ON THE ASBESTOS MARKET.

Information from the Canadian mines is that production is about twenty-five percent. below normal, with increased demand for asbestos. As a result prices for asbestos crude and fibres are very stiff. European demand is reported to be increasing as industries there return to normal functioning.

Deliveries from Canada are better because of improvement in the car situation, and orders are being filled more quickly. Users of asbestos are strongly recommended to stock up before the Winter sets in, as this will cause further falling off in production, and prices are forecasted to go much higher. A survey of conditions of supply and demand, and the recovery of overseas markets, indicates that no less stringent conditions in the asbestos trade are to be anticipated for several years, and present purchases are advised.

COAL SUPPLY BULLETIN**A New Service.**

To meet the very evident need for data regarding output, exports, imports, and movements of coal, and in order that the general public may be kept accurately informed regarding Canada's coal supply, it is proposed to issue from the Mining, Metallurgical and Chemical Division of the Dominion Bureau of Statistics a "Coal Supply Bulletin" each month, giving all the available statistics relating to the production and disposition of Canadian coal, and the importation and distribution in Canada of coal from the United States. Owing, however, to the present extremely high costs of printing, the first number of this Bulletin, which it was proposed to publish at this time, has been postponed as changes are now being made in the multi-graph equipment of the Bureau, which, when completed, will permit of the printing, promptly and at greatly reduced cost of such publications as the one proposed.

The collection of coal statistics.

During the recent administration of fuel control in Canada under Mr. C. A. Macgrath, the necessity of maintaining accurate records of all data relating to coal production in this country and imports from the United States in readily available tabular form was so emphasized that the principal records inaugurated under that regime were merged with those previously compiled in the Dominion Bureau of Statistics, and when the Mining Division of the Bureau was established last year, with the writer in charge, the collection of adequate records of coal supply was one of the first matters given attention. The whole of this work is now on a permanent basis, and the several Government Department interested are being served through the coordination of provincial and dominion effort made possible by the Bureau. This Coal Supply Bulletin, compiled each month from the wealth of data available in the Mining, Metallurgical and Chemical Division of the Bureau, will provide a new service to the public, and will enable the Bureau to keep its many correspondents on the subject of coal, promptly and fully informed on the subject. The critical surveys made from time to time will serve to review and interpret the data recorded.

Organization of work.

Output and disposition of coal figures are obtained in the Bureau through the cooperative assistance of the several Provincial Departments administering the mining laws in the coal producing provinces. This scheme, inaugurated in January 1920, provided for the collection of production data from the mine operators by Provincial officers, thus ensuring the highest degree of reliability in the data collected. Returns are obtained in duplicate, and one copy, after vise by the Provincial officers, is forwarded to Ottawa for compilation with the data from the other Provinces, by the trained staff of the Mining Division. This plan has resulted favorably, not the least of the advantage gained going to the mine operator, who now completes one form each month, knowing that he will not be required to do the same work over several times more for other Government Departments. The present arrangements are working so smoothly and well that Coal Supply Bulletin will contain output figures complete for the month preceding its date of publication.

Imports of coal into Canada, and exports therefrom, are supplied to the Bureau twice a month through the

courtesy of the Department of Customs. These figures are absolutely up to date and all coal coming into Canada from the United States is shown by quantities and kinds for each port of entry. Exports of coal produced in Canada are also shown by quantities shipped through each port of exit.

These data, with the production figures obtained through the Provinces, enable the Bureau to survey the coal situation continually, and to determine with facility when a fuel famine threatens. All the information thus collected is carefully compiled and tabulated, and digests are prepared for the various administrative offices, including more particularly the Railway Commission.

A mailing list is being prepared and those who wish to have Coal Supply Bulletin forwarded to them regularly free of charge should send in their names and postal addresses at once to the Chief of the Mining, Metallurgical and Chemical Division, Dominion Bureau of Statistics, Ottawa.

TORONTO MINING STOCKS.

Silver	High	Low	Last
Adanac Silver Mines, Ltd	2	2	2
Bailey	43 ³ / ₄	43 ³ / ₄	43 ³ / ₄
Beaver Consolidated	41	40	41
Cobalt Provincial	45	43 ¹ / ₂	45
Crown Reserve	25	25	25
Gifford	11 ¹ / ₈	11 ¹ / ₈	11 ¹ / ₈
Great Northern	17 ⁷ / ₈	13 ³ / ₄	17 ⁷ / ₈
Kerr Lake	3.05	3.05	3.05
La Rose	35	33	33
McKin.-Dar.-Savage	60	60	60
Mining Corp. of Canada	1.74	1.65	1.74
Nipissing	11.00	10.75	10.75
Peterson Lake	15	15	15
Right of Way	1	1	1
Silver Leaf	11 ¹ / ₂	11 ¹ / ₂	11 ¹ / ₂
Temiskaming	35.6	34	35
Trethewey	26	24	24
Gold.			
Apex	1.6	1 ¹ / ₂	1 ¹ / ₂
Boston Creek Mines	16	16	16
Dome Extension	37 ¹ / ₂	36 ¹ / ₂	37 ¹ / ₂
Dome Lake	4 ¹ / ₄	3 ³ / ₄	3 ³ / ₄
Dome Mines	12.75	12.25	12.50
Gold Reef	3 ³ / ₄	3	3
Hollinger Consolidated	5.95	5.75	5.95
Hunton Kirkland G.M.	12	12	12
Keora	16 ³ / ₄	15	16 ³ / ₄
Kirkland Lake	53	49	50
Lake Shore Mine Ltd.	1.15	1.10	1.13
McIntyre	2.08	2.00	2.05
Moneta	12	12	12
Newray Mines, Ltd.	7	6	7
Porcupine Crown	24	23 ¹ / ₂	23 ¹ / ₂
Porcupine Tisdale	11 ¹ / ₂	11 ¹ / ₂	11 ¹ / ₂
Porcupine V.N.T.	25 ¹ / ₂	24	25 ¹ / ₂
Schumacher	17 ¹ / ₂	17 ¹ / ₂	17 ¹ / ₂
Teek-Hughes	8	7	7
Thompson Krist	7 ¹ / ₄	7	7 ¹ / ₄
West Dome	6 ³ / ₄	6 ¹ / ₂	6 ¹ / ₂
West Tree Mines Ltd.	5 ¹ / ₂	5 ¹ / ₄	5 ¹ / ₄
Miscellaneous.			
Rockwood Oil, Gas	5	3.7	5
Vacuum G.	28 ¹ / ₂	24	28

MEETING OF NORTH COAST DIVISION OF THE CANADIAN INSTITUTE OF MINING AND METALLURGY.

