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VOL. XXXVIII

TORONTO

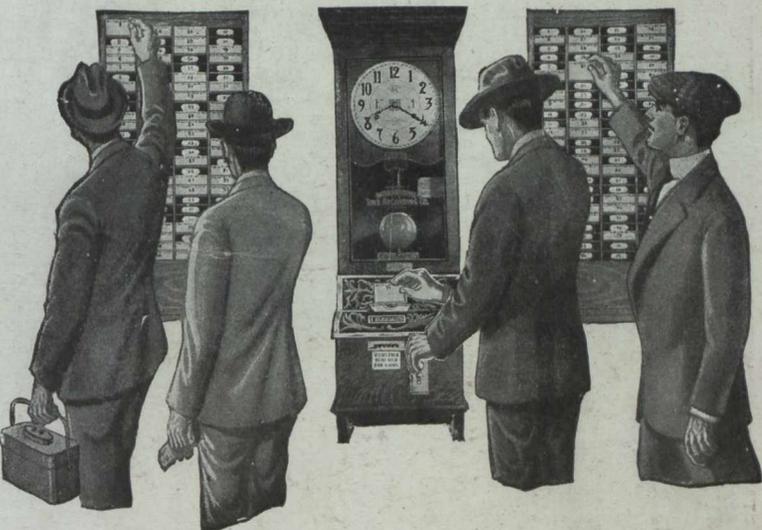
No. 22

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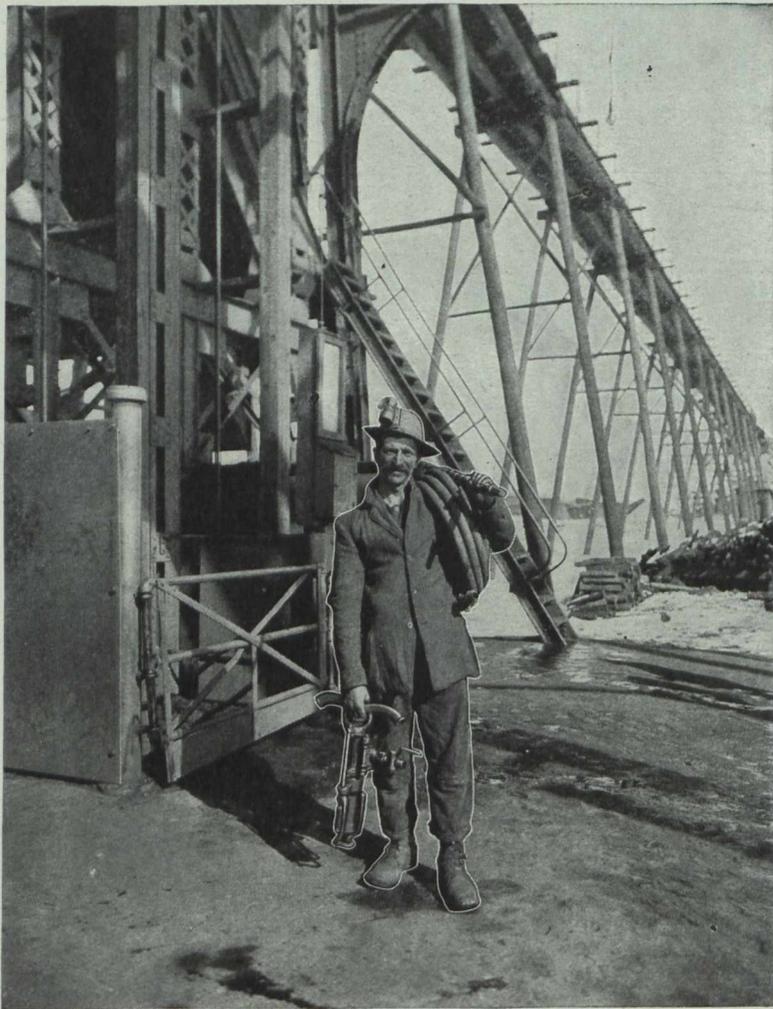
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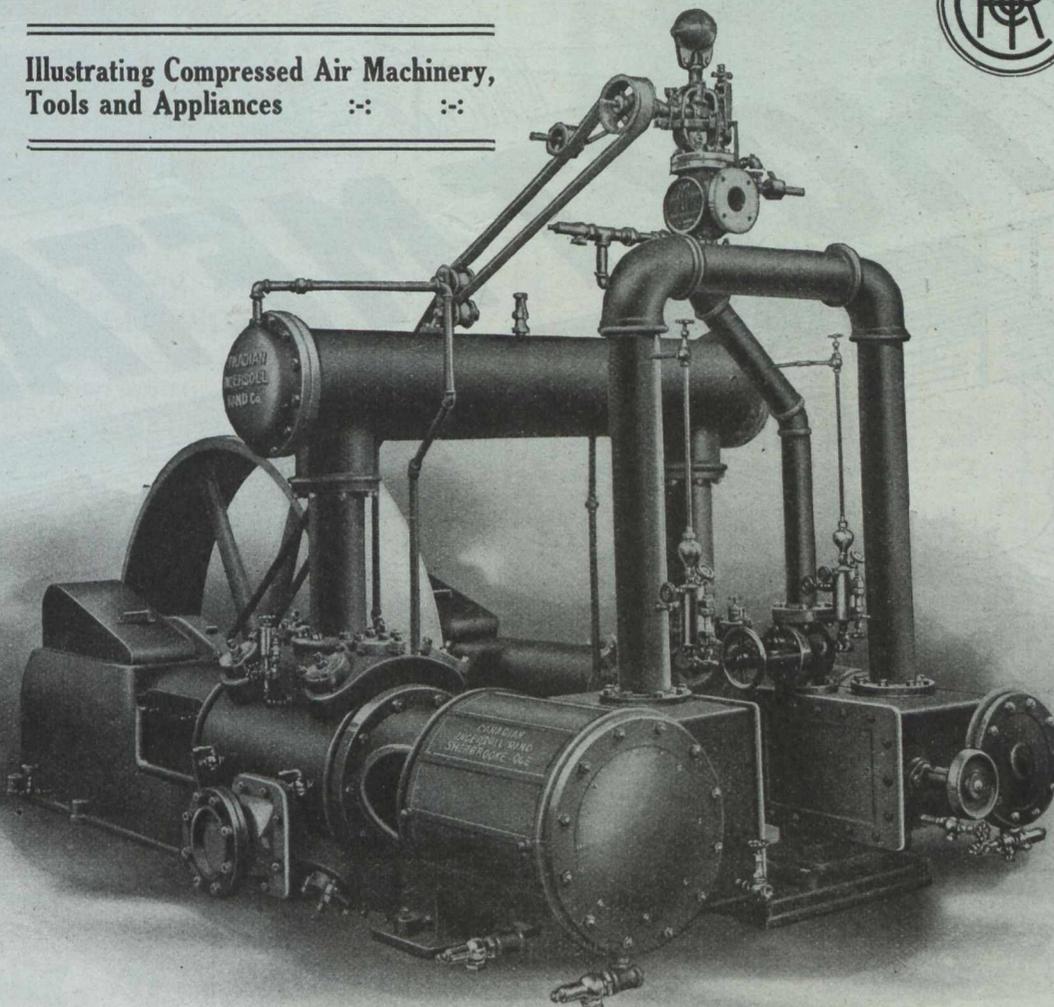
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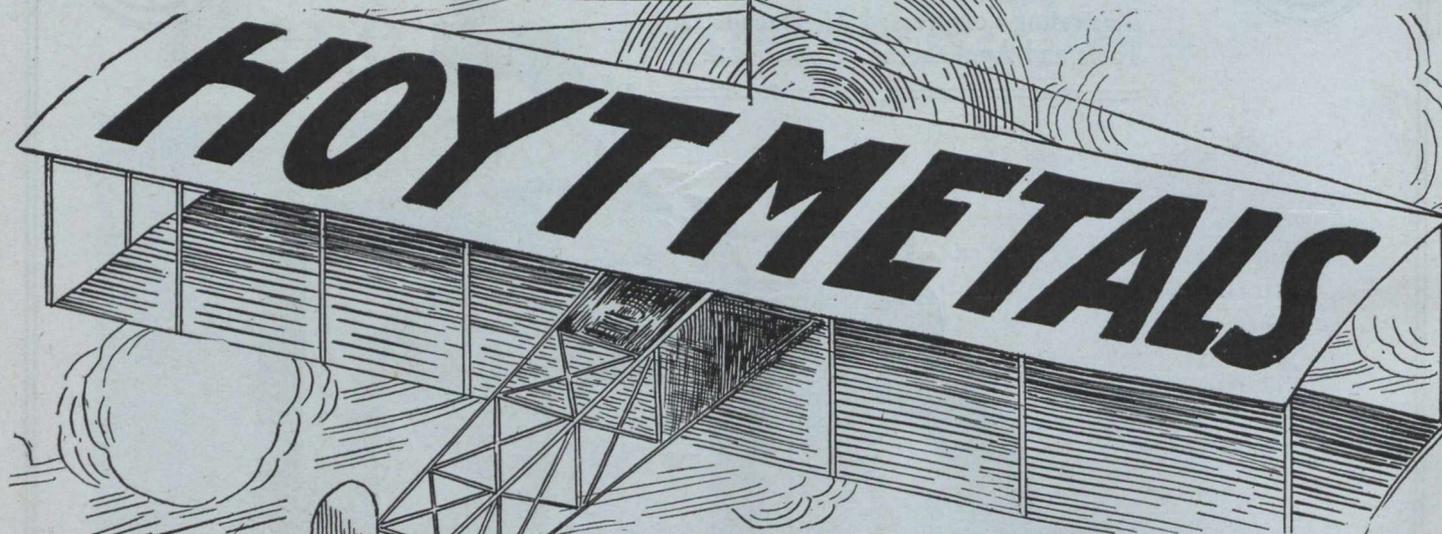
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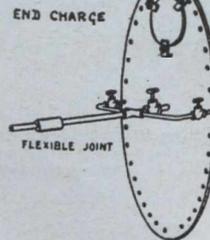
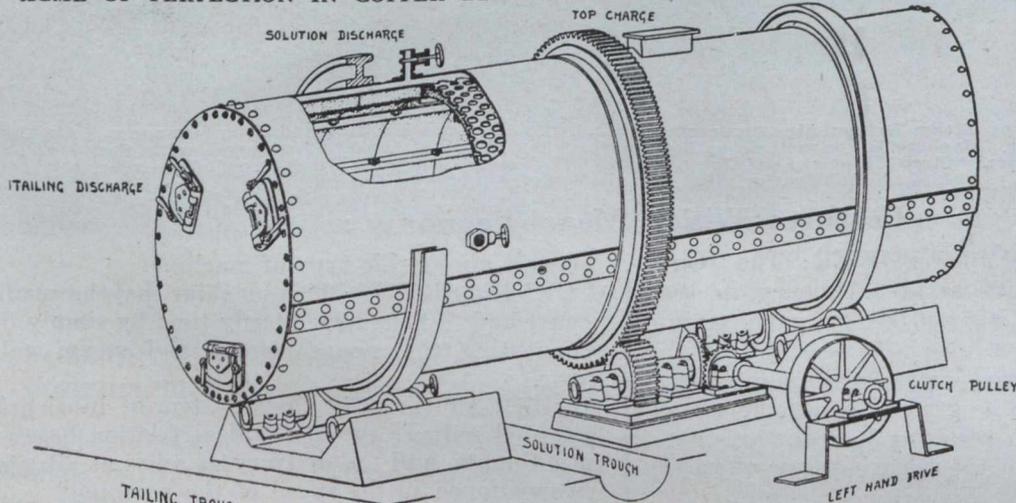
