CANADIAN MINING JOURNAL

Vol. XLI. Gardenvale, P.Q., December 17, 1920. No. 50

HAMMER YOUR DRILL BITS

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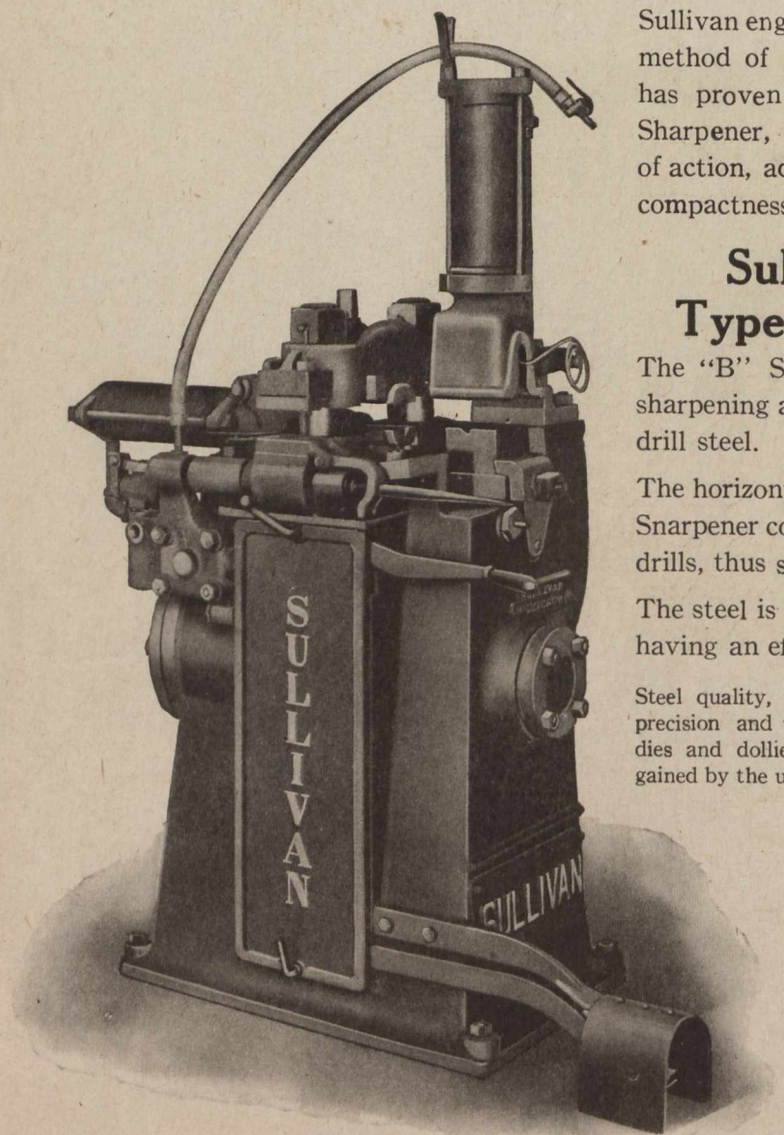

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PROVINCE OF ONTARIO

DEPARTMENT OF MINES.

HON. H. MILLS, Minister of Mines.

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Canadian Mining Journal

PUBLISHED WEEKLY.

Devoted to the Science and Practice of Mining, Metallurgy and the Allied Industries; and more particularly to their progress in Canada.

VOL. XLI. GARDENVALE, P.Q. December, 17, 1920 No. 50

CONTENTS

Pages 1029 to 1048.

Published every Friday by The Industrial and Educational Publishing Co., Limited, at the Garden City Press, Gardenvale, Que. 'Phone, Ste. Anne de Bellevue, 165.

J. J. Harpell, Managing Director.

A. S. Christie, Eastern Manager,
Room 205 Drummond Building, Montreal.
'Phone Uptown 7773.

H. W. Thompson, Western Manager,
1402 C.P.R. Building, Toronto.
'Phone Adelaide 3310.

F. E. Payson, Pacific Coast Manager,
528 Winch Building, Vancouver, B.C.
'Phone Sey. 3920.

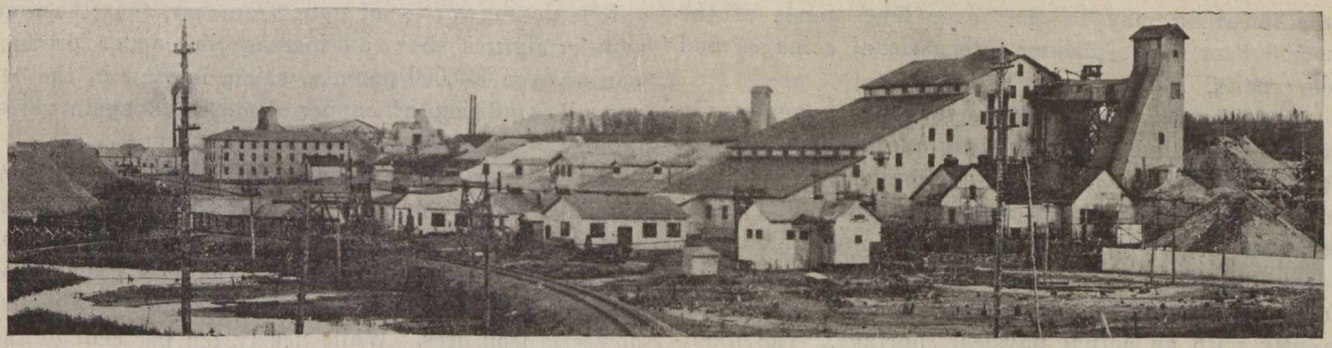
Changes in advertisements should be in the Publishers' hands ten days before the date of issue.

F. W. GRAY, M. I. Min. E., Editor,
Gardenvale, Quebec.

REGINALD E. HORE, Consulting Editor,
1403 C. P. R. Building, Toronto

The editor cordially invites readers to submit articles of practical interest which, on publication will be paid for.

Subscription to any address in Canada, United States and British Empire, $5.00 yearly. Other countries postage extra. Single copies 15 cents.



EDITORIAL

The Price of Silver and other Commodities

The collapse of the price of silver to below sixty cents per ounce in New York, is a most serious blow to silver producers in Canada. During the war period, and for some time after the close of hostilities, it looked as if the return of silver to whatever may turn out to be its post-war normal level would be a gradual process reflecting the restoration of the gold standard, and it appears probable that the price of silver has now fallen below its intrinsic value, as has also fallen the price of other commodities, such as copper, sugar, lead and tin. The price of a number of commodities seems not only to be scraping bottom, but to have gone below bottom, if that term is used to express cost of production.

Various explanations are offered for the slump in silver value. One is that sixteen major governments in Europe have discontinued the use of silver in coinage, and are offering the metal for sale that is thereby released.

The factor that is probably most responsible for the lack of demand for silver is the desperate state of political affairs, the poverty, hunger and disease, and the entirely miserable condition of a territory that stretches from the Carpathians to the Sea of Okhotsh and from Ceylon to Archangel. The condition of China in particular is one of famine, and that great absorber of silver is now desirous to part with silver for bread.

The London "Financier" contains the first of a series of articles on the complexities of China's silver currency, which, as it throws some light on the silver market, is reproduced in part in this issue.

The writer of this article, Mr. T. Bowen Partington, speaks Chinese languages, and is said to have a unique knowledge of his subject. In view of what has happened this week to the price of silver there seems some incongruity in Mr. Partington's insistence on China's great need of silver, and his statement that the world's available supplies of silver metal are "getting scarcer and dearer every day."

So far as China is concerned, and that country is one of the most important in the world when the price of silver is in question, the situation appears to approximate to national bankruptcy occasioned by calamitous famine, and aggravated by political disunion. Under such circumstances, the sale rather than the purchase of silver is indicated.

India's financial position is weak, and political disunion is again an unsettling factor.

Turkestan and European and Asiatic Russia seem likely to slip back into a dark age, and political peace with material prosperity are not in sight.

One hopeful feature about the Chinese situation is the formation of the Chinese Loan Consortium, a combination of interests representing the United States, Great Britain, France and Japan, formed for the assistance of China's internal development in communication and industry. As this Consortium has the approval of the Governments of the countries named, very substantial assistance to China will be forthcoming, and a combined effort will replace international rivalries. This development is a cheering one, and should in particular help the silver market to recover.

The position of silver resembles that of many other commodities, including articles of clothing and food, that are now being offered below the cost of production, even if that production cost is reckoned upon pre-war figures. This condition has come about despite an actual shortage of many commodities, and arises from sheer inability of nations to pay their way.

The world is nowadays so small that the sickness of one nation weakens all other nations, and while it is flattering to national pride to have currencies at a high premium, if that premium becomes too high it opposes an insuperable barrier to trade, and extension of credits and even barter may have to be resorted to on a scale not yet apprehended. The reported decision of Bolshevik financiers to abolish money has been greeted with much derision, but its

real meaning may be that over large parts of the world barter is replacing international coinages and currencies.

Reduction of silver production must necessarily follow a continuance of existing quotation levels, and the silver mines will have to follow the same procedure of curtailment and conservation of liquid assets that has been adopted by miners of copper, zinc, lead and tin. As is the case with steel, wheat, cotton and other staples there exists a lack of demand concurrently with an actual physical shortage. The likelihood of an abrupt upturn of demand is therefore not a distant thing, but it all depends on the Old World and the Far East.

The participation of Canadian delegates in the councils of European nations is therefore a proper proceeding, and the sooner it is found possible for the United States also to take similar action the better it will be for the world at large and for North American commercial prosperity. Mr. Rowell at Geneva told no less than the truth when he said that Canadian lives had been sacrificed to European stupidity, but the harshness of truth will not alter the fact that if Europe is sick Canada and the United States will suffer, and that assistance extended to Europe is also self-help at home in North America.

METALLIFEROUS PRODUCTION OF ONTARIO.

The figures issued by the Ontario Bureau of Mines showing the metalliferous production of the Province for the first nine months of 1920 are pleasant reading, and show that the production for the whole year 1920 will be much larger in quantity and in value of the minerals marketed than the figures of the first quarter promised.

Silver, to the end of September, more than held its own, notwithstanding that at the end of March it was 800,000 ounces below the record of 1919. Later developments will tend to restrict production during the closing quarter, but, when the year's figures are complete they will prove relatively satisfactory.

Gold production in Ontario has features that permit of much optimism, and an increase of 58,000 ounces over the corresponding period of 1919, when compared with the record of other gold-producing countries, is a matter for genuine congratulation. Commodity prices are decreasing, labor is becoming more available and more efficient, and the need of Canada for new gold is clamant and insistent. Production of gold in the concluding quarter of the year should give 1920 a further lead over 1919. The conditions seem propitious, and expansion of gold production in Ontario seems a very probable feature of the coming months.

The imposing increase in the yield of platinum metals, nickel oxide and cobalt oxide, is a result of refining in Canada, and is so satisfactory that there will be general agreement that a little more of this kind of thing would be very welcome.

It is not unworthy of note, moreover, that the nine months figures show an increase in copper production of over 500,000 pounds, which, in view of the depressed condition of copper demand, is again satisfactory.

The comparison between the amount of iron ore mined in Ontario and that used at Ontario blast-furnaces is not pleasing, but it has at least this feature of satisfaction for Ontario that it is the only province of Canada that is at this time even attempting to utilize domestic iron ores. While nearly ten per cent of the iron-ore used in Ontario was of domestic origin, the figure for all Canada is about four per cent. That is to say, Ontario is doing more than twice as well as any other province in smelting domestic ore.

The total value of Ontario's mineral production for nine months exceeds that of 1919 by some eight million dollars, and indications are that Ontario will bulk even larger in the total figures of the Dominion for 1920 than was the case in 1919.

"INDUSTRIAL LEADERSHIP AND THE MANAGER."

Our contemporary, "Mining and Scientific Press" contains no more interesting feature than its correspondence columns, which, thanks to the magnetic personality of the Editor, are able to attract thoughtfull communications from men who have really something to say.

A recent issue contains two strikingly constracted viewpoints from Northern Ontario — a circumstance that provokes to breach of the last Commandment—namely, from Mr. C. V. Corless of Coniston, and Mr. F. J. Bourne of Cobalt, dealing with labor's share of produced wealth and the human factor in management.

Mr. Bourne expresses a viewpoint that has unfortunately only too often become the settled conviction of managing executives who have found their attempts at understanding and conciliation interpreted by labor unions as signs of weakness, and it is not possible to deny that in recent times some aspects of trades unionism have borne all the earmarks of selfishness usually attributed to employing capitalists. The short memories of labor unionists, and their quick ingratitude is pointed out by Mr. Bourne, who instances Lloyd George and the Welsh miners as an example. Ingratitude is a characteristic of labor union politics because it is a characteristic of mob physchology, and must be expressed in all forms of democratic leadership. No persons suffer so severely from the ingratitude of labor unions as their own chosen leaders, and it is an old story that men kick down the ladder up which they have climbed. The well-meaning executive often emerges from his attempts at conciliation a chagrined and disillusioned man, ground between the clamant demands of his subordinates and the unyielding, non-understanding attitude of his directorate. Mr.