Stewart, B. C.—The North Coast Division of the Canadian Mining Institute held a two-day meeting recently at Stewart and was attended by representatives of all the important mining centres of the section, including Salmon and Bear Rivers, Anyox, Princess Royal Island, and Alice Arm.

E. J. Conway, presided and among the speakers were E. E. Campbell, vice-president of the Institute, and Peter E. Peterson, both of whom are connected with the Granby Consolidated Mining and Smelting Co., at Anyox. Mr. Campbell declared that the men most needed now were miners and metallurgists who could mine for a dollar when there was but \$1.25 in the ore. He reviewed some of the work being done at Anyox and asserted that the operations there were being carried on at a lower cost per ton than at any other mine in the Dominion. The Company's concentration work he characterised as unique. The latter phase was dealt with by Mr. Peterson who described the concentration methods and stated that these not only were adaptable to the treatment of the ores of the Stewart and Alice Arm zones, but ultimately would be in use at those places.

An interesting talk was given by A. C. Garde, of Prince Rupert, on milestones in the evolution of the mining industry of the Pacific Northwest, the speaker touching on the growth of operations at Anyox, the Surf Inlet Mine development, and the discovery of the Premier Mine in the Portland Canal section and the resulting opening up of that area.

HIGHER WAGES ACCOMPANIED BY SMALLER PRODUCTION IN BRITISH COAL MINING.

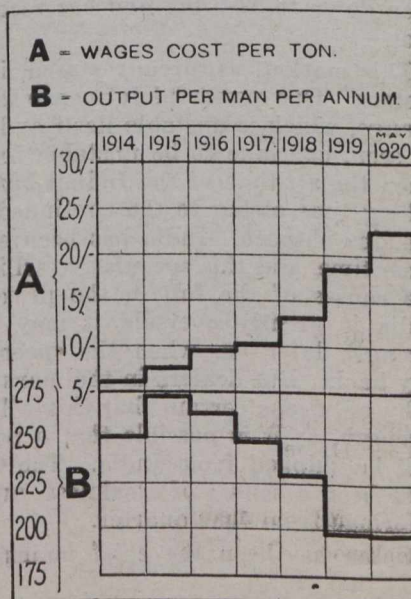
In the accompanying diagrams, prepared by the statistical department of the Monmouthshire and South Wales Coal Owners' Association, graphic representations are given of the divergent tendencies of outputs and labor costs in the coal mining industry between 1914 and May 1920. The higher labor costs are due partly to the higher wages and partly to the decline in the efficiency of labor. In the United Kingdom the wages cost per ton has increased from 6s. 2.92d. to 22s. 8.75d., while the output in the United King-

dom per person employed above and below ground has fallen from 252 tons in 1914 to 194 tons. In the South Wales coal field the expansion on the wages cost per ton has been from 8s. 1.47d. to about 29s. 8.13d., whilst the output per person employed above and below ground has fallen from 230 tons to 190 tons. In other words, in the United Kingdom the output has declined by 23 per cent. and the labor cost increased by 264 per cent., while in the South Wales coal field the output has decreased 17 per cent. and the labor cost increased 265 per cent.

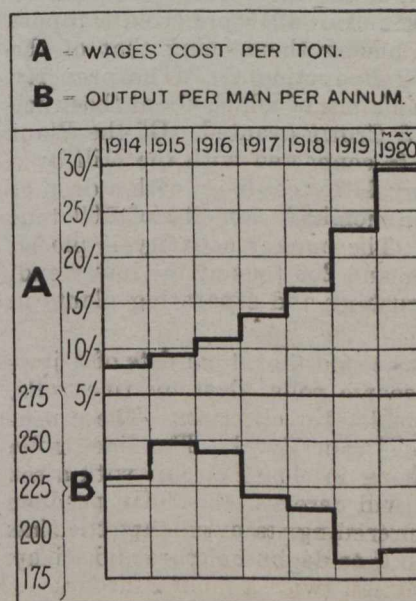
Dr J. A. Bancroft's address on the value of trained geologist in practical mining was another feature. He said that the big mission of the geologist in the mining field, looking at it from a national aspect, would be the working out of the geology of districts before the coming of the prospector, thus saving a lot of useless work by indicating where mineral bodies were not to be found.

At a banquet, which closed the session, Pat Daly, the well known prospector and mining operator, referred to the closing down of the Big Missouri in the Salmon River District of Portland Canal. He said he was not inclined to accept as final the negative results of the limited amount of diamond drilling and the studies of Dr. Bancroft on which were based the decision to abandon work. Mr. Daly made reference to the history of some great mines in support of the contention that engineering mistakes were not uncommon and re-asserted his faith in the Big Missouri ridge. Among the delegates were: E. E. Campbell, vice-president of the Canadian Mining Institute and assistant to the General Manager of the Granby Co., at Anyox; E. J. Conway, field engineer for the Granby Co.; H. M. Roscoe, secretary of the North Coast Division C. M. I.; J. Tuttle Jr., mine superintendent at Hidden Creek; P. E. Peterson, superintendent of concentration at Anyox; N. E. Nelson, field engineer; John Dillon, assistant superintendent Anyox Smelter; W. L. Wetmore, mechanical engineer; Wm. Weir, chemist; A. B. Wing, superintendent at Swamp Point, Granby Co.; A. C. Garde, consulting engineer; Dr J. A. Bancroft, professor of geology at McGill University; Dr Stuart A. Scofield, Canadian Geological Survey; and G. W. Bain, fourth year student McGill University.

UNITED KINGDOM.



SOUTH WALES.



SUIT CONCERNING OWNERSHIP OF MOLYBDENUM PROPERTY AT ALICE ARM, B.C.

There is now before the Supreme Court, Victoria, B.C., an action involving title to The Molybdenum Properties of Alice Arm which, particularly while the war demand for this mineral kept its value high, were considered among the most promising mining holdings of the Province.

The suit is brought by Robert M. Stewart, manager of the Stewart Land Co., of Victoria, and the defendants are the Molybdenum Mining Co., H. A. MacLean, counsel for the latter, in his summing up of the situation explained that the purpose practically was to obtain judgment as to the ownership of the property.

Mr. MacLean, in sketching the origin and history of the litigation, which it may be said incidentally had the effect of preventing the development and operation of the property during the war when its product not only would have had a ready market but when the product was badly needed in the forwarding of the Allies' interests, stated that in 1914, Mr. Stewart agreed to sell the Conundrum Claim to Messrs. C. P. Riel and F. Teetsel and that the assessment work was not done in the following year, the result being that in June 1916 the title to the claim lapsed. Thereupon it had been restaked as two claims by Messrs. Riel and Teetsel.