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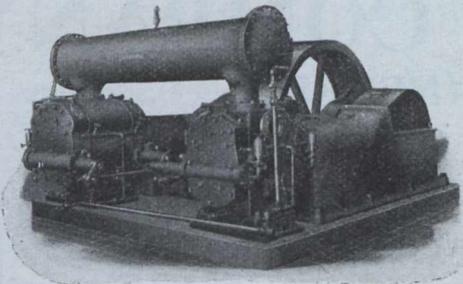
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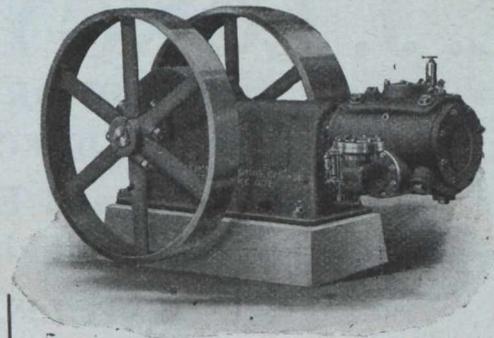
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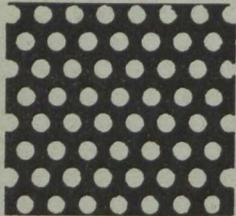
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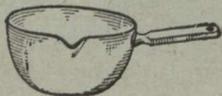
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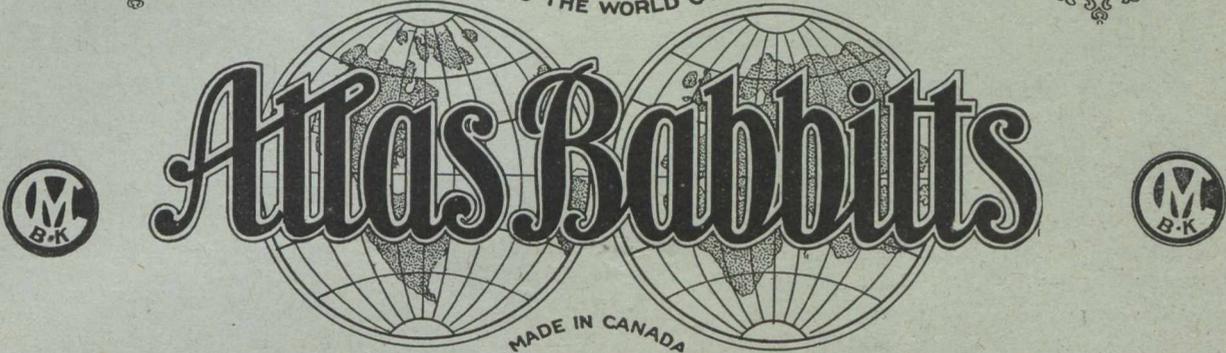
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5