Bourne's conclusion is that labor can only be bargained with on terms of equal strength. "The solution is for all the employers to organise and meet organised labor on its own ground."

Whether this is a solution or not would form matter for much debate, but it must be admitted that it foreshadows a great danger, for it is a course that at once devides the citizens of a democratically governed country into two irreconcileable camps, and emphasises the principle that guides the O.B.U., namely that any member of a labor union "who enters into rela- " tions, or bargains, or receives any favor from the " bosses, is a traitor to the working class."

A line-up of organised labor and the representatives of employing capital was seen at Ottawa some fourteen months ago, and it was neither a helpful nor an edifying spectacle.

The experienced executive knows that the last thing he should invite is a crisis, or any situation that forces either party to a dispute to fight on the issue of a principle. The development of crises are by all means to be prevented, as is, we earnestly believe, any attempt to line up the battle array of those who work for wages, and those who work for interest and profits upon invested capital.

Mr. Corless proposes another way, that of the leaven and the lump. He supports Mr. Sam. Lewisohn's plea for executives that will act as a buffer between capital and labor, men that can mediate between the greed and mulishness that too often are characteristics shared pretty equally by the employee and the directorate. Taken in the mass the ideality and humaneness of the employer will not be found to rank higher than that of his employees, especially when conveyed through the chilling and dehumanizing channels of corporation procedure.

Mr. Corless believes that the world war closed an epoch of mechanical development of industrialism, but that in the epoch on which we are entering, "the " development and application of the sciences that " deal with human beings and their organization into " industrial and other social groups—economics, civics, " ethics, sociology, psychology, industrial organiza- " tion, history, and the like—will receive steadily in- " creasing attention." It is a propitious horoscope, and a thoroughly modern exemplification of the ancient advice to do justly, love mercy and walk with humility.

The saving grace of Mr. Corless's method is its appeal to the individual, as opposed to the agitation of a mob whether that mob be named capitalistic or proletarian. He combats the pernicious theory that brains are the monopoly of the industrial leader, and in this attitude Mr. Corless will have the support of many executives who have had occasion to measure their brains against the labor leader. "Probably the "most profound problem in industry," states Mr. Corless, "arises from the search for a method of organ- " ization that will result in enlisting in its service the " highest degree of brain-power—intelligence, good- " will and will-power—of all those engaged in it." Such an organization can only come about through the contact of individual minds. The closest contact between the minds of the workers and the minds of the employers is found in the mind of the humane and understanding executive. May his tribe increase. So far, in the annals of recent Canadian industrialism, the name of our sage of Coniston leads all the rest.

NICKEL AND COPPER.

The poor market for nickel and copper is seriously felt at Sudbury. The producers were placed in an unenviable position when the war ended suddenly with large stocks of metals in the hands of the several governments. The absorption of these stocks was slow and the general slowing down in industries this fall has added to the metal sellers difficulties. Under the circumstances it is not surprising that production is being cut down.

In the United States several well known copper mines have been closed down and others are operating with much reduced forces. Until there is a general quickening of manufacturing again we may expect little activity in nickel and copper mining centers.—R. E. H.

COAL AND IRON PREPONDERATE IN MINERAL PRODUCTION IN GREAT BRITAIN.

The value of minerals raised in the United Kingdom during 1919 (at $4.87 to the pound) was approximately $1,634,720,000. The value of the coal raised was $1,530,000,000, or 93.7 per cent of the total mineral production value.

The value of the iron ore raised in the United Kingdom in 1919 was $36,176,000.

If the production of coal and iron-ore is added they account for 96 per cent of the total.

The preponderance of the production of coal and iron is the measure of Great Britain's economic stability.

The coal and iron production of Canada contributes between 30 and 32 per cent to our total mineral production value. The question obtrudes itself, to what extent is this lamentably insignificant percentage a measure of economic instability?

Britain imports no coal. Canada imports more than she mines. To the extent that such importations are unnecessary, they are also unwise. Great Britain's coal production is 4.5 tons per capita. Canada's is 1.5 tons per capita. Reams might be written to explain away this divergence, for which excellent reasons exist, but nothing will avail in extenuation of the fact that **Canada does not mine half the coal that she should and could mine at this particular time.**

CORRESPONDENCE.

Sir,—

To claim that the Mines Act of Ontario formerly held place with the most satisfactory mining law of any province or state, and to at the same time accuse the same law, when enforced, with being discouraging to prospectors and investors, is something only those used to receive special privileges are able to understand.

The law that swivel chair prospectors are so strongly objecting to, has been on the statue books since 1907 and had the Bureau of Mines done its duty to the Province, by collecting this tax when due, Mr. E. J. Morrison of Haileybury would no doubt have paid his tax and remained in possession of his property and so would Teck-Hughes and others. To imply, that a law enacted by the Legislature was not intended to be applied, is in effect claiming that the express will of the peoples representatives in Parliament is not to be considered the rule by which the officials and members of the Government should be guided, or the people governed. A mining act, that states what is to be required to be done in order to secure title and hold mineral land and is enforced in every respect, is after all the best security to title for both prospectors and investors.

Personally, I consider that the Hon. H. Mills has made a good beginning and wish to recommend, for his next considerations, Sections 183a and 192 The Mining Act of Ontario.

The limitations imposed upon the prospector, in the number of claims he can stake during the year for himself and others covers an area sufficiently large to include within that area any one of the following Northern Ontario mines,—The Dome, Dome-Lake, Dome Extension, Davidson, La-Rose, Peterson-Lake Schumacher, Teck-Hughes, Temiskaming, Tough-Oakes.

I would think, that if the above mentioned companies can get along with less than 360 acres each surely the prospector and his grubstaking partner can.

L. O. HEDLUND.

Gowganda, Dec. 7th, 1920.

The Bonusing of Iron Ore Mining in Ontario.

Port Arthur, Ont., December 11th, 1920.

Editor, Canadian Mining Journal,

Sir:—

In your issue of December 3rd, 1920, there was an article by Mr. J. J. O'Connor commenting favorably on the Conference of members of the Port Arthur and Fort William Boards of Trade, and the Hon. Harry Mills, Minister of Mines, on November 27th.

As the writer was one of the delegates mentioned, I would like to take up the reasons which called for this Conference, and the procedure advocated by the Minister of Mines for the development of the iron resources of Northern Ontario.

About a week before this Conference was called, the Minister of Mines, in an address to the Convention of the Municipalities held in Fort William, made the statement that he did not think a bonus was the most efficient plan for the working out of the problem. In his opinion electric smelting was a solution of the treatment of our low-grade iron ores. Electrical power at $10.00 or $12.00 H.P. per annum would, he claimed, compete with coal at present prices, and this procedure would really be the more efficient plan for the problem in hand. When asked where the $10.00 or $12.00 power was to come from, Mr. Mills was at a loss for an answer to the question, and apparently did not care to enter into any discussion on the matter.

When the Board of Trade delegates met him, he stated that while as Minister of Mines he would not advise against a bonus, his personal opinion was strongly aginst the granting of a bonus in any form, and he thought some other plan could be worked out that would be more efficient and more permanent than a bonus of iron ores for a more or less extended term of years. The writer asked if he was referring to electrical smelting as mentioned in his address at the Conference. I also pointed out that in a conference with American engineers in 1914, I took up the question of electrical smelting with these men, who were responsible consulting engineers for large iron companies. Their reply was a question, "What is power worth in Canada?" As Quebec then had the cheapest power in the Dominion I gave them $12.00 as being about the average cost of production in that Province. Their summing up was as follows:—When you can produce power at this time for $4.00 instead of $12.00, then you can consider electrical furnaces as an active factor in competition. With care I repeated this opinion to Mr. Mills, pointing out that our foremost experts declare we would want power at one-third the actual cost of production at any time, to compete with the present-day smelters.

That ended the discussion as far as electrical smelting was concerned.

The Minister then stated that he had what he considered the most efficient plan for the solution of the problem: that is a re-survey of, diamond-drilling and testing of all our iron ranges, this work to be carried on by a commission of experts who would teach us how to **mine, diamond drill, smelt, treat, refine** and **market** our ores. When the storm of commendation had passed over, one of the delegates from the Fort William Board of Trade, who had introduced himself as an engineer with practical experience in furnaces, made the suggestion that the Minister go even farther with his program, that markets should be established so that the farmer could market his ton of ore at the same time he brought in his load of wood, or a few sacks of potatoes. As the Zulus in Central Africa and the natives in the interior of India still carry their ores to the furnaces in baskets and rolls of matting, this gentleman showed that he, at least, was in favour of being progressive. I endeavoured to point out to the Minister that a survey such as he suggested would take twenty-five years to complete, and at the end of that time we would be standing exactly where we are now, but my comment was ridiculed, and the Conference was ended at that point, after the Minister being assured by the Presidents that he would have the solid backing of the Boards of Trade of both Cities.

In defense of my statement, I would like to point out just what tedious operations such surveys, drilling operations, and testing of various ores really amounts to. In 1901, I had charge of a section of the large exploring party, organized by the well known consulting engineers, Prof. Pumpelly and Prof. Smyth. This work was carried on by these men in the seasons of 1901 and 1902, and operations were confined to limited distance of Lake shipping in the Thunder Bay and the Rainy River Districts. On my section of the party I

had two expert cruisers, and our work during the season of 1901 was confined to the examination of about six square miles of territory. This occupied the whole season from the latter part of May, to the middle of October. This was a mere preliminary examination, to decide whether the iron range explored was worth acquiring from the Crown, or otherwise. No detail work was done at all and it was estimated at the time that the five square miles which were surveyed and purchased from the Crown, would take an engineer and three cruisers approximately five months to work out the details of the survey before making plans for diamond drilling. Lest we be accused of not being among the live men mentioned by your correspondent, I might mention that Messrs. Pumpelly and Smyth gave their entire approval to the method in which the work was being carried on and they still take my reports at par.

The United States Steel Corporation spent nearly two years in diamond drilling on the Atikokan Iron Range, and several months additional in the mining and treating of large-scale roasting tests.

J. D. Gilchrist of Denver, Colorado, spent the whole of the summer seasons of 1918 and 1919 in examinations and taking out samples varying from 100 to 1000 pounds for concentration tests of our low-grade ores. After spending the winter months of the same years on the working out of these tests on a laboratory scale, he advised me that he had found three ranges which he **hoped** could be treated with the one type of concentration plant, but he could not be sure of this until a suitable pilot plant had been erected and a commercial size test had been obtained.

Dwight Woodbridge, who was the founder of a testing plant in Duluth, Minnesota, had practically unlimited capital, expert help of every description, and the entire confidence of the Hayden Stone Company who had spent a quarter of a century in working out the problem of concentrating low-grade ores. Yet, over three years in time was taken up, and the plant had to be remodelled a number of times to devise the best method of concentrating the low-grade ores on one range alone.

As I have mentioned in a former letter to your Journal,* I have visited personally over 1000 lineal miles of iron ranges in Northern Ontario, all within shipping distance of Lake ports; of this 1000 miles I considered that there were at least 100 miles which were worthy of the close detailed survey that would precede any plan of diamond drilling. The performance of all this work mentioned should give the variest layman some little idea of the problem ahead of the Minister of Mines in carrying out his suggestions. As we have admittedly no visible ore-bodies of high-grade ore between the boundaries of Manitoba and Quebec but what need beneficiation in some form, beneficiation would seem to be our principal problem. (This does not mean that no high-grade ore bodies would be found on these ranges, on the contrary I am firmly of the opinion that merchantable grades of ore will be found, but the search for these will necessarily be costly and may take years to carry out.) Therefore, as I have estimated we have within a radius of 100 miles of the Twin Ports at least 300,000,000 tons of ore which might be concentrated commercially by some method or other. I would consider that if the Minister of Mines carries out his plan and teaches us how to mine, diamond drill, treat, market, etc., the ores in all this territory, of course erecting pilot plants as needed for the concentration tests of these ores, that when I mention twenty-five years as the time limit needed, I might still be a year or two under the mark.

As we have in the Thunder Bay District greatly diversified types of low-grade ores, the problem of concentration or other forms of beneficiation must be worked out by the operators on practically each range individually, and it is our opinion, and the opinion of the majority of our Canadian engineers, that a reasonable bonus, given over an extended term of years, would be the most attractive inducement to investors and producers of iron ores.