Messrs. Stilwell Brothers, of Seattle, then were induced, Counsel asserted, to purchase the claims and they incorporated the Molybdenum Mining & Reduction Co., which spent about \$100,000 on development. The Company has suffered through the decline in the value of the mineral since the war and in 1918 when about to obtain a certificate of improvement were met by Mr. Stewart's claim. The latter took the position that Messrs. Riel & Teetsel were only trustees of the property and that they had neither the right nor authority to negotiate a sale.

Mr. MacLean further recalled that, when the suit was started in 1918, an adjournment had been taken in order to give effect to an order of the court that the property be sold. Because, however, of the decline in the metal market this had been found impossible and, he stated, the contending parties now were before the Court in an action the object of which virtually was to decide the ownership of the property.

The case is proceeding.

Prof. J. M. Turnbull, of the B. C. University, visited the Alice Arm District and in 1916 prepared a report on various properties among them being that of the Molybdenum Mining & Reduction Co. The property consists of twenty-five claims, of which six at that time had been surveyed and Crown-granted. Of the Plant he says that the mine is connected with the Mill by a 2-bucket aerial tramway 4,075 feet long, with a drop of about 1,100 feet and a nominal capacity of 100 tons in twenty-four hours. The bunker capacity is placed at 80 tons at the upper and 200 tons at the lower end. The Mill consists of crushing and separating plants in separate buildings.

Describing the Plant he said that it consists of a jaw-crusher followed by coarse rolls, then by fine rolls, connected in series by 2-bucket elevators. The crusher and rolls are on the same level. The fine rolls operate by choke crushing in closed circuit with a set of gently sloping shaking screens, the final product being 40 mesh. A short trial run showed that the fine screen tended to bind, due to slight moisture and sticky

material probably in the ore. The separating plant contains flotation machinery, but was not completed and the writer observes that the Mill appears to be more or less of an experiment and "may require some remodelling before successful operation is attained."

The main mine-workings are at an elevation of 1,200 feet, and begin in a gully, along the bed of which bare rock is exposed for over 1,200 feet, the balance of the ground being largely covered with soil and timber, with occasional rock outcrops or humps.

The formation, broadly speaking, is sedimentary, belonging in the slate or argillite area. The ore occurs as a series of quartz veins, with a general strike about north (mag.) and dips to the west varying, but mostly steep. These veins are quite irregular in width along strike and dip, and form rather a zone than a well-defined vein. Mineralization consists mostly of molybdenite in the form of thin seams parallel to the walls, but often curved and crumpled where the veins have been squeezed by pressure, in which case the seams may be 1-4 inch thick. The ore tends to break along seams, which gives specimens a deceptively solid appearance.

Paralleling the veins, and between them, are a number of dykes which make up a large percentage of the country-rock near the veins. This general dyke-vein zone continues for about 800 feet north of the mouth of the main working-tunnel at which point it is cut off by a tongue of granite rock, mostly moderately coarse feldspar and quartz, which strikes about north-east and has a width of probably several hundred feet. Vein-fissures continue into the granitic rock, but the mineralization seems to change. A 42-foot tunnel, 250 feet above the main tunnel, driven north from the contact with the granitic rock, shows a fissured zone much altered or decomposed, in which small dykes are seen. In this tunnel small lenticular shoots of ore were found, which consisted of quartz with galena, zinc-blende, and pyrite, both coarse and very fine-grained. The best showing was 3 feet wide. Six inches shows in a crosscut near the face in one place. This crosscut shows the fissure-zone to be at least 15 feet wide, and strong, with much gouge on the walls. An assay furnished by the company shows: Silver, 150 oz. a ton; lead, 55 per cent; zinc, 35 per cent, which seems to total up too much, but shows the general character of the ore. The occurrence does not suggest any important tonnage of this class of ore, though it has possibilities.

SILVER'S OBSCURE OUTLOOK.

The price of silver of late has continued to fluctuate in a most uncertain manner, and from the indications observable it is likely to continue to vary erratically. It is quite impossible in a market where the influences at work are diverse and complex to see a day ahead. The outlook is most obscure, and, therefore, it would be most hazardous for anyone, however close his experience of this market, to enter into the region of prophecy. Within the past fortnight the price has leaped to 63 $\frac{3}{4}$ d, and after varying day by day it has been down to 57 $\frac{5}{8}$ d, and has recovered to 60 $\frac{1}{8}$ d for spot.

This market, as already stated, is swayed by many factors. One powerful influence is the American exchange, which is unstable itself and will, so far as can be seen, continue to be unstable for some time hence. Then the attitude of the Indian bazaars, uncertain for a long time owing to the continued speculation there, remains obscure. India has been a bear of silver for some time, and this speculative selling has been one of the causes of the fall in the price of the metal. If India is greatly oversold it may prove a source of strength later on, when the speculator will have to buy back. But dealers in the market point out that it is by no means certain that this will prove a source of strength, as it is possible that a portion of the silver will be shipped from India. The Continent has likewise been a source of weakness, owing to the further offerings from that quarter.

China has been the chief mainstay of the market,

owing to the demand from the Chinese banks. But the support that has been coming from these institutions is uncertain, and therefore precarious. The banks are by no means keen buyers, and this being so the support they give is not to be greatly relied upon, especially as there is no improvement in the Chinese export trade. Taking a survey of these uncertain elements—viz., speculation in India, uncertain support from China, the American exchange, the little demand from other sources, the possibilities of further offerings from the Continent and the uncertain exports from Mexico—it will be seen that the influences at work now, and which will continue to operate, make the immediate prospect unreliable.

On the other hand, as is pointed out by Messrs. Samuel Montagu in their weekly circular, there should be little risk, of any important set-back in the world-price so long as the United States is a buyer at a dollar the ounce. But the same authorities simultaneously point out that the London quotation will be influenced

by the course of the American exchange, a factor of great complexity. Opinions greatly differ in the foreign exchange market with regard to the future of the American exchange and the extent to which it has been affected by the preparations made by France towards the repayment of her portion of the Anglo-French loan, as distinct from the actual trade position between Great Britain and America.

If it is not possible to see into the immediate future, because of the complex influences that affect the silver market, it is not possible to see more distantly ahead. The price will depend upon future supplies, and Mexico is the principal key to this. There may come a time when supplies from Mexico will swamp the market, and should that time come then we may see a low price for the metal again, and a permanent low price. Much, therefore, depends upon Mexico in the years ahead of us, and in the meantime the price will continue to be swayed by unstable and arbitrary factors.—“Financier and Bullionist.”

International Mine-Rescue and First-Aid Field Competitions, Ladysmith, B. C.

A Suggestion for Standardized Breathing Apparatus.