The Minerals of Nova Scotia

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

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

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

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

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

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

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

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

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

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

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

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

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

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

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The Flotation Process

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who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES adjudged our basic patent for air-froth flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision and, at a recent trial in the United States District Court at Butte, Montana, Judge Bourquin admitted these claims as amended.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

Prospective users of our flotation processes are earnestly requested not to be misled by the mistaken views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

NOTICE

Notice is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

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Aggregate Value of \$558,560,715

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

Production During last ten years, \$284,916,993

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

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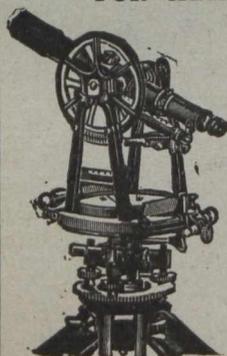
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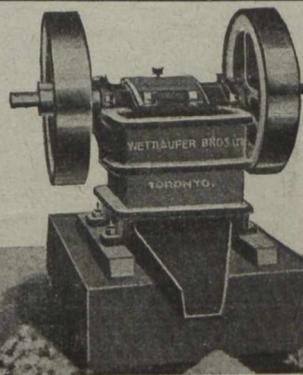
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THE CANADIAN MINING JOURNAL

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CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo N.Y., under the Act of Congress of March 3rd, 1879."

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DUST BARRIERS IN COAL MINES.

In order to prevent as far as possible the propagation of explosions, inert dust barriers have been installed in several bituminous coal mines in Alberta. These barriers extend from 175 ft. to 200 ft. in length and consist of shelves eighteen inches to twenty-four inches wide with spaces of twenty-four inches between them. These shelves are loaded with incombustible dust taken from the combustion chambers of steam boilers, the analysis of this dust showing that it is very satisfactory for this purpose.

MORE COMMISSION NONSENSE.

Many of our readers have received during the past few weeks an undated circular letter from the Munitions Resources Commission that must have surprised those who read it. They were possibly not surprised to receive such a circular; for similar ones have been widely distributed in the United States, and it was to be expected that some poorly informed commission would be found to imitate our American friends. Many of those who promptly recognized it as a poor imitation of an out-of-date American circular letter, probably consigned it to the waste basket. Those who have read the thing carefully, however, must conclude that the misinformation contained in this sort of letter may be doing considerable harm. Is it not time to stop this childish prattling about our supposed ignorance of our mineral resources and to take steps to check the spreading of lies and misleading information by our poorly informed commissions?

The Munitions Resources Commission in its circular letter says: "Some immediate action is imperative. The first thing is to take a careful inventory of Canadian resources. . . . The work of this Commission is to secure and condense information as to the relative importance of various properties from the standpoint of domestic mineral production. . . . The following minerals are of special importance: pyrite, and pyrrhotite, sulphur, manganese and manganiferous iron ore, lead, nitrate, phosphate, potash, bauxite, chromite, tin, platinum, flake graphite, molybdenite, tungsten, magnesite, sheet mica and high grade refractory clay." It then asks engineers and geologists to send in information concerning deposits in all parts of the country.