A direct vindication of the request of the Mining Committees of Northern Ontario for a bonus, is the mooted establishment of a 15,000,000 dollar steel plant in the Province of British Columbia. This has been undertaken after a careful survey of the situation by Mr. Sloan, the Minister of Mines; and it was owing solely to his recommendation and indefatigable efforts that the project for the establishing of a large iron and steel industry, in what is really a somewhat isolated Province in that respect, has taken definite shape. Owing to this isolation it was deemed a better plan to have this bonus given to the producer of pig iron, as he must necessarily equip steel works to use up his own product.

The problem for the Provinces of Manitoba, Saskatchewan, Alberta, and the North Western Territories could be worked out on somewhat similar lines. Sault Ste. Marie markets heavy iron and steel at Pittsburg prices, plus the duty. Duluth steel plants market their product at Pittsburg prices, plus the freight from eastern plants. All heavy iron and steel landed at the Twin Ports of Port Arthur and Fort William cost approximately 8 p.c. of purchase price from Sault Ste. Marie or Duluth, and over 20 p.c. from the eastern steel plants for freight alone. It is also admitted by the United States purchasers of heavy iron and steel that Duluth can manufacture practically at the same cost as Pittsburg. Let the Western Provinces combine in giving a bonus of from 3 to 3½ p.c. on actual capital invested, extending over a term of from 20 to 30 years to aid in the establishment of steel plants where iron, coal and power meet, at the Canadian Head of the Great Lakes. These plants could be bound to sell to the Western Provinces at Duluth prices, minus the freight from eastern plants to the Head of the Lakes, thus effecting a saving of from 8 to 20 p.c. Assembling and finishing plants could be erected at various points in the west to further cut down the westerly freight in all directions, in threshing outfits, farm implements, etc., and the districts where this material is marketed would also be greatly benefitted. The Provincial Government of Ontario and the Federal Government could combine in giving a reasonable bounty on iron ore, extending over a term of at least 15 years payable strictly to the operator of the mine. Do this and the annual import of nearly $200,000,000 worth of iron and steel products from the United States will dwindle more rapidly than did the production of iron ore in Ontario, and Tariff critics in the western Provinces will have less to complain of in defense of the claims of the agriculturist.

J. E. MARKS.

*See issue 21 May, 1920, page 424.

CHINA AND SILVER.

Complexity of the Chinese Currency.

In the London "Financier" of 22nd November, Mr. T. Bowen Partington, a business man of Hong Kong, possessing an intimate knowledge of Chinese methods, mentality and languages, writes the following article. It is interesting to Canadian producers of silver, in the current market conditions, because it maintains that a great scarcity of silver exists, and that China's first requirement for banking stability is large silver reserves:

Mr. Partington states:

The question of Chinese currency is an extraordinarily complex one, to-day more so than ever before. Most people in England only know that the country is on "a silver basis," and that the various trading centres on the seaboard have each its own particular brand of local currency dollar. If that were all the position would be comparatively simple, but this slender knowledge does not even touch the fringe of the problem. The trouble is that China is a very large country, containing many provinces and dependencies, each under a semi-independent administration and with commercial customs and standard which differ widely from one another.

No Recognized Medium of Exchange.

There is no common medium of exchange that is recognized throughout its wide domains, for in the Celestial Empire or Republic the Government has little or nothing to do with business.

There is the tael, of course, but the tael is not a piece of money at all, it is a weight—nominally an ounce of silver. Now an ounce in Tientsin is not necessarily an ounce in Hankow or in Canton, neither does it follow that a tael minted in Pekin is equal in fineness to one minted in Shanghai. In fact, there are no fewer than three distinct kinds of tael put out by the central Chinese Government, viz., the kuping, which is the standard tael of the public Treasury; the tsaoping or Government standard for taxes in some of the provinces, and the haikwan or Customs tael.

The standard of each locality is that particular tael in which wholesale transactions are conducted and in which exhange on other centres is quoted. Sometimes it is merely a nominal unit and may take the form of sycee or ingots, which are usually equivalent to 50 taels. These sycee ingots, or "shoes," are fantastically shaped silver castings of standard fineness, and are employed almost exclusively between banks and bullion dealers, being usually stamped by the banker or money changer with his individual "chop," which is accepted by the other parties to the transaction as a kind of endorsement as to weight and fineness.

Most banks doing their business in China import their own silver and turn out their own sycee "shoes" with their own particular earmark or guarantee; and all clearing transactions are done in these shoes as a matter of course. As for the different brands of taels in the various provinces of China it is sufficient to add that there are close upon 70 well recognised varieties, although the majority are not in circulation to any great extent.

Variety of Dollars.

The chaotic condition of Chinese currency has, if anything, been aggravated by the introduction of the various kinds of dollars—Spanish, Mexican and local currency—and to master the intricacies of this particular angle of the currency problem is a study in itself. The old Spanish "Carolus" dollar was introduced into the treaty ports from the Philippine Islands during the 18th century, and continued in common use until the middle of the 19th, when the Mexican dollar made its appearance and commenced gradually to crowd out the Spanish coin.

The Mexican dollar has retained its popularity to this day, and in spite of the existence of other competing coins, both native and foreign, is in every-day circulation. Chinese attempts at various times to oust the Mexican dollar with a locally minted coin have met with scant success, as the merchants seem to have acquired the ineradicable habit of treating native money by weight and fineness and not by count. The "Yuan" dollar (bearing the superscription of the late President Yuan Shi Kai), which was approved by the young Republic as a universal standard coin, has not so far proved a success.

The multiplicity and diversity of provincial taels, to say nothing of the many different dollars on the coast, has had its due effect, and before the Chinese mercantile community will consent to accept a common medium of circulation much water will flow down the Yang-tse-kiang. Perhaps, with the gradual growth of China's railroad system, one or the other dollar may acquire national ascendency; in any case, it is a matter of slow evolution and gradual education.

All we know is that the unification of China's silver currency upon a definite standard basis is of the utmost importance, and until it is achieved it is futile to hope that China will join the ranks of the "gold" countries.

Paper Money.

In passing we may allude to China's paper currency. Like many other countries, she has had her experience of unrestricted paper issues; indeed, it is an ancient evil which various dynasties and regimes have had to confront and have sought to remedy. In this the inherent love of the Chinaman for the silver and his distrust of paper money proved of considerable assistance to the authorities in their efforts to remedy the situation.

Down to the sixties of last century everything was going well, and the superabundant paper issues were being gradually called in and redeemed. Then the great Taiping rebellion broke out, and at once the financial situation took a turn for the worse. The Governments, both central and provincial, needed money—lots of it—and so, like the Bolshevik presses of the present time, the printing presses of Pekin and in the new provincial capitals, started working overtime turning out flat money.

For the moment the needs of the emergency were met, but by the time the rebellion had been repressed, the country was flooded with an irredeemable paper currency which circulated at a terrible discount, something like 97 to 98 per cent. Ultimately, of course, like the Assignats of the French Revolution and the American Confederate currency notes, it was withdrawn altogether, and in due time forgotten. Nevertheless, their Taiping experience did not deter subsequent Chinese Governments from playing with fire and repeating that disastrous performance.

The Bank of China Needs Heavy Silver Reserves.

It was not until 1911, shortly before the fall of the Imperial dynasty, that the Pekin authorities made a strong move towards swinging the position back to something like normal. They entered into negotiations with an international group of foreign banks for a loan of 50,000,000 dollars, with the avowed object of getting rid of the troublesome paper issues, but before the transaction could be closed the revolution broke out and shortly afterwards the dynasty fell.

Since that time the authorities have been issuing large quantities of "military notes." and until these have been called in there will be trouble in the land. Still, the Republican authorities mean well. Since they assumed sway a number of measures have been taken which promise well for the future, such as the establishment of the Bank of China, the Bank of Communications, and others whose declared policy includes the redemption of those military notes and others put out by the various Provincial Governments of recent years.

Doubtless the authorities mean well, but we know what place is paved with good intentions, and with the best will in the world we do not foresee an end to China's financial difficulties arising from the glut of paper currency. About the only true and lasting remedy would seem to lie in the creation by those Government banks of heavy silver reserves of such proportions as would inspire confidence among the public, especially the mercantile community.

Inevitably the accumulation in the hands of the banks of such a vast quantity of metal would constitute an additional big drain upon an already over-taxed silver market, and would automatically drive up the price to the levels wihch might baffle even the boldest of prophets. Again and again we are forced back upon the original aspect of the problem: How and in what manner is Great Britain to settle her adverse trade balance with China seeing that the world's available supplies of silver metal are getting scarer and dearer every every day.

A Montreal Letter

By ALEX. GRAY.

SILVER MARKET CONDITIONS.

Silver has slumped to below sixty cents. More of the Ontario mines are about to cut down or to curtail production. To have the metal at 59¼ cents—half a cent below the average price in 1913—leaves the mines in general no altertanive other than to go slow, stop—or hold their production until the market rights itself.

At the moment "silver is demoralized on Chinese and Eastern selling". Millions are starving and trade throughout the East is in a state of collapse, hence the cancellation of orders placed in the European markets—and the liquidation of silver holdings. So, between the shortage of power and the Asiatic debacle—which began with Japan—the penalties of inflation, speculation and liquidation are acutely in evidence.

The onward sweep of the wave of so-called deflation cannot be stemmed instanter. Throughout the Orient funds are inadequate with which to buy silver. Really the holdings of silver have to be jettisoned to secure funds in Europe—and that has intensified the situation in our metal market. Having paid the Orient for its wares in silver, the demand for silks, rubber, hides, tea, rice and vegetable oils being at the minimum, it follows the Orient must have emergency funds.

Silver being the medium of exchange, notwithstanding the admitted fact that production of the metal "has been coming on to the market for the last six months at less than half the pre-war amount"—and that consumption in Europe and on this Continent has increased—the break in the price was inevitable. Speaking of this, the "New York Evening Post" devoted its last weekly financial review to the discussion of the subject, and had this to say: "The present break is the more remarkable since world production of the metal now is only about 70 per cent. of prewar; since one third of this production, or the total mined in the United States, is automatically taken out of the market, so long as the price is below $1, by the provisions of the Pittman Act and since consumption in moving-picture films has increased greatly." Of course, should the Harding administration repeal the Pittman Act—which seems improbable—silver might not recover from its fall—and that would not mend matters in the Ontario North Country. So, "marking time" may be a remedy. It is so considered by copper producers, most of whom cannot make copper for the current price—and none of whom would attempt to do it were it not for Flotation practice.

Hollinger 1920 Gross Income.

According to the Ontario Department of Mines report for the nine months ended September 30th., Hollinger Consolidated Gold Mines had then produced gold to the value of $4,620.800. Taking that as the ratio, the production for the year would be about $6,160,000—were it not for the shortage of power which has occurred. From mining and milling operations, the chances are this company, therefore, will not come within half a million dollars of the 1919 result; yet it would seem as though the income from investments, rents and the premium upon gold will more than make up the deficiency on actual operations at the properties. It has been ascertained, for example, that the Hollinger Consolidated gross income for the ten months ended November 3rd., was $5,989,313. Out of that $2,789,199 was expended, leaving $3,200,113, or 13.08 per cent. on the issued capital. Over and above that, the November and December results are a substantial addition. So the Hollinger treasury, after paying 9 per cent. in dividends, ought to reflect the prosperity of the company despite handicaps.

SILVER AND GOLD IN ONTARIO TO END 1920 VALUED AT $445,000,000.

To the end of September, it has been officially announced by the Department of Mines, Ontario had produced metallics to the spot value of $597,851,488. Of that grand aggregate, about $210,000,000 came from the remarkable silver-cobalt-nicolite Mines of Cobalt and other districts, whose twenty-eight-year record almost excuses the myriad ventures promoted in the hope and expectation that they would become part of that achievement. By the end of this year those silver mines will have yielded something like 310,000,000 ounces, besides the cobalt, nickel and arsenical contents. Out of the profits they have distributed about $80,000,000 in dividends— and several of them are still vigorously in the running. Spread over the entire period since McKinley and Darragh, and Fred. La Rose stumbled across something they knew nothing about, the Silver Industry of Ontario has provided $7,500,000 per annum to date—and "the end is not yet".

Next in the Order of Merit—even if imaginery decorations are permitted in the Dominion—is the nickel industry. As a matter of fact—and to be exact—although not in the spectacular precious-metal-class the nickel copper industry takes precedence, for the grand total value of its production at the expiry of 1920 will be about $234,000,000. Adding to this the hypothetical valuation of the rare metals accredited to this section of Ontario's mineral industries, the figures rise to between $235,000,000 and $236,000,000—and some of the more important nickel mines seem to be perennially youthful in that ore reserves display a degree of resiliency surprising even to their directorates. Anyhow, nickel, copper, silver, cobalt, and a minor factor of rare metals, have bequeathed no less than $445,000,000 to the wealth of nations, or will have bequeathed that much on January 1st.