The International Mine Rescue and First Aid Field Competitions held yesterday at Ladysmith under the auspices of the Vancouver Island Mine Safety Association was a success in point of attendance and in regard to the keenness of the competitions. It also was outstanding in the class of work done by participants in both forms of contest, it being demonstrated that the coal miners of British Columbia and of the State of Washington are maintaining a high standard of efficiency in the work so necessary for the preservation and protection of the lives of underground workers and of property.

In the Mine Rescue Competition for the championship shield the Newcastle Team, Pacific Coast Coal Mining Co., Ltd., State of Washington, and the Laird Team, Canadian Western Fuel Co., Nanaimo, both made a score of 94 per cent. In the effort to decide the draw between the Newcastle team, Pacific Coast Mining Co., Ltd., Washington, and the Laird Team, Canadian Western Fuel Co., Nanaimo, B. C., for the Pacific Northwest Championship, the contestants again received an equal percentage. This time both went through the work perfectly. The judges were in a quandry in the endeavor to find a way out of the deadlock. Finally it was agreed that the cup shall remain in Nanaimo for six months and go to the other side for the remainder of the year and that each of the competitors of both teams shall receive medals. This is the first time in the recollection of British Columbia coal miners that there has been so close a struggle in Mine Rescue Competition.

There also was a tie for third place, the Cumberland (Canadian Collieries (D) Lad.) and the Cassidy (Granby Consolidated Mining Smelting and Power Co.) have made a score of 90 per cent. The Ladysmith (C. C. D. Ltd.) and Fernie (Crow's Nest Pass Coal Co. Ltd.) teams were tied for fifth place with 88 per

cent. The Carbonado Mine team (S. of W.) had a score of 83.1 while the Michel Team was disqualified. Two of the judges were Messrs. Bagley (Washington Chief Inspector of Mines) and Strachan (Inspector of Mines, Fernie District), while the third was a representative of the U. S. Bureau of Mines.

The First Aid results follow:

Department of Mines Cup: 1, Nanaimo; 2, Cumberland.

Coulson Cup: 1, Cumberland; 2, Cumberland.

Open Competition: 1, Nanaimo; 2, Cumberland.

One Man Event: 1, Wm. Jones, patient, Toman, Newcastle, Wn. 2, Barton, patient, Thompson, Nanaimo.

Two Man Event: 1, Carruthers, Neave and Wilson, Nanaimo. 2, Williams, Taylor and Franceschini.

Juvenile Event, Ladysmith.

Called upon to present the prizes Hon. Wm. Sloan commented on the increase of interest in Mine Rescue Work. When he first attended the competitions of a similar nature on the Island the showing was disappointing. With the advent of International Competitions, however, the spirit and earnestness of the participants had become marked and the class of work much improved. The Meets of the past several years, as a result, had been more interesting and that of this year, it would be admitted by all who witnessed it, was gratifying in every respect.

Mine Rescue Work was important both for the safeguarding of life and of property and the high standard of efficiency displayed by the competing teams was a matter for congratulation. So long as the rescue teams were well equipped, and their members were kept in touch with the latest developments in the work, the officers and members of the Vancouver Island Mine Safety Association, as well as of similar British Columbia and Washington State organizations, could take satisfaction in the realization of the performance of an important and necessary duty. Mr. Sloan re-

ferred in congratulatory terms to the good work of the judges of the Mine Rescue Contest as well as that of the doctors who had come, some of them a considerable distance, to judge the First-Aid Competitions.

Reverting to the Mine Rescue features of the Meet the Minister spoke of the recent improvements in the apparatus in use, referred to the progress constantly being made in this direction, and commented on the recent accident at the Back Diamond Mine, Pacific Coast Coal Mining Co. Ltd., State of Washington, as having given the work an unfortunate set-back. The Chief Inspector of Mines for British Columbia, Mr. McGregor, had been sent to the scene of the occurrence to investigate and report. He had been courteously received by Mr. Bagley, State Inspector of Mines, and granted every facilitate for the performance of his duty. Those interested in Mine Rescue Work were familiar with Mr. McGregor's report which had been issued in pamphlet form by the Department of Mines. It showed, briefly, that the members of the Rescue Team who had perished had gone underground, and into workings exceptionally dangerous, without an adequate supply of oxygen. The result was that two members of the first team to enter the Mine, both of whom were members of last year's champion team, had succumbed and later one member of the rescuing team from Burnett had lost his life. The members of the two teams had been provided with apparatus which varied as to type and which functioned differently. The disaster was particularly unfortunate because it was absolutely uncalled for, there being no necessity for a team engaged in practice to enter into seriously dangerous surroundings.

The lesson taught by this occurrence was the need for the standardization of mine rescue equipment. Mr. Sloan stated that he had taken this matter up with the Bureau of Mines, Washington D. C. with a view to the securing of joint action towards the adoption of a uniform instrument for the use of Mine Rescue Teams in connection with coal mines on this continent. His suggestion was that there should be a Conference, held either at Washington or at Pittsburg, the latter being the point where the American Mine Rescue Work was centralized, for the discussion of this question. This gathering, no doubt, would be attended by all interested parties both of Canada and the United States and Mr. Sloan felt sure that good results would be obtained. If it were found practicable to adopt a standard apparatus for the two countries it would mean the elimination of the present variety of types, all of which possessed some special merits, and the substitution of something incorporating the best points of all with which the miners in all coal mining fields could and would become familiar. In the event of an emergency, under such circumstances, there would be no question of the knowledge of members of Mine Rescue Team. They would find an apparatus ready for their use with which they were accustomed to work and in which they had confidence.

Personally Mr. Sloan felt keen interest in Mine Rescue Work and he asserted that he had under consideration a policy which would have the effect of rendering further encouragement and stimulus to it in connection with the working mines of this Province.

TORONTO NOTES.

Le Pas Has Great Mining Promise.

Mr. B. A. C. Craig, mining engineer, who has just returned from a tour of the Le Pas country, Northern Manitoba, states that he is confident that from a mining standpoint, the entire district has great promise. "Manitoba has the same, or similar mineral formations that Ontario has," he said, "and has already a partially developed copper area that is much more extensive and much richer than any copper area so far found in Ontario." Large deposits of amber east of the Churchill are owned by Mr. Craig, and his last trip was to investigate the extent and quality of his claims. "I don't anticipate any great output of block amber," he said, "as the deposits do not show much promise in that direction. But it can probably be used for making pressed amber and high class varnish which will withstand heat." What is needed to develop the mining assets of Manitoba is first of all an accurate survey, and in the opinion of Mr. Craig this can best be done by aeroplane photography. The other requirement is technical skill and this will be attracted to the district by the large copper deposits. "When these two essentials are introduced you may look for great and rapid development in the mining industry in Northern Manitoba," said Mr. Craig. "They are sinking on the famous Flin Flon property south of the Hudson Bay Railway right now, and it is showing up enormous quantities of solid sulphite of copper. Diamond drilling has also been done, so that there would be no doubt as to the enormous size of the deposit and they have values in sight now of over \$200,000,000. Labor is very scarce in the mining centres there now and every available man is taken on at good wages."