The Munitions Resources Commission is, as readers of the circular may easily judge, wholly incompetent for such a task as it proposes to undertake. It evidently knows little concerning our mineral resources and the demand for minerals, and even less about the machinery for gathering and condensing information. It makes foolish misleading statements and then asks for the co-operation of engineers and geologists. The commission will do well to consider whether it has acted wisely in usurping the functions of governmental departments. On whose authority is the commission undertaking to repeat work already done by more capable men?

Why does this commission refuse to recognize the work of years of properly qualified men? Why does the commission spread the foolish report that we do not know anything about our mineral resources. Does it propose to deliberately mislead the public or is it merely exhibiting its own ignorance?

If the Munitions Resources Commission really wants the information it asks for why does it not apply to the Department of Mines at Ottawa? Very complete information is on file there and is readily accessible, although some poorly informed gentlemen, occupying positions which give their words some weight with those who do not know of their unreliability, frequently make statements to the contrary. The Department of Mines has collected information concerning all known important deposits and it is crass stupidity for the Munitions Resources Commission to begin now to duplicate the work already done by better qualified men. If further information is wanted than can be obtained from the Department of Mines and the Bureaux of Mines of the Provinces, these organizations can secure it much more readily than can the Munitions Resources Commission. They will moreover be able to interpret the information obtained; while the Munitions Resources Commission gives no indication in its circular of being able to intelligently compile and condense such information.

The circular sent out by the Munitions Resources Commission is not only evidence of that Commission's inability to deal with the matter, but the action of the Commission is insulting to the Departments of Mines of the Dominion and the Provinces. It is to be hoped that the heads of these capable organizations will not allow the insult to pass unnoticed. The Commission, like other Commissions that are undertaking to interfere with the work of the mining departments, should be put in its place and at once. It is undertaking business that can be better done by others and it has plenty of work which it is better qualified to undertake. It is also, by its ignorance of the mineral industry, creating false impressions.

It is unfortunate that such commissions are given powers which allow them to waste effort and make unnecessary work for their staff. It is to be hoped that this commission can be made to realize that its action will lead to a lot of useless work. If they are men of the caliber which their efforts in other lines indicates them to be, they will recall these foolish circulars and leave our mineral resources to the care of the Mines Departments.

The Canadian Munitions Resources Commission in its circular gives the impression that there is a shortage of lead. Why does it do this? Is it because our lead producers are experiencing such difficulty in disposing of their product?

The Munitions Resources Commission wants deposits of phosphate. Our American neighbors have more than they know what to do with. We have already had a lot of nonsense about phosphate deposits from another commission. Apparently one commission is being affected by the absurdities of the other.

At Sudbury there is going to waste annually 300,000 tons of sulphur which could be manufactured into a million tons of ordinary sulphuric acid. It is not being used because there is not enough demand for acid here to warrant its recovery. And yet the Munitions Resources Commission professes to be worrying about the sources of supply.

If there is a shortage of molybdenite a larger production can easily be obtained by removing the embargo on shipments and allowing producers to receive a price that will warrant the operation of properties that cannot be worked under present conditions.

Information concerning all known important mineral deposits in Canada has been collected by the Mines Branch and Geological Survey. Much of the information has been given to the public in reports. For convenience of reference, a carefully prepared index is available for the years 1863-1906, while a revised up-to-date index is in preparation. Officers of the Department of Mines who have prepared the various reports can be consulted concerning developments since their reports were issued. The files have been arranged for easy reference. Some of those who do not consult the Mines Department make misleading statements concerning the available information, but these statements do not alter the facts. A false impression has been conveyed by repetition of false statements. The Munitions Resources Commission apparently shares this impression.

If a committee on war minerals is needed in Canada, a properly qualified group of men can best be obtained by getting together the heads of the Federal and Provincial Mines Departments. These men know what information is available and they know how to use it. They know how to get additional information and they can use the resources of their departments to get it. Moreover, they know how to interpret the information they collect.

If any engineer or geologist has a nice little tin deposit hidden in the bushes, the Munitions Resources Commission would be pleased to hear of it.

The Munitions Resources Commission must be getting panicky. It evidently does not know enough to refuse to undertake work for which it is not qualified.

It is not surprising that our American friends show some signs of panic in their endeavor to do their utmost to provide munitions. It is not surprising that they exhibit great concern over their scarcity of nickel, for they may have forgotten for a moment that Canada can supply all they want. They will get over that phase of the war excitement soon. It is surprising, however, that our Munitions Resources Commission is willing to imitate this weakness. It professes to be worrying

over phosphate, while the United States has more than it knows what to do with. Are we not Allies? The men who really produce minerals are acting under the impression that we are.

A few years ago the Department of Mines and the Canadian Mining Institute between them dealt with all questions concerning the mineral industry. During recent years certain commissions have been formed which now usurp to some extent the work of these two organizations. The Conservation Commission makes its own reports on certain phases of the mineral industry. The Advisory Council of Scientific and Industrial Research has also been paying much attention to mining and allied subjects. Now the Canadian Munition Resources Committee is sending out misleading circulars. Is not our machinery in Canada becoming a little too complex?

The owners of those phosphate plants in the United States which have been closed down owing to lack of facilities for shipping phosphate to Europe will be pleased to hear that the Canadian Munition Resources Board is getting anxious about the supply of phosphate. Perhaps the Commission intends to put a little more phosphate into those deposits at Banff that the Commission of Conservation delights to talk about.

The Munition Resources Commission wants information on phosphate deposits. If the chairmen of the Advisory Council, the Commission of Conservation and the Munition Resources Commission would have a little phosphate convention and ask someone familiar with the phosphate industry to speak to them, they would get some very helpful information.

There is an opening at Ottawa for a few nice middle-aged deposits of potash ore. Deposits soluble in water will be given preference. Owners will please apply to the Munition Resources Commission.