Yet mining industrialism is a species of "monster, of such hideous mien, that to be hated needs but to be seen!" The story of Cobalt and the Montreal River Districts is punctuated with harrowing experiences. Hardly less is this so of the earlier chapters in the history of the nickel country. As a sequel, the discovery of Porcupine and the Kirkland Lake areas will serve to demonstrate the potentialities of real mines despite paroxysms. Public incredulity, bush fires, and the Great War, attended the development of the Ontario gold industry, notwithstanding which the total gold production on January 1st. will have amounted to about $70,000,000—and at least there is as much more assured in known ore reserves—possibly the more venturesome would place the value of the gold ore reserves at around $100,000,000.

For distinguished proportions, Nipissing dividends have earned pre-eminence. That company's profit-sharing has amounted to about $23,000,000—and, with the cash on hand, the most exacting shareholders cannot groumble. Hollinger Gold Mines have yielded over $13,500,000 in dividends, have perhaps the strongest treasury position of any company operating in the precious metal districts, and have well on toward twice their capital liabilities in their proved ore reserves. They have paid over 70 per cent. of the dividends credited to all the Ontario gold mines—the Dome and McIntyre Mines coming next with about 10 per cent. of the total.

Metalliferous Production of Ontario First Nine Months of 1920

Returns received by the Ontario Department of Mines from the metalliferous mines, smelters and refining works of the Province for the nine months ending September 30th, 1920, are tabulated below, and for purposes of comparison the quantities and values are given for the corresponding period in 1919. Tons throughout are short tons of 2,000 lbs.

ONTARIO'S METALLIFEROUS PRODUCTION, FIRST NINE MONTHS — 1920.

Product.		Quantity 1920	Quantity 1919	Value $. 1920	Value $. 1919
Gold	ounces	424,297	366,288	8,735,768	7,574,586
Silver	"	7,831,143	7,475,396	8,435,088	7,898,220
Platinum metals	"	213.75	87.26	13,917	4,981
Nickel (metallic)	lbs.	7,060,078	7,820,866	2,440,303	2,732,676
Nickel oxide	"	4,886,712	5,700	1,146,768	1,607
Other Nickel compounds	"	159,725	217,135	15,362	22,279
Nickel in matte exported (*)	tons	17,446	11,301	8,723,000	5,424,552
Cobalt (metallic)	lbs.	159,151	93,227	373,168	174,782
Cobalt oxide	"	509,043	321,483	1,015,696	463,916
Other Cobalt compounds	"	1,717	29,491	1,629	18,250
Lead, pig	"	1,290,726	1,481,204	117,122	54,802
Copper (metallic and sulphate)	"	4,952,413	4,436,101	800,369	756,883
Copper in matte exported (*)	tons	9,497	6,818	2,659,160	1,908,936
Iron Ore (**)	"	5,468	5,827	47,120	44,234
Iron, pig (***)	"	49,422	30,849	1,395,948	795,009
Total		.....	.....	35,920,418	27,875,713

* Copper in matte form was valued at 14 cents and nickel at 25 cents per pound in both years. Total matte produced was 44,922 tons, of which 31,800 tons were exported. For further details see heading "Nickel-Copper."

** Shipments of iron ore totalled 89,931 short tons valued at $445,355. The figures in the table cover shipments to points other than Ontario blast furnaces.

*** Total output of pig iron from both domestic and imported ore was 512,559 tons worth $14,480,794. Figures in the table represent proportional product from Ontario ore.

GENERAL REMARKS.

Although the aggregate production of mines, smelters and refineries in the Province of Ontario for the 9 months ending September 30th, shows an increased valuation of over six million dollars as compared with the 1919 figures, developments during the past two months have been such that a proportional increase for the full year cannot be expected. Rainfall was so scanty during the late summer and fall that the power plants supplying Cobalt, Porcupine and Kirkland Lake have been unable to meet the requirements. A power shortage setting in now may be prolonged. Furthermore, the wholesale prices of commodities have declined abruptly, and industry and commerce are feeling the effects of this inevitable aftermath of the war. Labour, however, is becoming more plentiful, and the cost of production is declining, Such circumstances are specially advantageous to the gold mining industry, which has had to carry on during the war period under difficult conditions.

GOLD.

Ontario's gold output for the first three quarters of the year was 424,297 fine ounces worth $8,735,768, an increase of $1,161,182 or 15 1-3 per cent over the corresponding period in 1919. During the period 977,475 tons of ore were milled, distributed as follows: Porcupine, 903,945 tons, Kirkland Lake 69,328 tons, and Miscellaneous, 4,242 tons. As already pointed out the disabilities under which gold mining has been carried on are gradually being removed, the power situation alone excepted. Details of gold production are presented herewith :

Porcupine

Hollinger	$4,620,800
McIntyre	1,603,376
Dome Mines	1,515,086
Northcrown	70,406
Porcupine Crown	70,962
Dome Lake	46,809
Davidson	11,210
Total	$7,938,649

Kirkland Lake

Lake Shore	$ 371,359
Kirkland Lake	215,558
Teck-Hughes	182,152
Total	$ 769,069
Miscellaneous Mines	23,904
Recovery from Nickel — copper refining	4,146
Grand total	$8,735,768

Miscellaneous mines include the production by Argonaut Gold, Limited, in the township of Gauthier, Contact Bay Mines, Limited, near Dryden, and W. E. Stone of Mine Centre. In addition to gold output 71,990 ounces of silver were produced, worth $80,420. The 150-ton mill of the Wright-Hargreaves mine at Kirkland Lake is nearing completion.

SILVER COBALT.

Silver production increased from 7,475,396 to 7,831,132 ounces during the period as compared with 1919. With the exception of 32,073 ounces recovered

from nickel-copper refining and 71,990 ounces from gold refining operations, the output came from Cobalt, Gowganda and outlying areas. Power shortage and a rapid decline in the price of silver will have their effect on the output for the last quarter of the year. The average price of silver was $1.33 per fine ounce in January and 94 cents for September, with an average of $1.09 for the 9 months' period. On December 1 the price dropped to 69 3-4 cents for foreign silver on the New York market. Mines shipping over a half million ounces are given in order: Nipissing, Mining Corporation, O'Brien, Coniagas and Kerr Lake.

Refineries: During the period 426 tons of ore, 2,654 tons of concentrates and 2,117 tons of residues were treated in southern Ontario refineries for a recovery of 2,406,880 ounces of silver in addition to arsenic, nickel, cobalt and compounds of the two last mentioned metals. A small output at Welland of nickel and cobalt compounds is reported by Ontario Smelters and Refiners, Limited, successors to Metals Chemical, Limited. Copper sulphate was marketed to the extent of 98,918 lbs., the metallic equivalent being included in the total coper production. Silver producers were paid for 18,202 lbs. of copper recovered in United States refineries. A considerable increase is noted in the price of cobalt, but more recently the general slump in prices of metals has seriously affected the business of silver-cobalt refineries. The output of 203,953 lbs. of metallic nickel and 20,711 lbs. of nickel oxide from silver-cobalt ores is small as compared with the product of Canadian nickel-copper refineries.

NICKEL COPPER.

During the period 925,378 tons of ore were raised at the Creighton, Murray, Garson Levack, Bruce, Victoria No. 1 and Worthington mines. Ore smelted at Copper Cliff, Coniston and Nickelton totalled 809,022 tons, from which 44,922 tons of bessemer matte were produced. To the United States and Wales 31,800 tons of matte were exported, while 12,531 tons were treated in Canadian refineries at Port Colborne, Ontario, and Deschenes, Quebec.

At the beginning of the year smelting of nickel-copper ores was back again to a pre-war basis after the greatly curtailed production in the early part of 1919, which followed an abnormally large output in 1918. Although production has increased from 30,942 tons of bessemer matte for the first 9 months of 1919 to 44,922 tons for the corresponding period in 1920, conditions since Sept. 30th have considerably reduced this rate of production. The present market for both nickel and copper is dull and stocks have accumulated. In consequence the International Nickel Company of Canada were obliged to curtail operations both at Copper Cliff and Port Colborne on Nov. 1st to the extent of 25 per cent, which reduces the output to 3,000 tons per month of bessemer matte and 400 tons of refined nickel.

In the bulletin for the half year ending June 30th it was stated that nickel-copper matte was in process of treatment at the new refinery of the British America Nickel Corporation at Deschenes. Electrolytic nickel and copper were produced during the latter part of the nine months' period. The International company markets a considerable part of the nickel in the form of oxide.

IRON ORE AND PIG IRON

During the period 135,023 short tons of ore were mined by the Algoma Steel Corporation and Moose Mountain, Ltd. Of this total 84,463 tons (nodulized) were shipped to Ontario blast furnaces. Shipments of briquettes produced from magnetite ore were 5,468 tons worth $47,120.

The furnaces of the Standard Iron Company at Deseronto, Midland Iron and Steel Company and Parry Sound Iron Company have not been in blast since June, August and October respectively in 1919. Four stacks were operated by the Algoma Steel Corporation at Sault Ste. Marie, two by the Steel Company of Canada at Hamilton, and one by Canadian Furnace Company at Port Colborne. Of a total of 1,036,229 tons of ore smelted only 99,916 tons or 9.64 per cent was of Ontario origin. In steel making 252,797 tons of pig iron product were used. The total steel output at Sault Ste. Marie and Hamilton was 525,084 tons worth $19,253,470.

RETIREMENT OF THE DIRECTOR OF MINES AT OTTAWA.

It is announced from Ottawa that Dr. Eugene Haanel, who has been director of the Mines Branch since 1907, when that department was first constituted, has retired in compliance with the regulations of the Superannuation Act. Previous to appointment to the position of Director, Dr. Haanel was Superintendent of Mines in the Department of the Interior, from 1901 to 1907. Dr. Haanel, during his incumbency, took much interest in the application of electricity to the reduction of iron ores. Interest in electric smelting of ferrous metals in America may be said to date from the time of the Canadian Commission's tour in Europe in 1904, and the historical introduction to Rodenhauser's and vom Baur's "Electric Furnaces in the Iron & Steel Industry," the German edition of which appeared in 1911, states that when the invention of the Stassano, Heroult and Kjellin furnaces first drew the attention of the iron industry "an important contributing factor was a report by Dr. Haanel, chief of a commission of experts sent by the Canadian Government to Europe to study the electric furnace."

Dr. Haanel has also devoted much attention to the utilisation of the peat deposits of Canada, and in general has adapted his knowledge of technical progress in Northern Europe to Canadian conditions, which are in many respects strikingly similar.

U. S. BITUMINOUS COAL SHIPPED TO CANADA.

A calculation based on figures given in "Saward's Journal of New York shows that in 1919, during the first nine months of the year, there was shipped from the United States to Canada approximately 8,670,000 tons of bituminous coal at average prices ranging from $3.61 to $4.33 per ton, and averaging over the whole period $3.68 per ton.

For the corresponding period of 1920, there was shipped 9,700,000 tons, at prices ranging from $4.22 to $6.72 per ton, and averaging $5.67 per ton.

Canada's importations of bituminous coal therefore, in the period named, were greater in 1920 by one million tons, and cost two dollars per ton more. During the quarter ending September 30th, importations cost about $12,000,000 per month.

PRODUCTION OF STEEL IN CANADA DURING THE FIRST NINE MONTHS OF 1920.

The total production of steel (including ingots and direct steel castings) in Canada during the first nine months of 1920 according to statistics collected by the Mines Branch of the Department of Mines, Ottawa, was 945,282 short tons, or an average of 105,931 tons per month as compared with a total production during the corresponding period in 1919 of 770,053 tons and an average monthly production throughout the whole of 1919 of 86,157 tons.

The production of steel during the nine months included: 901,188 tons of ingots and 44,094 tons of direct castings. The production in electric furnaces was 18,323 tons and in open-hearth, converter, crucible, or other furnaces 926,959 tons.

MONTHLY PRODUCTION OF STEEL IN CANADA.
(Including Ingots and Direct Castings).
(In Short Tons).

	1916.	1917.	1918.	1919.	1920.
January	.....	130,991	145,808	120,297	102,709
February	.....	120,674	138,975	100,531	94,245
March	589,553	152,420	158,234	111,793	109,027
April	.....	139,734	166,612	83,445	103,578
May	.....	155,411	174,275	77,146	100,965
June	.....	137,161	165,973	76,185	101,935
July	100,817	139,222	165,022	73,536	105,394
August	107,273	145,934	170,495	60,226	117,460
September	113,411	149,000	166,725	66,894	110,369
October	123,469	161,297	184,115	73,716	
November	124,431	158,122	129,255	92,328	
December	116,265	155,967	117,965	97,789	
Average Monthly	106,268	145,494	156,954	86,157	105,931

PRODUCTION OF PIG IRON IN CANADA DURING THE FIRST NINE MONTHS OF 1920.