A party of geologists headed by Mr. Cyril Knight and including Messrs. Hill and Pickard of the Haileybury Mining School were in Kirkland Lake over the last week-end, visiting the various properties. The party was favorably impressed with everything in general and showed much interest in the work that is going on in the camp.

GASOLENE CONSUMPTION EXCEEDS PRODUCTION.

U. S. Bureau of Mines report on petroleum for June and six months of 1920 shows operations of 307 refineries in June with daily capacity of 1,601,295 barrels, against 292 refineries and daily capacity of 1,356,355 barrels in December, 1919. Refineries ran at 73 per cent. of rated capacity against 77 per cent. in December. June production of gasolene totalled 415,159,911 gallons while consumption totalled 427,242,862 gallons. Six months gasolene production was approximately 13 per cent. greater than that for corresponding period of 1919, while consumption for that period totalled 1,845,775,925 gallons, or 28 per cent. greater than six months of last year.

As Herbert Hoover has recently pointed out, a national policy towards mining is a differing and a better thing than nationalization of mines. A National Policy towards coal mining, for example, is what Canada has never had. Nationalization of mines would bring about that stultification of individual effort and associated nepotism that seems inseparable from government control in a country having a popularly elected government.

Core Drilling Inside a Glacier

By A. S. WILLIAMSON *

The Lucky Four Mines, Laidlaw, British Columbia, are situated 16 miles south of the Fraser River at the headwaters of Jones Creek on the Cheam Range. The outcrop that the property was sold on is at an altitude of 5750 feet on a glacier.

I got instructions on the 1st of February, 1919, to take in a Diamond Drill and 20 tons of supplies and start operations.

First we located a trail by blazing through the timber and once above timber line we used small flags. We had two miles of trail above the timber line. Next was the hardest problem, how to make a snow trail that would stand up under horses, as we had 12 inches of snow at the Fraser River, 13 feet at Jones Lake, 2000 feet altitude, and 30 feet at the place we picked out for a camp site—5550 feet up on a ridge.

I had received all kinds of suggestions how to get in. Some said it could not be done. However, I got the trail gang to tramp solid the trail in one-hundred-yard sections, then followed up with a light horse and go-devil, the go-devil made entirely of vine-maple with the runners curved towards the center in the front so that it would follow the curves of the trail without cutting into the snow on the sides. The trail was not over 18 inches wide. After two or three trips with the go-devil loaded up to 300 pounds we could load up to 700 or 800 pounds with one horse. We established camps every five miles and got in with our supplies, without any difficulty, to our camp site within one mile of the mine, which was 1000 feet or over above camp on the glacier.

We dug down through thirty feet of snow to bed-rock and put down three tents—14x16—with split cedar for floors and four-foot shakes all around for sides—making a very comfortable camp indeed.

The next question was, "How were we going to get the diamond drill with its equipment onto the glacier?" This included three poles for the tripod—23 feet long, gasoline, tools, etc., including a zinc tank 5 x 1/2 x 3 feet to melt snow in order to get water for the drill, as there was no water on the glacier.

By this time the snow was getting very soft and I found it impossible to make a trail that would hold up horses from the camp to the mine. So we tramped the trail good, switch-backing up over the glacier, then put 14 men on a rope attached to the go-devil and took the drill up in two sections—first the drill portion and then the gasoline engine. Also the supplies and heavier portions by go-devil. The gasoline we back-packed.

While the trail was being built and supplies coming up we were digging on a ridge below the outcrop for a place to put the drill up. This was accomplished by digging out a cut across the ridge five feet wide by 35 feet deep and 50 feet long, afterwards cutting out a space 25 x 25 feet to place the drill in.

After getting the drill set up we made it as comfortable as possible by putting a large tarpaulin over the tripod and machinery, very much like an Indian tepee, heated with oil stoves, which also melted the snow in the big tank.

Work was started drilling with three shifts under fairly comfortable conditions. But after drilling one hole 700 feet we attempted to drill a hole to the right

at an angle of 15 degrees to the west of the first hole, but after going 60 feet we ran into glacial ice. Repeating the performance to the east, in 35 feet we ran into ice again.

Now there was no possible place to approach the ore body except at the cost of going down the mountain several hundred feet and putting in holes, the shortest of which would have been 1000 feet. So we decided to try putting the drill into the glacier within two or three hundred feet of the ore body, and cross-cutting it.

In order to find out how deep the ice was and what the bedrock looked like, I drove a tunnel 4 x 6 feet through the ice to bedrock, a distance of 80 feet. Now knowing the thickness of the ice and the slope of the bedrock (about 30 degrees), I started an open cut four feet wide paralleling the tunnel.

After driving 80 feet, bed-rock was struck. There I cut out a place for the drill 22 x 22 feet, leveling off the bedrock in order to give a foundation for the drill. At this point there was 50 feet of solid ice above us on four sides.

Now arose the question of getting the drill up to its new position from its old setup about 400 feet below. We decided that we would make the drill pull itself up over the glacier. So we rigged up a set of blocks and tackles and put in "dead men" every 50 feet in a trench in the ice. Using the carriage on which the drill and gas engine were placed as a sleigh, inside of two hours the whole outfit, drill and engine, was standing on the dump ready to haul up a go-devil loaded with gasoline and later all the supplies from the old location. Once this was accomplished we had the drill and engine pull itself right into the face and in two days we were drilling away in good shape in the most unique location that a drill ever was in.

One of the Provincial Government Engineers, who came up one day after climbing up the glacier, and on going in to see the drill said, "Well, I have seen lots of glaciers, but this is the first time I have ever seen the guts of one."

We drilled over one hundred feet from this position with satisfactory results in drilling, using the Sullivan Class No. 3 ("S") Diamond Drill with an ordinary bit. We did not cut through any ice with our drilling; we were just prospecting. After the work was done we pulled the drill out to the surface of the glacier, greased it thoroughly, covering all with a heavy tarpaulin, where we left it in cold storage until needed elsewhere on the property.—"Iron Mine & Quarry."

TORONTO COAL PRICES.