What are the qualifications of the Munition Resources Commissioners? Who appointed them? Who gave them authority to solicit the co-operation of engineers and geologists to collect information which they would not know how to use when they got it. They don't know how to use the information already available.

Why is the Munition Resources Commission undertaking to make an inventory of our mineral resources and duplicate work already done? Is it because the Commission is unwilling to co-operate with the public departments?

ANNUAL MEETING, C. M. I.

The twentieth annual meeting of the Canadian Mining Institute will be held in Montreal on March 6th, 1918.

MINERALS SEPARATION.

Under date of November 3 the following editorial was published in "Mining and Scientific Press," San Francisco:

It is apparent from recent issues of the "Canadian Mining Journal," the "Northern Miner," the Toronto "World," and other papers across the border, that the company claiming a monopoly of rights to the flotation process has been under the fire of journalistic shrapnel. The "Canadian Mining Journal" has maintained a dignified and correct attitude throughout this campaign, with the result that it has been attacked by its less responsible contemporaries. A charge has been made that Minerals Separation, more particularly its American subsidiary, is under German control. We stated the facts succinctly in these columns in our issue of October 6. Nothing has happened since to call for a revision of the statement then made. The connection, as agents at New York, of Beer, Sondheimer & Co., a German firm placed temporarily on the black list of the British government, is the chief evidence on which Minerals Separation is charged with being a German corporation anxious to hinder the production of war-metals in the United States and Canada. Since December, 1916, the American business of Minerals Separation has been in the hands of the Minerals Separation North American Corporation, the directors of which are Messrs. John Ballot, S. Gregory, and Frank Altschul, the last holding a commission in the American army. We infer nothing from the naturalized citizenship of this or that director, nor do we think that the efforts to separate the identity of the British parent company from the American subsidiary is of any importance, but we do feel absolutely confident that Mr. J. H. Curle, well known to readers of our paper, and a man of unimpeachable loyalty, as also of unimpeachable honor, could be no party to any attempt to interfere with metal production in the interest of the enemy. Amid the various charges of the Canadian press and the explanations published by Messrs. Ballot and Williams, we place our reliance squarely on the good faith of Mr. Curle, who is a director of Minerals Separation and a close friend of Mr. Ballot. Mr. Curle's association with the enterprise gives us confidence in Mr. Ballot personally and in Minerals Separation as a corporation. We believe that the papers at Cobalt and Toronto are barking up the wrong tree. We agree with them that Minerals Separation, with its attempted patent-monopoly, is a pestilential nuisance to the mining industry, but we see no good in beclouding the issue with false charges. The "Canadian Mining Journal" brushes aside the misstatements of the daily press and reviews the position in an eminently sane fashion. We appreciate our contemporary's reference to ourselves. Our attitude is now prejudiced, for good reasons, but we did not come to the conclusion that Minerals Separation's claims to a monopoly were unjustified by the facts of discovery without first making an honest and thorough inquiry. The patent-mongering company has tried to bluff the metallurgical profession in America by imposing an invalid agreement on technicians employed by its licensees, it has tried to exact extortionate royalties, and it has endeavored persistently to stifle the publication of information concerning the technology of the process. The decisions of

the American courts have been, in the main, favorable to Minerals Separation, but the end is not yet. Meanwhile the patent laws of Canada afford better protection to the public than our own and we expect that any attempt to impose an unreasonable royalty can be defeated. It is to be hoped that the Mines Department of the Dominion will give serious attention to the question, not only in the furthering of metal production, but in the vital interest of the mining industry. Owing to the closer control exercised by the Canadian government over patent royalties and over mining regulations, especially in this time of war, it ought to be practicable to bring the Minerals Separation people, whether in New York or London, into a sensible frame of mind and to make some arrangement with them, whereby the mining industry of Canada may be relieved of an incubus. We hope that the Canadian Mining Institute and the "Canadian Mining Journal" will unite in pressing the subject upon the attention of the Canadian government with a view to granting relief to the mining industry of the Dominion and preventing a further development of a tyrannical, extortionate, and stifling control upon the output of base metals.

Since writing the above we have received a telegram from the "Northern Miner" stating that Mr. Frank Cochrane, who was Minister of Lands, Forests, and Mines in Ontario before entering the cabinet of the Dominion government, stated at Cobalt on Oct. 24 before a "Win the War" convention: "It will be my business to see Sir Robert Borden (the Premier) on the question, with a view to bringing them (the M. S. people) to their senses, and, for the benefit of the mining community, I shall try to get him to cancel their contracts." He informed the meeting that, if, after a thorough investigation it were found that the control was not vested in German alien enemies, it would be the duty of the government to see that the royalty imposed was so reasonable that it would in no way embarrass the industry or in any way retard the development and production of Canadian metals. In this connection he suggested that the government would appreciate the advice of operators in Canada as to what, in their estimation, would be considered a fair and reasonable royalty. This is the summary as telegraphed by our courteous contemporary at Cobalt. We are glad to see that attention is being given by the Canadian government to the question, and we hope that the mining profession in Canada will bestir itself to co-operate with the proper departmental authorities. As to a fair royalty, five cents per ton regardless of quantity would yield a handsome income for the patentees without being burdensome to the operators of mines. The Anaconda and Inspiration companies, with others in that group, are paying 4 cents per ton on an aggregate output in excess of 30,000 tons daily. We do not believe in a royalty based on tonnage because in principle it is unreasonable, and in practice it comes hard on small mining enterprises. Some official fixation of the royalty would be a great relief to the Canadian mining industry, and we wish it were practicable on this side of the border, but we suggest that the Canadian government might do even better, by buying the disputed patent-rights, and then either make a present of them to the mining industry of the Dominion or else charge a small royalty, sufficient to represent 4 per cent. on the purchase. Such a step would serve at once as a strong stimulant to mining development.