The total production of pig-iron in Canada during the first nine months of 1920, according to statistics collected by the Mines Branch of the Department of Mines, Ottawa, was 806,488 short tons (800,608 tons made in blast furnaces and 5,880 tons made in electric furnaces from scrap steel) as compared with a production during the first nine months of 1919 of 710,114 short tons. The average monthly production of pig iron during the first nine months of 1920 was 89,610 tons as compared with an average monthly production throughout 1919 of 76,482 tons.

The blast furnace plants active during the first nine months were those at Sydney and North Sydney, N.S. Hamilton, Port Colborne, and Sault Ste. Marie, Ontario.

The blast furnace plants at Midland, Parry Sound, Deseronto, and Port Arthur, Ontario were idle throughout the period.

At the end of September 10 stacks were active and 8 idle.

Pig iron was made from scrap iron and steel at four electric furnace plants located at Hull, Montreal and Shawinigan Falls, Quebec, and Orillia, Ontario.

The monthly production of pig-iron in short tons since 1916 has been as follows:—

	1916.	1917.	1918.	1919.	1920.*
January	.....	89,187	74,239	103,963	81,494
February	.....	83,801	78,507	86,840	70,864
March	562,097	103,789	96,848	91,286	77,155
April	.....	100,564	104,331	93,359	86,303
May	.....	108,891	104,867	83,059	97,593
June	.....	99,998	103,037	66,470	89,258
July	92,012	93,499	109,723	60,927	94,417
August	87,864	100,727	96,164	67,404	104,482
September	102,744	100,690	95,102	56,806	104,922
October	113,608	103,277	106,962	56,049	
November	105,496	97,905	106,585	73,092	
December	106,496	87,152	119,186	78,526	
	1,169,257	1,170,480	1,195,551	917,781	
Average Monthly	97,438	97,540	99,629	76,482	89,610

* Subject to revision.

Mineral Production of Ontario in 1919

Statistical Report of the Ontario Bureau of Mines.

Part one of Vol. 29 of the Reports of the Ontario Department of Mines contains a statistical review of the mining industry in Ontario in 1919, tabulations and dissections of mining accidents and their contributory causes, and descriptions of the operating mines in the Province.

It contains also the Second Report of the Joint Peat Committee made by the Secretary, Mr. B. F. Haanel, a Report upon a geological reconnaissance into the District of Patricia, by Mr. E. M. Burwash, a Report by Cyril W. Knight on the Windy Lake and other nickel areas, and the note upon Haileyburian intrusive rocks by Dr. Middler and Mr. Knight which appeared in this Journal in the issue of August 13th. Certain typographical changes have been made in it.

The "format" of the Report is all that could be desired, and it may be noted that the Ontario Department of Mines furnishes information on dividends and financial aspects of the mining industry, and with regard to mining incorporations and other matters connected with the business side of mining that is not given in any other annual report of the various provinces of Canada.

Part Four, of the 1919 Annual Report dealing with the Kirkland Lake gold area, by A. G. Burrows and P. E. Hopkins, which it is noted by the Deputy Minister is considered by the Department as one of the most important of its recent publications, is still to be issued. Part Six, also yet to be issued is a description of the pelecypod fossils of the Lorraine and Upper Ordivician formations in the neighborhood of Toronto.

Statistics of the Industry.

Compared with the aggregate value of mineral production in 1918, namely $80,308,872, the peak of Ontario's achievement to date, the production of 1919, which was valued at $58,883,916, represents a decrease of 26.7 per cent. The obvious explanation, as the Report states, is the stoppage of the war.

Summarised statistics are as follow for 1919:

	Metallics	Non-Metallics	Total
Value	$41,590,759	$17,293,157	$58,883,916
No. of Employees	9,254	7,974	17,228
Wages	12,798,799	7,680,036	20,478,835

Annual production for 1913, the war years and 1919, compares in value as follows:

	Metallics	Non-Metallics	Total
1913	$37,507,935	$15,724,376	$53,232,311
1914	33,345,291	12,950,668	46 295,959
1915	44,109,679	10,136,000	54,245,679
1916	55 002,918	10,300,904	65,303,822
1917	56,831,857	15,261,975	72,093,832
1919	41,590,759	17,293,157	58 883,972
1920 (Nine months).			

The value of a number of selected metals produced in Ontario from the commencement of their mining is given in the Report as follows:

	To 31st Dec. 1919
Silver	$197,931,902
Nickel	149,931,762
Gold	61,316,572
Copper	53,656,767
Iron Ore	9,350,276
Cobalt and compounds	7,205,834
Platinum	1,500,000

Gold Production.

Sixty-six per cent of the Canadian gold output in 1919 came from Ontario, and by her contribution of 505,964 ozs., worth $10,451,709 Canada takes third rank in the six leading gold-producing British Dominions, and was the only one to report an increase in production during 1919.

Silver Production.

The high average price of silver during 1919, namely $1.11 per oz. aided by the exchange premium, gave a great impetus to silver production, permitting the working of low-grade ore, the re-opening of abandoned mines and stopes and the re-treatment by flotation of tailing dumps having a silver content as low as four ounces per ton. "Despite these aids" states the Report, the silver output continued to decline with the natural waning of the camp as the deposits are being worked out."

Nickel and Copper.

The completion of the new smelter of the British America Nickel Corporation at Nickelton was the most important event in Ontario metallurgy in 1919. The following description of the plant and its operations is taken from the Report:

On January 17th, 1920, the new smelter of the British America Nickel Corporation at Nickelton was blown in, and on January 21st the first converter went into commission. Ore is being raised from the Murray mine in which diamond drill borings have disclosed over 16,000,000 tons, of smelting ore. The inclined shaft is down 1,100 feet, and eight levels have been established, on five of which electric locomotives are used.

In the Nickelton smelter, which is situated one mile from the Murray mine, there are two blast furnaces and three Pierce-Smith basic-lined converters in operation. Another blast furnace and converter have been ordered. The most noteworthy features of operation are described in a letter dated June 24th, 1920, by W. A. Carlyle, Managing Director, as follows:

In the blower room are four turbo-blowers, each driven by steam turbines, 3,600 r.p.m., Rateau-Battu-Smoot design, made by the Dominion Bridge Co. Limited, Montreal.* There are two blowers of 30,000 cu. ft. free air each at 36 oz. for blast furnaces and two of 36,000 cu. ft. each, 12 pound pressure, for supplying air to converters, the steam turbines for the latter being 2,200 h.p. The air stabilizers and governors first supplied were not successful, but new ones just installed, using monel metal in certain parts are operating well and this unique blower plant now promises to be most satisfactory. Each turbine has its surface condenser complete in every detail. A 300 k.w. motor-generator set supplies D.C. power to the locomotives, cranes and converters in the smelter building and a duplicate will soon be placed.

The ore consists of eruptive rock (norite), impregnated with pyrrhotite and some chalcopyrite, containing about 25 per cent. SiO_2, 35 per cent. Fe., and 18 per cent. S., etc., and the metallurgical process is to smelt this ore direct without roasting and to convert the low-grade matte containing 10 to 12 per cent. copper and nickel to the usual 80 per cent. matte, which is granulated and sent to the refinery. Converter slag, averaging about 16 per cent. SiO_2, is the only flux used in the blast furnace, which easily smelts 1,000 tons of ore and flux per day and has done 1,148, taking about 10 per cent. coke in the charge. At each end of each furnace is a 20' by 30' settler having at one end two tapholes and two syphon exists for matte, the latter a new device, permitting most successfully the drawing off of matte from near the top of settler, thus avoiding breakaways.

In the converters low-grade matte is fluxed with fine ore

and some blast furnace molten slag, gravel or sand being used for end fluxing when a completed charge of 60 to 110 tons of 80 per cent. matte is poured and granulated. The converter slag is partly poured into the settlers and partly into beds, where after being broken up by hand or explosives it is loaded by steam loco-cranes and sent to the smelter bins. There is no trouble in producing slag containing only 14 to 15.5 per cent. SiO_2, making a good iron flux for the blast furnace. The Garr gun is used for charging the fine ore or gravel. There are large dust flues and chambers, with a brick stack 300 feet high and 25 feet internal diameter.

The electrolytic refinery is situated on the Ottawa river, at Deschenes, Quebec, where cheap electric power is available. Mr. Carlyle's description follows:

The matte passes through two Wedge roasters with 8 hearths, thence to leaching department where part of the copper is leached out and sent to the copper electrolytic depositing house.

The leached matte is then smelted with fluxes in a specially designed electric furnace using 24" carbon electrodes, and nickel-copper anodes, weighing 200 pounds, are cast in moulds on a revolving table. This furnace has proved a signal success. These anodes go to nickel house where the nickel is electrically plated out by the Hybinette process, to cathodes being then either cut up or remelted in a Rennerfelt electric furnace and poured into ingots or granulated to shot. The slimes containing platinum, palladium, gold, iridium, etc., will be refined in the precious metals department. The capacity of the present plant is 15,000,000 pounds nickel and 9,000,000 pounds copper per annum, but at comparatively small expenditure can be greatly increased.

A report for the half year ending June 30th, 1920, showed that 1,185 tons of Bessemer matte had been produced at the smelter. All this matte had been shipped to the refinery and was in process of treatment.

Iron Ore. — Beneficiation.

Reference is made to the proved value of blast- furnace slag as a road material, and the use of basic slag as a fertilizer, and attention is drawn to the slight recognition so far accorded to these by-products of the iron plants of the Province.

Attention is also drawn to the growing use of beneficiated ores in 15 states, and the subjection of 8,000,000 tons of ore annually to some form of concentration. The work of Mr. James W. Moffatt of Toronto,** and of Dr. Stansfield of McGill University is referred to, and it is pointed out that Ontario only requires the evolution of a commercially practical process to make large tonnages of low-grade iron ores available for use in domestic furnaces.

By-Product Coke.

Reference is made to the modern by-product ovens used by the Ontario steel companys, and to the new benzol plant of the Steel Company of Canada, now in operation, and designed to produce 100,000 gallons of motor-fuel per month.

The Semet-Solvat Company has leased a property from the Toronto Harbor Commission with the intention of erecting by-product ovens so soon as the cost of building will permit, and it is stated that the British Foundation Ovens, Ltd. proposes the erection of retort ovens in the neighborhood of Hamilton and Toronto, presumably for preparation of coke for domestic uses, in substitution for anthracite.

Structural Materials.

The increase in production of non-metallics in the Province is largely attributable to the partial recovery of building, although, as the Report points out, after allowing for increased costs of materials, the 1919 expenditures for building did not represent in the Province more than one-half the figures of 1912 and 1913.

Reference is made to the "Super Cement" being made at St. Mary's, a product that is receiving much advertising in England, and is stated to be stronger than Portland cement and possessing waterproof and oilproof characteristics.

The following reference is made to the Port Colborne plant of the Canada Cement Company, where the recovery of potash from flue-dust is to be undertaken.

During the year a potash recovery plant was under construction at the Port Colborne works of this company for the purpose of extracting or washing out flue-dust containing potash salts from gases passing through the kiln stacks. Volatilized potash in the gases is dissolved by passing through spray chambers. The resulting sludge is put through thickeners and filters, and the brine evaporated in condensers. The quantity of potash (K_2O) recoverable is about 1 ton per 1,000 tons of cement manufactured. In design the new plant contains many desirable features found in installations in the United States, and it is expected to be in operation by July, 1920. From the 12 potash recovery installations operated in the United States in 1918, there was a production of 1,549 short tons of potash (K_2O), valued at $603,617.

The production of felspar, fluorspar, graphite, talc, actinolite, gypsum, iron pyrites, mica, natural gas, peat, apatite (for phosphate), quartz (silica), salt, and other minerals is fully dealt with, but the diverse particulars will not permit of useful summarisation.

Mineral Revenues.

Sales of mining lands, lease rentals, royalties on sand and gravel, miners' licenses, natural gas tax and assay charges brought in a revenue of $137,541, and the Mining Tax Act yielded $624,951, made up as follows.

Acreage tax	$33,126.34
Natural Gas tax	38,797.71
Profits Tax	533,027.15

The Profits Tax was made of contributions from the mines derived as follows:

Gold Mines	$ 59,257.28
Silver Mines	143,292.58
Nickel-Copper	346,521.31
Miscellaneous	3,955.48

The large proportion of the tax contributed by the nickel-copper companies is noticeable, the amount paid by the International Nickel Company being $300,923.51, or 54 per cent of the total amount collected.

Mining Accidents.

Fatalities were 39 in 1919, compared with 32 in 1918. Although the fullest particulars are given of the accidents, the inclusion of metallurgical operations and the very diversified character of the industry, does not allow the drawing of deductions, except that the rate of accidents appears to be greater in the Winter than in the Summer, and that fatalities appear to be more numerous in the metallurgical operations than in mining work proper. The number of shaft accidents seems large. The rate of fatalities per thousand employees was 3.00 in 1919, comparing with 2.10 in 1918 and 2.02 in 1917, a rate that compares very favorably with the record of other mining provinces and countries.