Toronto, Sept. 15.—Local dealers look for a slight easing off in the hard coal situation owing to the calling off of the vacation strike among the hard coal people in the coal mining districts. It was stated during the week that bituminous coal shipments to Toronto were short a number of expected shipments as a result of the embargo west of Rochester and Pittsburg Railway. This line will be tied up for a few days but shipments will be continued over the other lines. It is expected that as the result of adjustments of labor difficulties in the mining areas coal shipments will be normal in another week. Hard coal is quoted at from \$8.00 to \$18.00 gross tons at mines, American funds: mine run \$14.25 to \$14.50 f. o. b. Toronto and smokeless coal \$14.50 to \$15.00.

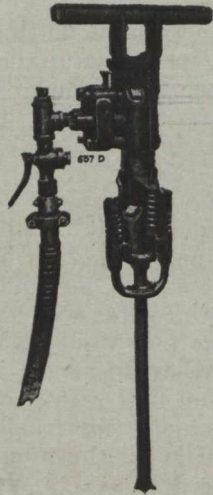
* Supt. Lucky Four Mines, 322 6th St. West, North Vancouver, B. C.

NEW TYPE OF LIGHT AIR-DRILL FOR MINE AND QUARRY USE.

The development of pneumatic mining and quarrying tools has been so rapid, and their performance latterly so efficient, that it is but natural they should now be regarded as having reached such a state of perfection that radical changes or improvements are, generally speaking, no longer expected.

Any yet, notwithstanding this popular notion, The Denver Rock Drill Manufacturing Company, which has for quite a number of years been in the forefront of rock drill progress, has recently developed a new type of light mining and quarrying drill which, it is claimed, marks an advance in the progress of air drill manufacture that has seldom, if ever, been equalled by any single achievement.

This new type of drill is built in three models, known respectively as Models NA-90, NRW-93 and NRD-95; the first named being a "dry" Auger Drill, especially designed for work in coal, iron and other soft forma-



Waugh "90" Drill.

tions; the second, a combination "wet" and "dry" rock drill efficiently serviceable in all kinds of rock and under all conditions, either above or below ground; and the last named, a "dry" rock drill particularly adapted to work in wet shafts or where out-of-door conditions prevail.

All three drills are extremely light, so that they can be easily carried about, and each is operated by one man alone.

They are built throughout of the very best steels compounded and with the utmost precision.

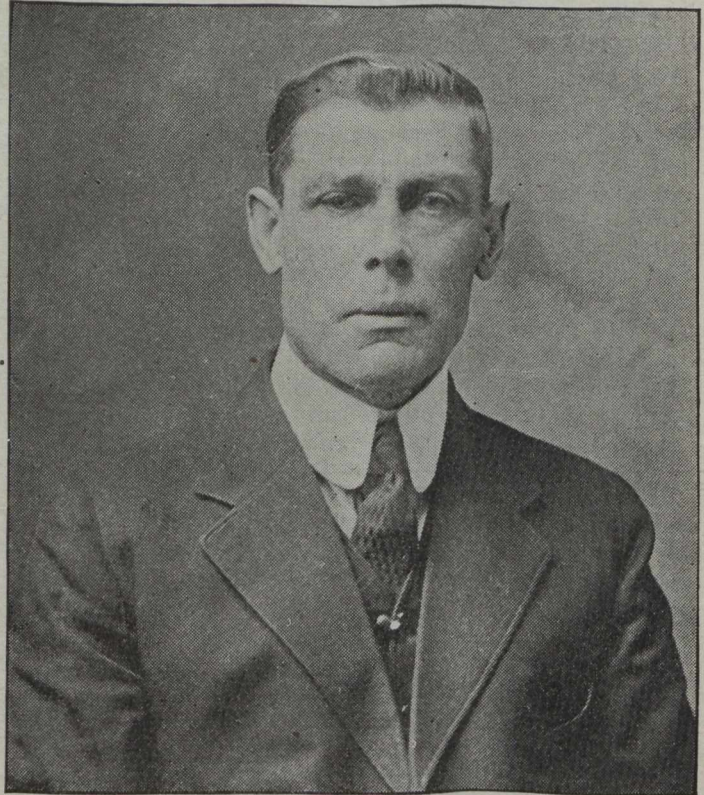
While most Waugh Drills are of the valveless type, the "Nineties" are equipped with an entirely new type of spool valve, having a positive action, which is said to be the last word in simplicity, and in efficiency as well.

The rotation mechanism is of exceptionally strong design in which stresses in both teeth and pawls are reduced to a minimum.

Lubrication is effected by pulsations of air which gradually feed the oil from a reservoir at the side of the cylinder into all parts of the machine.

The manufacturers state that comparative tests conclusively prove these "Ninety" drills to be much superior, more powerful and more efficient, at all pressures, than other drills of their general type and weight,

and express themselves as feeling gratified at being able to make such a substantial contribution to cost reduction and stimulation of production in mining and quarrying at a time when the country stands in greatest need of labor-saving improvements in machinery used in these industries.



MR. P. T. PRENDERGAST.

Assistant District Superintendent, Dominion Coal Company, Glace Bay.

Who read an informative and widely-quoted paper on "Conservation and Drawing of Mine Timber", at the May Meeting of the Mining Society of Nova Scotia.

PRECIOUS STONES IN EGYPT.

According to gossip a company may shortly be formed for the purpose of exploiting an area supposed to be the origin of the famous emeralds so frequently mentioned in Egyptian records. It would appear that in the time of the Pharaohs these stones were fairly plentiful—sufficiently so, in fact, for no specific mention being made as to where they came from. There have been from time to time numerous attempts to solve the mystery, which has been kept alive by some of the gems being occasionally found in possession of wandering Bedouin tribes, identical with the ancient jewels. It was generally supposed that somewhere in the wild desert country west of the Red Sea existed the mines from which the stones were extracted, but the efforts of several expeditions failed to discover the wanted locality. The Government of the time occasionally took a hand in the ventures, and the leading officials were not above joining in the searches, which, however, all proved unsuccessful.

One of the most important efforts to trace the origin of the ancient stones was made about a century ago by Mahomet Ali, who equipped a Frenchman, named Calliard, who after a vain search of many months at

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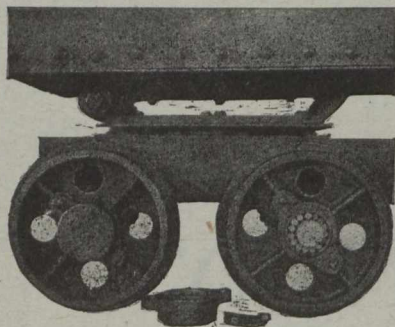
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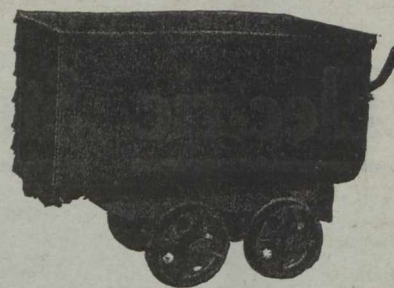
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Same car as shown above, but in Dumping position.