From this we deduce that Mr. Rickard's case against Minerals Separation is much the same as that of the Temiskaming mine managers insofar as unreasonableness of the Minerals Separation demands is concerned. He is, however, of the belief that the charge of German control of the N. A. Corporation is false.

While we believe with Mr. Rickard that this charge is false, we nevertheless believe that an investigation is necessary to clear away the suspicion which is a natural consequence of the association with Germans. We believe that the newspapers which laid the charges acted unfairly and that the evidence offered was not of a character to warrant such charges. On the other hand we know that some mine managers are sincerely of the opinion that the corporation is controlled by Germans.

The unreasonableness of the demands of the Minerals Separation corporation must also be considered as warranting investigation and action by Government. No Canadian mine manager should be expected to sign a license with the Minerals Separation corporation until the objectionable features of the license have been removed and a reasonable royalty agreed upon.

The Associate Committee on Mining and Metallurgy of the Advisory Council should at once go carefully into the work of the Council on all matters affecting mineral resources, with a view to preventing the waste of money on foolish projects and the misleading of the public.

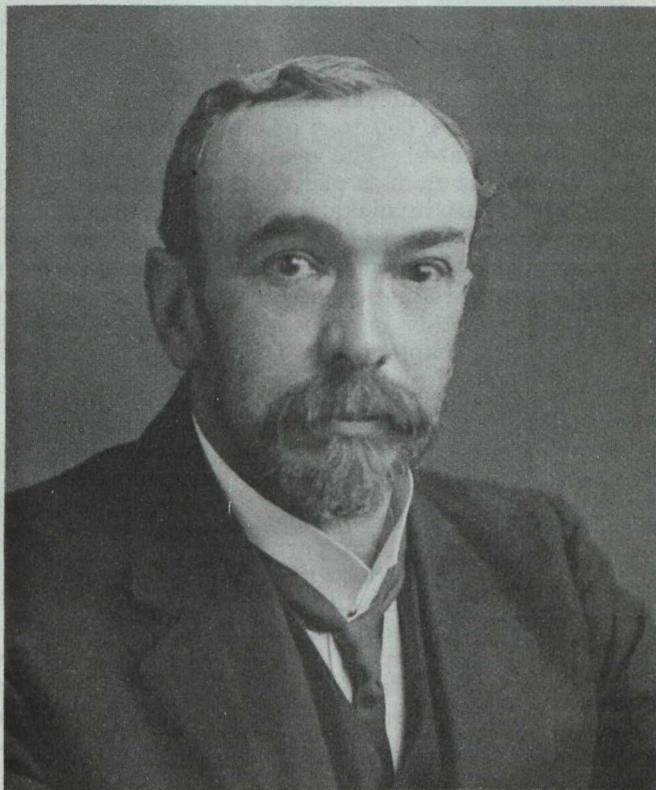
COBALT MINE MANAGERS BELIEVE MINERALS SEPARATION IS GERMAN CONTROLLED.

Cobalt, Nov. 6.—A special session of the members of the Mine Managers' Association was held here this afternoon. Mr. George Chapman, technical expert to Minerals Separation, was present, and in a brief address said the charges which nailed Beer, Sondheimer & Co. to Minerals Separation were without foundation. In fact he stated that Mr. Ballot had already been in Ottawa, and had placed the affair in the hands of the Canadian authorities, and felt firmly convinced the company representatives would come out clean and be proven free from German influence and control.

When asked as to whether or not the German firm of Beer, Sondheimer & Co. were likely to derive, directly or indirectly, any revenue from royalties paid to Minerals Separation, Mr. Chapman replied that he did not know. He merely knew that Beer, Sondheimer & Company were no longer agents for Minerals Separation, and having been in the employ of the latter company for eighteen years, he could say emphatically that Minerals Separation was not German. In concluding, the Minerals Separation representative requested that he be furnished with statistics as to the amount of ore being treated in Cobalt, and the results obtained, so as to be in a position to take the matter to his directors and in an intelligent manner quote terms of royalty that should be reasonably applicable in the silver mines of this district.

Mr. B. Neilly, President of the Mine Managers' Association, replied that, while the assertions of Mr. Chapman were of interest and sincerely given, the mine managers of Cobalt, as a body, were equally sincere in their

belief that Minerals Separation was German controlled. The whole matter, he said, must rest with the authorities at Ottawa. If, however, the government officials became convinced that Minerals Separation is not influenced or controlled by Germans, then the question of terms of royalty would be in place. But until such time as such proof was forthcoming it would be out of place to give statistics to anyone, in that it might be the means of conveying valuable information to alien enemies.



The late GEO. T. HOLLOWAY.

INTERNATIONAL NICKEL.

New York, Nov. 7.—Directors of the International Nickel Company reduced the quarterly dividend on the common stock from \$1.50 to \$1 a share on Monday. Report of earnings for the six months ended September 30 showed that surplus for that period was not sufficient to pay the regular common dividend, as the balance after preferred dividend requirements was equal to only \$1.18 a share on the common stock.

Gross income for the three months ended September 30 showed a loss of \$1,139,448 as compared with the previous quarter. This reduction was mainly due, according to an official, to the great increase in costs of labor and materials. The important items which advanced in prices were coal, coke and fuel oil.

Surplus for the six months' period, out of which the present common dividend is to be paid, was \$1,974,320. This surplus showed a loss of \$1,592,473 from the balance shown for the six months ended September 30, 1916. This reduction was practically entirely due to the reserve of \$1,741,140 which was set aside for United States war taxes for the six months' period.

ELECTRICITY IN COAL MINES.