*See page 796, issue of 1st Oct. 1920. "Utilization of Ontario Iron Ores", by R. E. Hore..

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

The end of the second week of December finds the mining companies in the Cobalt district growing uneasy over the steady recession in quotations for commercial bar silver. The price which the metal now commands is very little above the average cost of producing, and in the case of some of the smaller mines, the balance is on the wrong side.

A factor of outstanding importance, of course, is the steady decline in commodity prices. This is bound to reduce the cost of mining. So far, however, no cut has been made in the rate of pay to the mine workers, and up to the present these men have not volunteered any suggestion that they would prefer to work at lower pay rather than have the mines close.

Although the situation is disquieting, yet the fact remains that the mines of the Cobalt field contain many millions of ounces of silver in ore reserves, the ore is sufficiently high grade to compare with the richest in the world, and sooner or later the silver mining industry of Cobalt is bound to settle down into a steady stride and on a basis of profitable operation.

After having been closed for a short time due to shortage of hydro-electric power as well as desiring to make certain repairs to the mill, the Beaver Consolidated is again in operation. This is interpreted as an expression of confidence in regard to the future, relative to both power supply and the price of silver.

The McKinley-Darragh has issued a financial statement, summarised as follows:

Cash on hand	$ 69,070.80
Bullion on hand at smelters and ore at mine	244,307.75
	$313,378.55
Less Bills payable	$ 65,000.00
Cash assets	$248,378.55

These cash assets are equal to more than 11 cents on each of the company's issued shares. Factors of outstanding importance, and of special significance to the stability of the mining industry of Northern Ontario are found in the report just issued by the Ontario Department of Mines showing the metal output of these mines during the first nine months of 1920. The report is such as should cause a general wave of optimisim as not only does it show the North's gold output to be the heaviest in the history of the Province, but it also shows that the silver output for the nine months under review actually increased 355,747 ounces over the first nine months of 1919 and the value of the production for this year so far recorded shows an increase of $536,868.

Not only this, but the cobalt oxide produced in Cobalt more than doubled during the period as compared with last year, and altogether the report of metal output shows a total increase of more than eight million dollars.

This achievement is regarded as extremely remarkable owing to such having been accomplished at a time when the economic conditions were so adverse to silver, gold and nickel mining.

Coming just now when a good deal of pessimism seems to be abroad, the official figures should have a stabilizing influence and bring the public to realize that the physical condition of the leading mines and the general outlook for the mining industry of Northern Ontario was never better and the mines were never before confronted with prospects of such magnitude as that found now on every hand.

Labor shortage during the past summer, followed by shortage of electric power late in the fall gave rise to pessimism entirely out of proportion to all reason. The labor supply is now abundant and the power shortage at worst is entirely temporary. Bearing these facts in mind the opinion seems now to be likely to take quick form that in regard to the mining industry there is now greater occasion for optimism than ever before in the history of the North.

The re-treatment of sand tailings from Cobalt Lake has been discontinued in the Buffalo mill of the Mining Corporation. This has reduced hydro-electro power consumption to the extent of between 400 and 500 h. p. In the meantime, part of the plant is working on fines from the main plant of the Mining Corporation. This reduction in work has released about thirty men.

In all parts of the mining districts a surplus of labor is reported, and the suggestion is being made in circles in close touch with the situation that the workmen should consider some plan to encourage as little curtailment of work as possible. To do this, it would be necessary to volunteer a reduction in wages.

The Kerr Lake Mining Company is stated to be making good progress in the development of its property in the state of Utah. About 100 tons of silver-lead ore is being treated daily, and the company is stated to have paid about $50,000 in royalties, this amount applying on the ultimate purchase price of $250,000. The company's silver production at Cobalt has been reduced due to power shortage and is now about 40,000 ounces monthly.

Voting has been completed at the Cobalt mines on the question of adopting a scheme to establish an Employes' Sick Benefit Fund. The last two mines to be heard from were the McKinley-Darragh and the Peterson Lake. The former voted 65 for and only 3 against. The Peterson Lake voted 14 for and 11 against. This makes the total vote 871 of which 737 were in favor of the scheme and with only 134 opposed to it. Accordingly, arrangements will be made to carry the scheme into operation as quickly as possible.

A small shipment of ore has been made from the property of the Regent Mines, near Elk Lake, for testing purposes. The shaft has been put down about thirty feet, and encouraging results obtain to that depth.

Concerning silver mining in general, the present quotations necessitate a general reduction in operating costs. The price of the metal has now declined to almost pre-war levels and suggests no other remedy than a general cut in expenditure.

THE GOLD MINES.

The Porcupine Field.

In the gold mining districts, power shortage is preventing the full benefit which might otherwise result from the present abundant supply of workmen. Restricted operations on this account preclude the possibility of reducing operating costs for the time being. In spite of this, however, a very satisfactory showing is being made, and the margin of net profit is quite satisfactory.

Up to the beginning of December, the Dome Mines had produced over $1,800,000 and the indications appear to be that an output of close to $2,000,000 will

be made for the full year. As regards the future, the power shortage threatens to cause a reduction in milling operations, although it is stated the development of the mine will not be interrupted. The slack period in the mill at worst will be completely relieved in the spring when the break-up of ice takes place in the lakes and rivers.

Production from the Hollinger Consolidated Mines will approximate $6,000,000 for the current calendar year, according to official figures now available. This has been accomplished when able to operate at not more than two-thirds capacity. The causes contributing to the reduced scope of work was made up of a shortage of workmen during the first nine months, and by a serious power shortage during the last quarter. In spite of this, the company has just declared its ninth dividend of 1 p.c. payable December 31st to shareholders of record December 15th. This will call for the disbursement of $246,000 and makes a total of $2,214,000 paid this year. It seems to reflect the confidence with which the directors of the company view the future. Just now, the Hollinger is rushing large quantities of coal in full trainloads to the mine, so as to use its auxiliary plant to fullest capacity throughout the period of power shortage, and added assurance is thus provided that dividends during the coming year promise to even exceed the magnificent record of 1920.

Gold production from the north for the first nine months of 1920 increased fifteen p.c. over the corresponding period of 1919. The output came from twelve mines, seven of which are in the Porcupine field, three in Kirkland Lake, one in Gauthier townships near Larder Lake and one in the Rainy River district.

During the coming year, at least three more important producers should be added to the list, namely, the Wright-Hargreaves, Tough-Oakes and Ontario-Kirkland, all three of which are situated in the Kirkland Lake district.

Kirkland Lake Area.

Unofficial reports tend to indicate a movement intended to merge the Teck-Hughes with the Orr Gold Mines. Officials of these companies have been in conference, but have not made any public announcement as regards progress made. It is learned, however, that promising headway toward this end has been made. A merger between the Teck-Hughes and Orr would be beneficial to both companies, as it would increase the tonnage of ore available for treatment in the mill already operating on the Teck-Hughes. In regard to the latter property, it is stated the current year's operations have resulted in a substantial profit, and the outlook for the future is brighter than ever before.

For the current calendar year, the production of gold from the lake shore mine will approximate half a million dollars. In addition to this, considerable development work has been done, including sinking the main shaft from the 400-ft. level to a depth of 600 feet. The Company will enter the new year with extensive plans in view, among which will be continuing the shaft to a depth of 800 feet, as well as driving crosscuts at the 600 and 800-ft. levels for the purpose of determining the extent of the ore deposits at these horizons. Following this work, the question of enlarging the mill will be taken under consideration. For these reasons the year 1921 promises to be one of probable big expansion of this rich mine.

Output from the Kirkland Lake Mine of the Beaver Company will exceed $300,000 for the current year. This company is in excellent shape and can now proceed with the return of capital advanced by the parent company, the Beaver Consolidated.

Altogether, the Teck-Hughes, Kirkland Lake and Lake Shore mines will produce approximately $1,060,-068 for the current year, and with promise of the production being doubled during the coming year, owing to the present producers adding to the scope of their operations as well as the addition of the Wright-Hargreaves, Tough-Oakes and Ontario-Kirkland to the producing list.

Larder Lake.

The Goldfields, Ltd., of Larder Lake, one of the companies understood to be controlled by the Associated Goldfields, concerning which considerable newspaper criticism has been heard recently, will hold a meeting on December 15th to consider the special interests of the shareholders of Goldfields Ltd. Associated Goldfields is said to be proceeding with a reorganization intending to increase its authorized capital from 5,000,000 to 30,000,000 shares. The plan is to issue four shares of the new for one of the old, and thus leave an extra 10,000,000 shares in the treasury. The suggestion has been made in the press that it is understood the Ontario Government would be willing to appoint engineers to make a report on the property provided they are urged to do so by the stockholders. The Government, however, presumably would hesitate to take such action without first being urged by those financially interested.

Ore and Bullion Shipments.

During the week ending December 10th, four shipments of ore were made from the Cobalt district, aggregating 219,056 pounds.

Following is a summary :

Company	Cars	Pds.
La Rose	1	86,793
Dominion Reduction	1	63,000
Kerr Lake	1	59,715
H. F. Strong	Odd lot	9,548
Total		219,056

During the corresponding period, the Nipissing mine was a heavy shipper of bullion, sending out 76 bars containing 100,068 ounces. This makes a total of 360,933 ounces shipped from the Nipissing so far this month.

PERSONALS.

Mr. John T. Stirling, Chief Inspector of Mines of Alberta, is in Toronto on his way back to Edmonton. He has been overseas for some months on account of ill health.

Mr. Chas. Camsell, Deputy Minister of Mines, was in Toronto Saturday and addressed the Toronto branch of the Canadian Institute of Mining and Metallurgy.

Mr. Geo. Guess, professor of metallurgy at the University of Toronto has been chosen chairman of the Toronto branch of the C. I. M. M., for the coming year. Mr. J. P. MacGregor has been reelected as Secretary of the Branch.

TORONTO MINING QUOTATIONS.

Following are the average quotations for active gold, silver and oil stocks on the Standard Mining Exchange, for week ending 11 Dec. 1920.

SILVER	High	Low	Last
Adanac Silver Mines, Ltd....	1⅞	1¾	1⅞
Bailey	4	3½	3½
Beaver Consolidated	29	25¾	26½
Chambers-Ferland	5½	5	5½
Cobalt Provincial	46	40	40
Coniagas	2.00	2.00	2.00
Crown Reserve	20	15	16
Gifford	1⅜	1	1
Hargraves	1¼	1¼	1¼
La Rose	23	22	22
McKin.-Dar.-Savage	22¾	20	22¾
Mining Corp. of Can.	1.10	85	1.00
Nipissing	9.24	8.10	8.40
Ophir	2¼	1¼	1¾
Peterson Lake	10	8½	9½
Temiskaming	26	24	26
Trethewey	17¼	12½	14½
GOLD.			
Apex	1¾	1½	1½
Atlas	16½	15½	15½
Boston Creek Mines	10	8	10
Dome Extension	43½	42	42
Dome Lake	2½	2	2½
Dome Mines	13.00	12.20	12.40
Gold Reef	3	2½	2½
Hollinger Cons.	5.65	5.50	5.50
Keora	15	11	12
Kirkland Lake	39½	37	39
Lake Shore M. Ltd.	1.02	1.00	1.02
McIntyre	1.88	1.81	1.81
Moneta	9½	9	9
Newray Mines, Ltd.	3¾	3¾	3¾
Porcupine Crown	17½	15	15
Porcupine Tisdale	1	1	1
Porcupine V.N.T.	19	17½	17¾
Preston East Dome	2⅞	2⅝	2⅝
Schumacher	19	16½	18
Teck-Hughes	10	9	10
Thompson Krist	5	5	5
West Dome	5½	4¾	4⅞
West Tree Mines Ltd.	5½	5	5⅜
OILS.			
Ajax Oil	21	20	21
Eureka	31	30	30
Petrol Oil, New	34	30	30
Petrol Oil, Old	80	80	80
Rockwood Oil, Gas	3	3	3
Vacuum G.	20	10	12

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Dec. 14th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	19
Copper casting	18¾
Tin	43
Lead	6¾
Zinc	7¾
Aluminum	35
Antimony	8

SILVER MINE TO RE-OPEN NEAR PORT ARTHUR

J. J. O'CONNOR.

Another of the old time silver properties of the Port Arthur district is about to be developed. Mr. J. G. Spears, of Toronto, owner of the "3A", situated twelve miles east of Port Arthur, and one mile north of the Canadian National Railway, at Silver Harbour, has optioned this property to Pennsylvania interests. Work will be undertaken in the early Spring of 1921, when systematic development will be carried on to depth, and the formation thoroughly proven.