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last had to reluctantly give up the quest. Less authoritative expeditions have been formed since then, but it is only within the last few months that something tangible has been reported, a British expedition having been said to have discovered the old workings. They are reported to be in a desolate mountain range, running west of, and parallel to, the Red Sea, between the 24th and 25th degrees north latitude.

The locality shows signs of having at one time been the centre of a huge population of slaves, while the sides of the mountains have been pierced by long tunnels, enlarged here and there into great mining chambers. The workings are said to be big enough to accommodate several hundred miners. To judge from the character of the work and the primitive tools which are scattered about in the vicinity the age of the mines would seem to be about 2,500 years. It is interesting that some of the workings are supported by timber props, which are reported to be still sound and serviceable, due, no doubt, to the dry atmosphere. The indications appear to point to some sudden abandonment of the work, the miners having apparently thrown down their tools and fled. The district is regarded by the scanty wandering tribes as the abode of evil spirits, which may account for the mines having been undisturbed for so many ages.

It is said that the exploring party has found quantities of the gems in a rough state, many being of large size. The stones are reported to be identical with those which have been found on mummies and in the ruins of the ancient cities of Egypt. Further news about the discoveries will be awaited with some interest. That the difficulties connected with transport should not be insurmountable is shown by the signs of a one-time large native population, which must have

existed in spite of the scarcity of supplies and water, the latter appearing to have been husbanded in tanks cut in the solid rock.—W.I.L. in "Financier and Bullionist".

Demand for Gypsum Plaster in Cuba

Major H. A. Chisholm, 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 quite important imports of gypsum, crude and products were exported to the value of \$140,235. There were quite important import 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.

The Canadian Miners' Buying Directory.

Acetylene Gas:

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

A.C. Units:

MacGovern & Co.

Agitators:

The Dorr Co.

Air Hoists:

Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.

Alloy and Carbon Tool Steel:

H. A. Drury Co., Ltd.
International High Speed Steel Co., Rockaway, N.J.

Alternators:

MacGovern & Co.

Spielman Agencies, Regd.

Aluminium:**Amalgamators:**

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

Antimony:

Canada Metal Co.

Antimonial Lead:

Pennsylvania Smelting Co.

Arrester, Locomotive Spark:

Hendrick Manufacturing Co.

Arsenic White Lead:

Coniagas Reduction Co.

Assayers' and Chemists' Supplies:

Dominion Engineering & Inspection Co.
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.

Ash Conveyors:

Canadian Link-Belt Company

Ashes Handling Machinery:

Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.

Assayers and Chemists:

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

Asbestos:

Everitt & Co.

Balls:

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

Ball Mills:

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

Balances—Kousser:

Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Rabbit 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 (Coniagas Red):

Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:

Diamond Drill Carbon Co.

Boxes, Cable Junction:

Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:

Diamond Drill Carbon Co.

Brazilian Mica:

Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)

Hendrick Manufacturing Co.

Brazilian Ballas:

Diamond Drill Carbon Co.

Brazilian Rock Crystal:

Diamond Drill Carbon Co.

Brazilian Tourmalines:

Diamond Drill Carbon Co.

Brazilian Aquamarines:

Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:

Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:

Hendrick Manufacturing Co.

Buckets:

Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
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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 vale, Que.

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 adian Mining Journal.

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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 Ores:**
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 White & 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
Osborn, Sam'l (Canada) Limited.
- Crushers:**
Swedish Steel & Importing Co., Ltd.
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.
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Mussens, Limited

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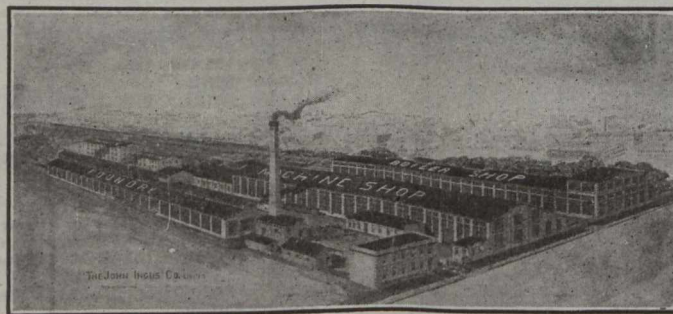
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Canadian Miners' Buying Directory.—(Continued)

- 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.
Conlagas 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 Dorr Co.
- Metallurgical Machinery:**
General Engineering Co., New York
The Dorr Co.
The Mine & Smelter Supply Co.
- Metal Work, Heavy Plates:**
Canada Chicago Bridge & Iron Works
- Mica:**
Everitt & Co.
Diamond Drill Carbon Co.
- Mining Engineers:**
Hersey, M. Co., Ltd.
- Mining Drill Steel:**
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
International High Speed Steel Co., Rockaway, N.
- Mining Requisites:**
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
- Mining Ropes:**
Dominion Wire Rope Co., Ltd.
- Mine Surveying Instruments:**
C. L. Berger & Sons
- Molybdenite:**
Everitt & Co.
- Monel Metal (Wire, Rod, Sheet and Foundry Metal):**
International Nickel Co.
- Motors:**
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
MacGovern & Co.
The Mine & Smelter Supply Co.
The Wabi Iron Works

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

Nails:
Canada Metal Co

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

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

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

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

Oil Analysts:
Constant, C. L. Co.

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

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

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

Pillow Blocks:
Canadian Link-Belt Company

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

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

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

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

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

Platinum Refiners:
Goldsmith Bros.

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

Powder:
Giant Powder Company of Canada, Ltd.

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

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

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

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

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

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

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

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

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

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

Pumps—Diaphragm
The Dorr Company

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

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

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

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

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

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

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

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

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

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:

Allan, Whyte & Co.
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.
Mussens, Limited
The Wabi Iron Works

Samplers:

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

Scales—(all kinds):

Canadian Fairbanks-Morse Co., Ltd.

Screens:

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

Screens—Cross Patent Flanged Lip:

Hendrick Mfg. Co.

Screens—Perforated Metal:

Hendrick Mfg. Co.

Screens—Shaking:

Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Screens—Revolving:

Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Scheelite:

Everitt & Co.

Separators:

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

Shaft Contractors:

Hendrick Mfg. Co.

Sheet Metal Work:

Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:

Hendrick Mfg. Co.