The great submarine coal-field of Cape Breton offers a wide field for the use of electric power. The problem of the extraction of coal at great distances from the point of entrance of fresh air and power supply is largely that of the transmission of power, and electricity offers the only possible solution in the light of our present knowledge. There are very real dangers connected with the use of electricity at the coal face, but modern improvements in flame-proof motors lead to the hope that, under the spur of necessity, a satisfactory solution will be forthcoming. If, however, objections to the use of electricity at the face are sustained in future practice, it is quite possible to install air compressors, operated by electric power, safely enclosed, and suitably housed at some distance from the coal face, and to convey compressed air in the usual way for the operation of coal-cutters and small haulages at the actual working face.—F. W. G.

The yield of coal in proportion to the number of men employed is relatively high in Nova Scotia. The production per man employed, including all classes above and below ground, will average 2½ tons a day.

COLLIERY HOISTING EQUIPMENT.

The hoisting equipment at the shaft collieries of the Dominion Coal Company, Nova Scotia, presents some unusual features. At several of the shaft mines in the Glace Bay district the loaded pit tubs are rests on a pivoted platform, and as the cage approaches the bank, the platform is pressed by a spring against a curved termination to the shaft guides, thereby deflecting the platform, tilting the tub and dumping the contents through an end-door into an automatic weigh-tank, from which, after being weighed, the coal passes on to the screens. The pit tubs do not leave the shaft. At other mines the pit tubs are run out on to the flat-sheets in the usual way,

At No. 2 Colliery of the Dominion Coal Company, the loaded tubs are weighed in the pit bottom, after which the coal is emptied by rotary tipplers into large inclined storage shoots excavated in the mine floor. From the shoots the coal is shot downwards into a hopper tank suspended from the hoisting rope, which in passing downwards automatically opens the door of the loaded storage shoot, and is filled with coal. When hoisted to the surface, the tank automatically discharges itself on to the screen. Normally, about six tons of coal is hoisted in the tank. The tank and framework together weigh 10 tons, so that the minimum loaded dead weight on the hoisting rope is between 16 and 18 tons. The entire operation is automatic, the best performance obtained reaching 57 hoists in an hour. So far as known this is a unique colliery hoisting arrangement.

SAFETY LAMPS USED IN ALBERTA COAL MINES

There are 5,395 safety lamps in use in Alberta. Of these 3,749 are of the Wolf type, 204 of the Koehler type, 287 of the Clanny type, 505 of the Edison type, 600 of the Wico type and 50 of the Ceag type. The Edison and Wico types are electric cap lamps and the Ceag type electric hand lamps. The Edison electric cap lamps have been provided in a number of cases for men engaged in transportation and for miners engaged in the extraction of pillars.

HISTORY REPEATS ITSELF.

Fort Frontenac and the Southwest—Missouri Cobalt.

In one of Parkman's entrancing volumes, "La Salle and the Discovery of the Great West," the voyages of La Salle from Fort Frontenac, now Kingston, Ont., to the Mississippi river, are described. The conditions of travel of that distant time differ so greatly from those of the present as to be almost inconceivable. Concerning the trip from the Illinois river to Fort Frontenac in 1680, Parkman says: "Meanwhile, we will trace the footsteps of his chief (La Salle), urging his way, in the storms of winter, through those vast and gloomy wilds—those realms of famine, treachery, and death—that lay betwixt him and his far-distant goal of Fort Frontenac.

"On the first of March, before the frost was yet out of the ground, when the forest was still leafless, and the oozy prairies still patched with snow, a band of discontented men were again gathered on the shore for another leave-taking."

Arriving at Niagara, "his three followers were all unfit for travel; he alone retained his strength and spirit. Taking with him three fresh men at Niagara, he resumed his journey, and on the sixth of May deserted, looming through floods of rain, the familiar shores of the seignory and the bastioned walls of Fort Frontenac." During sixty-five days he had toiled almost incessantly, travelling, by the course he took, about a thousand miles through a country beset with every form of peril and obstruction—"the most arduous journey," says the chronicler, "ever made by Frenchmen in America."

"Such was Cavalier de la Salle. In him, an unconquerable mind held at its service a frame of iron, and tasked it to the utmost of its endurance. The pioneer of western pioneers was no rude son of toil, but a man of thought, trained amid arts and letters. He had reached his goal; but for him there was neither rest nor peace. Man and Nature seemed in arms against him. His agents had plundered him; his creditors had seized his property; and several of his canoes, richly laden, had been lost in the rapids of the St. Lawrence."

At the present time another "man of thought, trained amid arts and letters," is making trips from old "Fort Frontenac" to the territory of the "Father of Rivers." The mineral deposits of Fredericktown, Missouri, are now under development by a Canadian company, the Missouri Cobalt. Professor S. F. Kirkpatrick, of Queen's University, is directing the erection of a plant, to be completed within a few months, for the treatment of these complex ores, containing lead, copper, nickel and cobalt. But "Fort Frontenac" is now within little more than a 24 hours journey from the Mississippi, a great contrast to La Salle's 65 days. In place of the frowning fort of old a smiling "limestone" city now welcomes the traveller on his return.

Fredericktown, distant 108 miles by railway from St. Louis, lies within three or four miles of the historic mine La Motte, which has been worked for lead at various periods during the last two hundred years and is at present being operated on a more extensive scale than ever. "The mine La Motte, upon the head waters of the St. Francis river, was also discovered by a Frenchman, the famous adventurer and explorer M. de la Motte-Cadillac, who founded Detroit. La

Motte discovered the celebrated Golden vein sometime between 1715 and 1719."

While mine La Motte has been known chiefly as a lead producer, the sulphide ores, underlying that of lead and containing nickel, cobalt and copper, have attracted attention and been worked at various times. Prior to 1855 metallurgists of Birmingham and Swansea obtained a supply of nickel and cobalt ores from this mine. About thirty years later a quantity of matte containing cobalt and nickel was produced from these ores and shipped to England.