This property was discovered by two miners employed at the Silver Harbour mine, which adjoins it on the south, in the fall of 1870. During the winter of 1871-72, these men worked on the lode, carrying the ore taken out in the day, to their boarding house at Silver Harbour every night. They sunk a pit 18 feet deep from which they took during the Winter, 22 barrels of ore, which was declared to be as rich as anything the Silver Islet Mine was then producing. This ore was sold to Mr. J. S. Lyon, of Buffalo, N.Y. where he had it reduced by Kayser, James & Co. The bars were sent to the United States Assay Office, in New York, where according to the official report of the chief clerk, Mr. J. M. Floyd, yielded $17.80 of gold, and $301.45 of silver to the ton, with some nickel and cobalt.

Soon after this event Captain Slawson took over the management of the "3A". He sank three shafts on the lode 310 feet apart, from which considerable very rich ore was taken. According to J. M. Courtice, and the assayer J. B. Cleveland, the assays showed a yield of 2,465 ozs. of silver to the ton of 2,000 pounds, and one and four-tenths per cent of cobalt, with a good percentage of nickel.

The vein strikes nearly east and west, parallel with, and about a mile to the north of Silver Harbour. It occurs in the Huronian series, which in the vicinity consists of thick beds of diorite and fine grained greenish-grey slates, some of which are chloritic, talcose and ferruginous, with some serpentine alongside and in the vein. This formation, with which the vein appears to conform, dips at an angle approaching the perpendicular. It is much more ancient than that in which other silver mines in the Port Arthur district have been found. The discovery of silver in these older rocks, which are known to underlie the horizontal silver-bearing slates of the Thunder Bay silver area, should be good evidence to show that the silver does carry down, and is not carried only in the surface bed.

The outcome of the forthcoming development will be watched with great interest, as it is expected to demonstrate the occurence of silver in paying quantities, in a formation known to have great depth.

The Dominion Coal Company has acquired the steamers "Kamouraska" and "Rosecastle" by purchase. Both these steamers were built for long-term charter to the Dominion Coal Company, and were for a long time under Admiralty requisition during the war period. A controlling interest has also been obtained in the S. S. "Daghilda" which was constructed under a similar arrangement for the coal and ore service of the Dominion Steel Corporation.

British Columbia Letter

Stewart, B.C.

Now that the winter has settled down on the north country, word may be expected soon of considerable shipments of high grade ore from the Premier Mine, Salmon River, Portland Canal. Preparations were made during the Summer to transport quantities of such material over the snow trail as soon as the latter had hardened. The Premier, however, is not depending on this ore for its future but on its reserves of lower grade which have been under development and for the treatment of which the necessary plant is under construction.

There is no doubt that the closing down of development on the Big Missouri had a dampening effect, but those who have been through the district and who are competent to talk, assert that the Portland Canal Mining Division has but started along the road of mineral production, that the Premier mill be one mine among many, and that last season there were a number of prospects staked on both the British Columbia and the Alaska sides of the boundary sufficiently promising to warrant extreme optimism.

The Spider Group of Mineral Claims, which is being opened up by the Algunican Development Company, is a property of which much is predicted. Work is being continued throughout the winter. Commodious quarters have been provided for the men, who are being well taken care of in every respect and it is planned to commence shipment of ore over the snow early in the New Year.

Kaslo, B. C.

There is a revival of mining in the Slocan, the richest silver-lead camp of British Columbia. For months all the large producers have been closed down, with the exception of the Silversmith Mines Ltd. (old Slocan Star), because of the refusal of the operators to meet the demands of the men with respect to wages, accommodation, etc. They regarded the requirements of their employees, as expressed through an organization known as the One Big Union, as extravagant and refused to take them seriously. A strike was called. There is no doubt that it was effective for the mines were forced to inactivity. Ever since midsummer the mine managements have held to their guns and now it appears that they have been successful. When the strike was first declared work was plentiful as the lumber camps were able to absorb practically all able-bodied men who wanted employment. These camps now, in many instances, are closed down. There also is an influx of labor from the prairies province. The mines, therefore, are well provided with men and the old-established properties again are being put on a producing basis. The Noble Five Mine at Cody has taken on a crew of between 65 and 70 men; the McAllister has obtained all the men required to carry on work planned; the Rambler-Cariboo has a full crew; the Rosebery-Surprise Mining Co. has re-opened the Surprise Mine at Sandon as well as the Bosun Mine at New Denver. The concentrators of the Rambler-Cariboo and the Noble Five are in operation. It seems, therefore, that the strike is definitely broken and that the output of this section of the Province from this date on will begin to climb. There is no hope, however, that the loss of time experienced can be made up this year, and it would appear certain that the silver production of the Province, as a result, will show a decline as compared with the previous year when the official statistics are compiled.

Nelson, B. C.

At the International Mining Convention held at Nelson, B.C., during the Summer it was resolved that the Dominion Government should be asked to make provision for the prospecting and mining of base minerals on Indian reservations in this Province. As a result of the joint action of the Federal and the Provincial Governments it is permissible at present to mine the precious metals on such reservations. This privilege is considered of little value in British Columbia, because gold and silver are seldom found entirely apart from other minerals. Delegates to the Convention, consequently, decided to ask the Ottawa authorities to broaden the regulations to such an extent that they might be of value to the mining industry. Judging, however, from the reply received from Ottawa the prospectors and miners of the Province are as far as ever away from their object. In the first place it is pointed out that the Dominion Department of Mines has no control over the minerals found within Indian reservations, but that they come under the jurisdiction of the Superintendent General of Indian Affairs. And, secondly, it is set out that "under the provisions of the Indian Act the baser metals can only be disposed of by this department upon a surrender being obtained from the Indians, and where the base metals are found in conjunction with gold and silver authorized to be mined by the regulations....this department cannot dispose of the same until surrendered by the Indians."

Taxation on mining companies was a subject dealt with by Hon. Wm. Sloan, Minister of Mines, in a recent address delivered at Nelson, B.C. He made the important announcement that the justice and equity of representations made by mining men had been recognized and that "it would be recommended for favorable consideration that the depletion of mines be allowed as a deduction from revenue in ascertaining the taxable income."

Continuing he said:

"Our policy in all branches of Provincial endeavor is to increase production. While there must be income to meet obligations and to provide for the development of natural resources and the opening up of the country, the Government's course is so shaped that no industry will be overburdened, but that all enterprise that gives employment and increases our wealth and stability will be encouraged and stimulated."

Ainsworth, B. C.

No. 1 Mine, Ainsworth Group, owned by the Consolidated Mining and Smelting Co., has been leased by a number of competent mining men who propose mining and shipping ore without loss of time. This mine formerly was an important producer. Some great stopes have been chambered out. The property is situated high up the mountain back of Ainsworth. Both tramway and compressor are included in the lease. Last year No. 1 shipped 235 tons to the smelter and this year it has contributed 336 tons to the Train plant.

The Florence Mining Co., is pursuing an aggressive policy in the development of its property situated on Princess Creek, a few hundred feet from Kootenay Lake. This mine has been operating steadily during the past two years and is one of the few silver-lead producers of the Province with such a record. R. H. Hewer, general superintendent, believes that it is to prove one of the deep mines of the Kootenay. While ore has been extracted constantly since the opening of the property, being shipped by tram to the hopper of the concentrating mill whence the concentrates are transported to the loading trestle at the lake edge, the proving of ore reserves and general exploration has been systematically carried out with good results, according to Mr. Hewer. He states that the Florence has been found to possess one of the big vein systems of the district, including seven large veins, three being parallel fissure-veins and four cross-fissure veins. These veins are in limestone formation and are of a very friable rock. The Company has acquired permission to utilize the natural power of Woodberry Creek and it is planned to construct a plant on this Creek in the Spring, thus obviating the possibility of being inconvenienced through shortage of water for the generation of power. It also is proposed driving a new main tunnel from a point near the lake some 500 feet below the present No. 5 Level. Assuming that the theory that the ore is to be found at depth proves correct this work will open up an extensive new stoping area.

Trail, B. C.

Ore receipts in gross tons received at the Trail Smelter of the Consolidated Mining & Smelting Co., during the week ending November 30th last were 12,561, bringing the total for the year to 239,183 tons. Of the former the Company's mines aggregated 11,150 tons, while the Canada Copper Co., Allenby, which recently commenced operations, contributed 362 tons. The Josie Mine, Rossland, shipped 531 tons and the North Star, Kimberley, 250 tons.

Grand Forks.

The Copper Mountain Mine of the Canada Copper Company now is on a permanent shipping basis. The new mill has been in operation for some weeks and is reported to be giving satisfaction. Some minor adjustments had to be made after the test runs but these have been effected and now the ore is coming from the mine daily in carloads, is being concentrated at Allenby, and thence shipped to the Trail Smelter. The last reports were that 50 carloads of concentrates were being shipped from Allenby every day which means that approximately 800 tons of ore is going through the Mill in the same period.

It is announced that a Dominion charter has been granted the Canada Copper Co. and that the Company's head-office will be situated at Toronto. The capitalization is $10,000,000 and authorization is given to take over the Canadian Copper Corporation Ltd. carrying on business in British Columbia.

Vancouver, B. C.

Those in charge of development on the Emancipation Mine are very sanguine in their references to the outlook. Dr. E. T. Hodge, who recently returned from the property, declares that some of the richest gold-bearing quartz of British Columbia has been uncovered, assay returns having been obtained which are rivalled only by the Engineer Mine of the Atlin District.

Reference has been made to the incorporation of the Coast Range Steel Ltd., an organization said to be backed by British capital to the extent of $15,000,000, and whose plans are to establish in British Columbia an iron and steel industry capable of taking care of all the requirements of north western America and as well of securing a large share of the foreign trans-Pacific trade. It was said, too, that another British syndicate has had its engineers in the field in this Province investigating its natural resources with a view to starting a similar enterprise. A third announcement has been made in this connection which is of interest. It is that the Industrial Department of the Provincial Government has undertaken to loan $250,000 to finance the amalgamation of the Port Moody, Eburne, and Tudhope Electric Plants, the new company to be known as the B. C. Steel Works Ltd. No official confirmation, however, is available of the assistance said to be promised by the B. C. Government.

Victoria, B. C.

Because of the weakness of the copper market the Britannia Mining & Smelting Co., has materially reduced its staff both at the mine and smelter. It is stated that the shipment of concentrates will cease until conditions improve and that in the meantime the development of the property will be proceeded with. The Granby Mining, Smelting & Power Co., has been similarly affected. The output is being substantially reduced, a large number of the employees having been discharged.

The prospectors of British Columbia now are strongly organized and they are moving towards the establishment of closer relations with the Provincial Department of Mines. They are anxious to obtain action on a number of matters of concern to them, chief among which is cheap powder. It is contended that the miners should obtain explosives on the same basis as it is supplied to the farmers for stumping purposes. The farmers get it through the Government and the Farmers' Institutes at cost plus transportation charges. The Prospectors' Association believe that a similar arrangement is feasible in connection with the mining industry. They also desire some uniform policy in respect of mine-road construction in the various districts, in regard to Winter lectures by resident mining engineers for the benefit of prospectors, and relative to the establishment of exhibits of minerals in the various provincial centres. There is a probability that a conference will take place before the next session of the Provincial Legislature between authorized delegates from the Prospectors' Associations and the Minister of Mines for a discussion of these questions and with a view to reaching a basis for close co-operation in the formulation of advanced and generally beneficial legislation.

GOLD-BEARING ROCKS IN THE WESTERN AUSTRALIAN DESERT.

Valuable Report issued by the Geological Survey, Perth, W. A.

Notable among the publications of the geological surveys of the British Dominions are those of Australasia, and in particular those of New Zealand. These publications, which rival in excellence of contents and format those of our own Survey, apart from their scientific value are interesting because of the vivid contrasts they reveal between the necessary outfits and the surroundings of geological survey parties in Canada and in the Antipodes.

An exceptionally interesting report to hand is one issued by the Geological Survey of Western Australia describing a geological reconnaissance of the country between Laverton and the South Australian Border, including part of the Mount Margaret Goldfield, near south latitude 26 degrees. In this instance the word reconnaissance is used with exactitude, as a great part of the territory traversed was waterless desert, with occasional "soaks" and desert vegetation consisting largely of spinifex. The country contains roving black fellows, and some delay was occasioned to the expedition by an attack of the aborigines in which one of the party was seriously injured. The pack animals were camels. The location of water-holes was carefully observed by the party and a chapter is devoted to notes on this all-important matter in desert travel.

A characteristic topographical feature of the West Australian desert is the "breakaway", and much space is devoted to explanation of the probable origin of these raised "table-tops". The feature is due to an indurated surface capping over unconsolidated material. When through animal agencies, or wind and water, the indurated capping is broken through, the unconsolidated strata below is, after undergoing breaking down by weather agencies, finally "exported" by the wind, and eventually rolled into great ridges, leaving the insolated "breakaway" ranges like coastal cliffs in appearance.

The area of possibly auriferous rock discovered appears to be small, but it is stated there are good grounds for believing that it extends further than it was possible for the exploring party to penetrate. The rock samples brought back were found to be only slightly gold-bearing.