Shoes and Dies:

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

Shovels—Steam:

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

Ship Bunkering Equipment:

Canadian Mead-Morrison Co., Limited.

Silent Chain:

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

Silent and Steel Roller:

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

Slime:

Coniagas Reduction Co.

Saline Refiners:

Goldsmith Bros.

Smelters:

Goldsmith Bros.

Sledges:

Canada Foundries & Forgings, Ltd.

Smoke Stacks:

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

Solder—Bar and Wire:

Hoyt Metal Company.

Special Machinery:

John Inglis Co., Ltd.

Spelter:

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

Sprockets:

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

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

Structural Steel Work (Light):

Hendrick Mfg. Co.

Stone Breakers:

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

Sulphate of Copper:

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

Sulphate of Nickel:

The Mond Nickel Co., Ltd.

Surveying Instruments:

C. L. Berger

Switches and Switch Stand:

Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:

John J. Gartshore

Tables—Concentrating:

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

Tanks:

R. T. Gilman & Co.

Tanks—Acid:

Canadian Chicago Bridge & Iron Works
The Mine & Smelter Supply Co.

Tanks (Wooden):

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

Tanks—Cyanide, Etc.:

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

Tanks—Steel:

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

Tanks—Oil Storage:

Canadian Chicago Bridge & Iron Works
The Mine & Smelter Supply Co.

Tanks (water) and Steel Towers:

Canadian Fairbanks-Morse Co., Ltd.
Canadian Chicago 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 Apparatus:**
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:**
MacGovern & Co.
- Turbines—Steam:**
Fraser & Chalmers of Canada, Ltd.
MacGovern & Co.
- Twincones:**
Canada Foundries & Forgings, Ltd.
- Uranium:**
Everitt & Co.
- Weighing Larries:**
Canadian Mead-Morrison Co., Limited.
- Welding—Rod and Flux:**
Prest-O-Lite Co. of Canada, Ltd.
Imperial Brass Mfg. Co.
- Welding and Cutting—Oxy-Acetylene:**
Prest-O-Lite Co. of Canada, Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Imperial Brass Mfg. Co.
- Wheels and Axles:**
Canadian Steel Foundries, Ltd.
Hadfields, Limited
The Electric Steel & Metals Co.
The Wabi Iron Works
- Winches—Power Driven:**
Canadian Mead-Morrison Co., Limited.
- Winding Engines—Steam and Electric:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works
- Wire:**
Canada Wire & Cable Co., Ltd.
Greening, B. Wire Co.
- Wire—Bare and Insulated:**
Canada Wire & Cable Co.
- Wire Rope:**
R. T. Gilman & Co.
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.
- Zincconium:**
Everitt & Co.
- Zinc:**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Zinc Spelter:**
Canada Metal Co., Ltd.
Hoyt Metal Co., Ltd.

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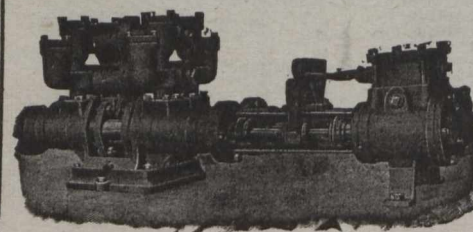
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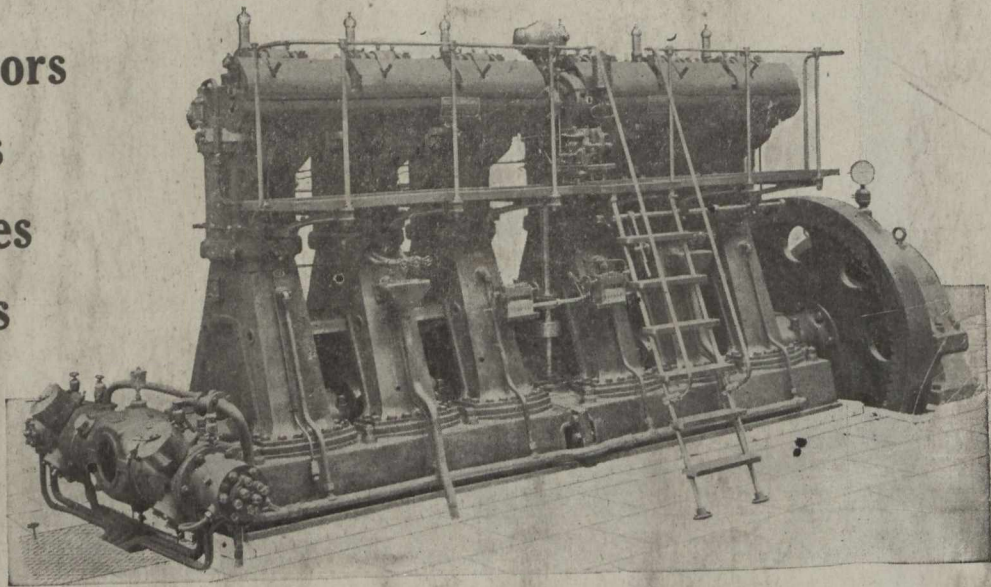
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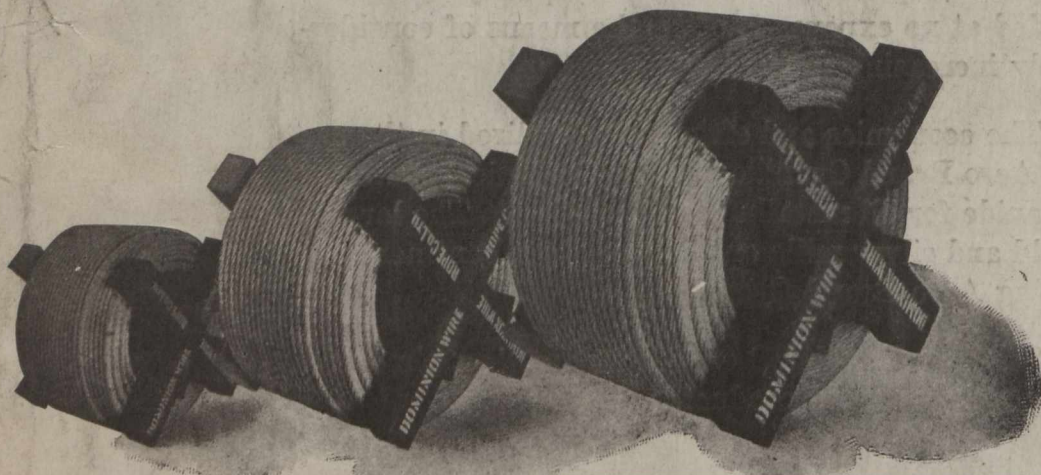
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