At one point the expedition noted an extensive and definite boulder bed about fifteen feet in thickness, of glacial origin. Mr. A. Gibb Maitland considers this important discovery to be of more than local significance. The precise position in the geological time-scale of this deposit cannot be fixed definitely, but Mr. Maitland suggests it may be of late Mesozoic or Tertiary age.

The petrology of the rocks observed is very carefully worked out, and numerous microphotos of specimens are included in the Report. A correlation of the specimens brought back by the expedition is given with those from other localities in Central Australia, and from the Western Australian Goldfields. The rocks brought back by the survey party include acid porphyries, granites, granulites and gneisses, greenstones, basic plutonic and dyke rocks, and rocks of clastic and sedimentary origin. About half the volume is occupied by the petrological matter.

The Report is issued by Minister of Mines, Perth, West Australia.

NOTES FROM THE NOVA SCOTIA COLLIERIES.

Labor and Wages.

The vote of the union members taken on the question of the acceptance of the Montreal agreement approves of its acceptance. The matter has been one of very hot debate, and the advice of the leaders to accept the terms agreed upon at Montreal met with severe criticism, especially from the mainland collieries. The alternative of a strike met with no sincere advocacy, because the inopportuneness of a strike for higher wages under conditions of widespread unemployment and tumbling values of commodities and securities was too plainly evident.

Lifting of the Export Embargo.

The Board of Railway Commissioners has ordered a conditional lifting of the export embargo, and it is unlikely that such a measure will again be invoked. The ideas of Government with regard to the coal industry seem to be limited to the imposition of control of prices and limitation of distribution. It never seems to have occurred to anyone at Ottawa that what the coal industry needs is financial aid, more skilled miners and governmental solicitude for extension of coal markets. Up till now the Nova Scotia coal mines have been utterly neglected when coal could be cheaply imported from the United States, and treated as the reserved property of the national railways when coal was scarce and dear across the line. No consistent policy of guaranteeing government purchase of domestic-mined coal, or of preference for Canadian coal in governmental uses has ever been adopted. If the policy of the government is to buy coal in the cheapest market, regardless of its origin, it can not grumble if the public do likewise, and if such a policy is persisted in, it makes the variest buncombe of all arguments for a policy of national protection. The imposition of an embargo on exports in times when export trade is profitable carries with it an obligation to guarantee a domestic market when export is unprofitable, and when the pressure of foreign importation is great. Coal production is as truly a crop as wheat. Unless the seed of preparation, development, expenditure and human energy is sown, and due allowance made for the factor of growth and the lapse of time, no production can be looked for. The popular idea that a coal mine resembles a reservoir which can be tapped at need is all wrong. The production of coal five years from now will depend upon the work done in 1920, and not all the King's horses or all the King's men can produce coal in times of scarcity if the plans were neglected, or prevented, in the years that preceded scarcity.

WATER-WHEELS IN B. C. MINES.

The Improved Kincaid Water-Wheels and Governors are the latest in water-power machinery. This equipment is of Canadian manufacture, being manufactured in Vancouver, British Columbia by the Canadian Water Wheel Company, Limited. Mr. John Kincaid, the designer of this water-wheel, is in charge of the factory, and every machine passes under his personal supervision. Several of these wheels have been in use at the Premier Mine, and just recently orders for two more wheels have been received from the same people, which speaks well for the results obtained from these machines.

COAL MINING IN SPITSBERGEN.

The Scottish Spitsbergen Syndicate sent two expeditions to Spitsbergen, the second of which recently returned and reported. The expedition, including distinguished geologists, miners, borers and assistants numbered about fifty persons.

Coal seams are noted, containing coking coal of good quality. The seams are not thick, varying from 2 ft. 3 ins. to 4 ft. One proved area in the Ebba Valley is estimated to contain up to 16½ million tons of accessible coal, and another area is estimated to contain 90 million tons. There is said to be an absence of folding and faulting.

There are now stated to be ten working coal mines in Spitsbergen, and over one thousand miners and mine officials and their wives are wintering in Spitsbergen this season.

Some idea of the necessity for coal in Europe may be gleaned from the statement that Spitsbergen coal is finding a ready sale at from fifty to sixty dollars a ton. The community has postal service, a newspaper, hospital and other conveniences, and is connected by wireless stations with various points on the European mainland.

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,
Peacock Brothers Limited.

Alternators:
MacGovern & Co.

Spielman Agencies, Regd.

Aluminium:

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

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Arrester, Locomotive Spark:
Hendrick Manufacturing Co.

Arsenic White Lead:
Coniagas Reduction Co.

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

Ash Conveyors:
Canadian Link-Belt Company

Ashes Handling Machinery:
Canadian Mead-Morrison Co., Limited
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.
Peacock Brothers Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works.
The Hardinge Conical Mill Co.

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

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

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

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

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

Belting—Leather, Rubber and Cotton:
Canadian Fairbanks-Morse Co., Ltd.
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 & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co.

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

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

Bluestone:
The Consolidated Mining & Smelting Co.

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

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

...de 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 Handli...
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.
Peacock Brothers Limited.

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

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.
Peacock Brothers Limited.

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.
Peacock Brothers Limited.
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.
Peacock Brothers 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, Q

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

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

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.
Peacock Brothers Limited.

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

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

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

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

Coal Pick Machines:
Sullivan Machinery Co.

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

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

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

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

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

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

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

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

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

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Jones & Glassco (Regd.)

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd.

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

Conical Mills:
Hardinge Conical Mill Co.

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

Couplings:
Hans Renold of Canada, Limited, Montreal, Q

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

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

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

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

Crushers:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited

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., Rockwa
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, I
Jones & Glassco (Regd.)
Mussens, Limited
The Wabi Iron Works

Engineering Instruments:
C. L. Berger & Sons

Engines—Automatic:
Canadian Fairbanks-Morse Co., Lt
Canadian Mead-Morrison Co., Limit
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., Mont
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.

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

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

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

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

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

Feed Water Heaters:
MacGovern & Co.

Fire Fighting Supplies:
Gutta Percha & Rubber, Ltd.

Flashlights—Electric:
Spielman Agencies, Regd.

Flood Lamps:
Northern Electric Co., Ltd.

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

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

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

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

Frequency Changers:
MacGovern & Co., Inc.

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

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

Gaskets:
Gutta Percha & Rubber, Ltd.

Gears:
Hans Renold of Canada, Limited, Montreal, Q
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, Lt
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 Ste
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R T. Gilman & Co
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Link Belt
Canadian Fairbanks-Morse Co. Ltd.
Canadian Link-Belt Co., Ltd.
Northern Canada Supply Co.
Jones & Glassco
Machinists:
Burnett & Crampton
Machinery—Repair Shop:
Canadian Fairbanks-Morse Co., Ltd.
Machine Shop Supplies:
Canadian Fairbanks-Morse Co., Ltd.
Magnesium Metal:
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.
Manganese Steel:
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
Metal Marking Machinery:
Canadian Fairbanks-Morse Co., Ltd.
Metal Merchants:
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canad
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

Canadian Miners' Buying Directory.—(Continued)

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

Nails:
Canada Metal Co.

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

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

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

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

Oil Analysts:
Constant, C. L. Co.

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

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

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

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

Roller Chain:
Hans Renold of Canada, Limited, Montreal, Que.
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., Ltd.
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.
Ledoux & Co.
Milton Hersey Co.
Thos. Heyes & Son
Mine & Smelter Supply Co.
Mussens, Limited

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

Screens:
Greening, B. Wire Co.
Hendrick Mfg. Co.
Mine & Smelter Supply Co.
Canada Wire and Iron Goods Company.
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.
Peacock Brothers Limited.
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.)

Silver:
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 Electrice:
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.
Peacock Brothers Limited.
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Steel Drums:
Smart-Turner Machine Co.

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

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

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

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

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

Surveying Instruments:
C. L. Berger

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

Switches and Turntables:
John J. Gartshore

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

Tanks:
R. T. Gilman & Co.

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

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

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

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

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

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

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

Canadian Miners' Buying Directory.—(Continued)

Tramway Points and Crossings:
Canadian Steel Foundries, Ltd.
Hadfields, Limited
Transits:
C. L. Berger & Sons
Transformers:
Canadian Fairbanks-Morse Co., Ltd
R. T. Gilman & Co.
Northern Electric Co., Ltd.
Transmission Appuiances:
Jones & Glassco (Regd.)
Transmission Machinery:
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.
TTrucks:
Canadian Fairbanks-Morse Co., Ltd.
Tubs:
Hadfields, Limited
Tube Mills:
The Electric Steel & Metals Co.
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.
Tube Mill Balls:
Canada Foundries & Forgings, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.
Tube Mill Liners:
Burnett & Crampton
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.
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:
Allan, Whyte & Co., Ltd.
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
Zirconium:
Everitt & Co.
Zinc:
The Canada Metal Co., Ltd.
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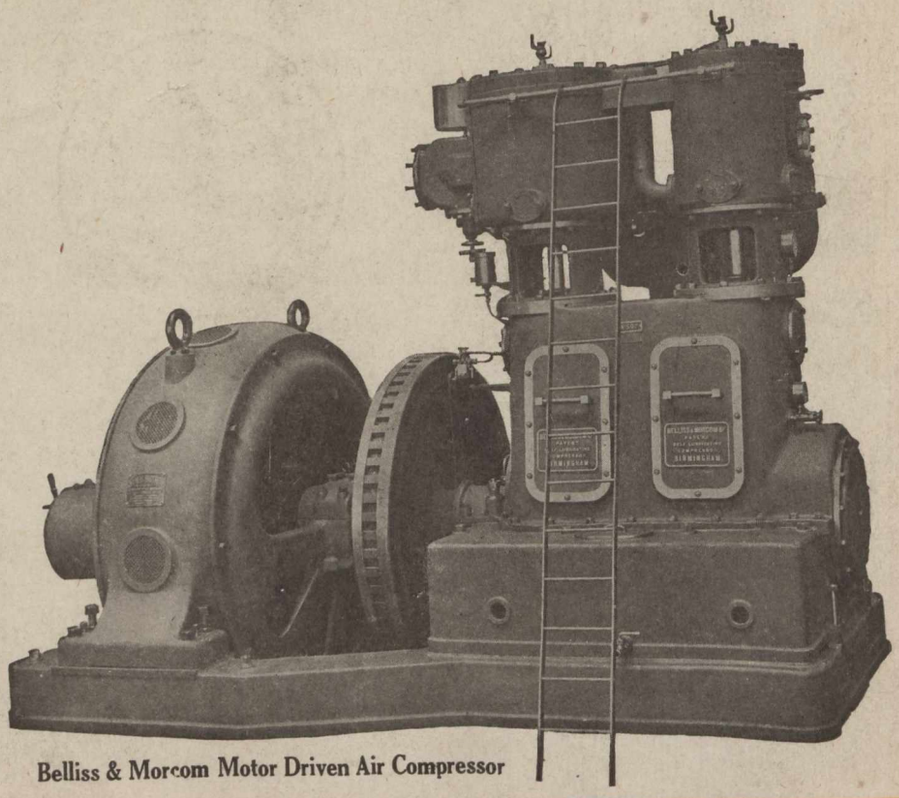

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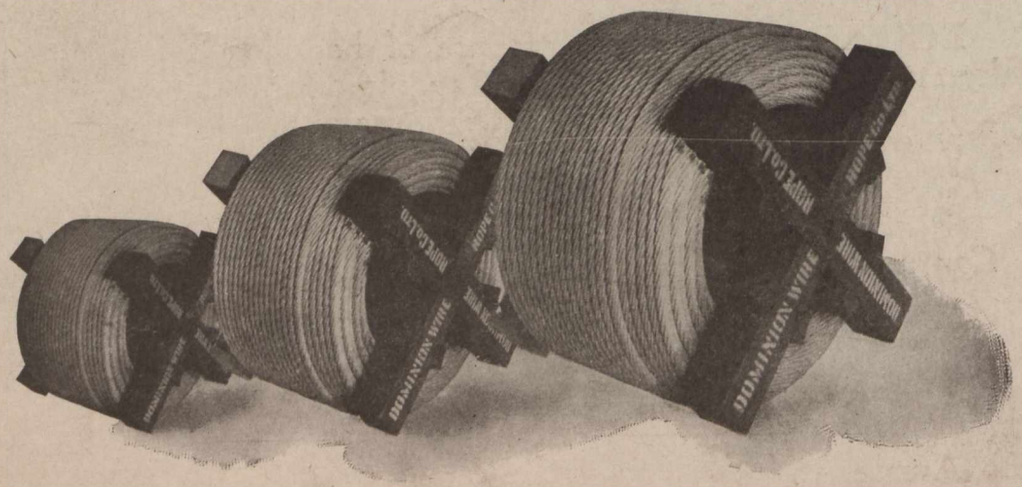

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