In 1906 operations were begun under the direction of the well-known metallurgist Mr. V. N. Hybinette. A plant was erected and considerable cobalt oxide was produced; the quantity in 1907 was 2,731 pounds. In 1909 the production was 83,394 pounds of cobalt oxide, 328,403 pounds of nickel, 8,214 tons of nickel and cobalt concentrates, 600 tons of copper and 1,353 tons of lead concentrates. The ore is said to contain, on the average, less than 2 per cent. of lead, over 2 in copper, about 0.9 in nickel and 0.6 in cobalt.

Mr. Hybinette returned to Norway in 1909 and the Fredericktown works were closed. He has since been engaged in the production of nickel and copper from Norwegian and other ores by his electrolytic process, which is to be employed in Canada by the British America Nickel Corporation for the treatment of the matte from its Sudbury ores.

The geological structure of the mine La Motte, Fredericktown area, is simple. Over an uneven, eroded surface of granite, which varies considerably in texture, there lies in almost horizontal position sandstone which is conglomerate in part. The sandstone does not completely cover the granite, knobs of the latter projecting through the sediment. Overlying the sandstone, and resting in some places directly on the granite, is limestone. Most of the lead ore, galena, occurs in the limestone not far from its lower surface. The copper-nickel-cobalt ores are found in the sandstone. They lie at the contact with the limestone and extend downward to a maximum depth of 15 or 20 feet.

During Mr. Hybinette's operations at Fredericktown, Canadian capitalists, represented by those in control of the refining plant at Deloro, became interested in the Missouri deposits. Under their auspices the new plant is being erected. Experience in treating the complex silver-arsenic-nickel-cobalt ores at Deloro is of great value in the Fredericktown undertaking. An attractive plant, consisting of several buildings on the edge of an artificial lake, is nearing completion.

The Fredericktown plant will be the only important producer of nickel from domestic ores in the United States. It will have an output probably about equal to that of Norway during recent years. Sudbury and New Caledonia are the only other large producers, although the quantity of nickel obtained as a by-product in the refining of copper is increasing. Next to Cobalt, Ont., Fredericktown will probably be the largest producer of cobalt. The mining of this metal in New Caledonia has been dormant for some years, although should the price increase mining will likely be revived there. The only other important source of cobalt is the Belgian Congo, where it is associated with copper.

Remembering the internecine strife that has been waged between the "plutonists and neptunists" over the origin of the Sudbury ores, one fears, lest he might unwittingly be drawn into a fray, to say anything concerning the origin of these Missouri ore deposits that have been worked for 200 years. During this

long period doubtless most of the operators have given little heed as to "how the ores got there." They have been much more concerned as to the size of the ore-bodies, the percentage of metal in them, and methods of treatment. They have lived good lives, or otherwise, and have "little recked" that they were face to face with one of the great problems of the universe, the origin of the ores, concerning which certain of their successors on this mundane sphere have had lively controversies. It may be safe to say, however, that while many papers have been written and various theories proposed, there are practically only two schools of thought as regards the origin of these Missouri ores. The adherents of these schools are not known as plutonists and neptunists, but are more properly called descensionists and ascensionists. It is to be hoped that the revival of mining of the cobalt-nickel ores will not, to use a Lyellian phrase, increase the "intemperance of the sects." W. G. M.

NOVA SCOTIA COAL AND PRODUCTS.

The preparation of coal for the market at the Nova Scotia collieries has not yet reached the elaborate scale noticeable at European coal mines, because, hitherto, the coal has been mined from clean thick seams; but as the inferior and thinner seams come to be worked, more attention to the matter of preparation, and the rejection of impurities from the coal, will be required. In a bulletin written for the Mines Branch and recently published, Mr. F. W. Gray says in part:

All the bankheads at the more recently developed collieries are equipped with shaking screens and picking belts. Coal is sold either as "run of mine," that is, without removal of the slack, or as "screened coal," the slack being taken out. The slack coal, made in the mining, amounts to between 25 per cent. and 30 per cent. of the runmine, and in some cases runs very much higher.

Slack coal for coke making has been washed for many years, and latterly, a little has been washed for the general market. The Dominion Steel Company has a washery on the Campbell "bumping table" principle, with a washing capacity of 100 tons per hour, which prepares coal for the coke ovens.

The Dominion Coal Company, in 1912, erected a "Baum" washer, having a capacity of 120 tons per hour; and three years later the Nova Scotia Steel & Coal Company installed a washer of the same type, but of smaller capacity. The "Baum" washer is of the "jig" type, the principal feature being that the impulse to the washing-water in the jigs is given by compressed air. A feature of this washer is the recovery of all the fine coal, and economy in the use of washing water. The Inverness Coal & Railway Company has a small Jeffrey washer.

Several installations for briquetting slack coal have from time to time been put down. The Colonial Coal Company, one of the small companies operating in the Sydney field, successfully manufactured "ovoid" briquettes from slack coal, that found a ready sale, but the plant was destroyed by fire, and has not been rebuilt.

All the Sydney coals are suitable for coke making, and yield a good percentage of by-products. Some of the Pictou coals make an excellent coke, but not all the seams in this district yield a coking coal. Judging by the high percentage of nitrogen shown in the analysis

of the Pictou coals, they should be valuable for use in any way that allows the recovery of the by-products. The Springhill coals do not yield a commercially strong coke, and the seams that are at present mined in the Joggins and Inverness districts are unsuitable for coke-making.

Coke is manufactured in by-product ovens at the works of the Dominion Iron & Steel Company and the Nova Scotia Steel & Coal Company. The by-products recovered are sulphate of ammonia, tar, and latterly, benzol. The waste gases are used in the open-hearth furnaces, in re-heating furnaces, and in the various processes of steel-making, and for steam-raising. The ovens of the Dominion Iron & Steel Company yield from eight to nine gallons of tar per ton of coal carbonized. The tar is taken by the Dominion Tar & Chemical Company, which has a plant immediately adjoining the coke ovens, and is there fractionally distilled for the manufacture of light oils, carbolic acid, creosote oil, disinfecting fluid, protective paints, pitch, and other tar products.

In 1915, the Dominion Iron & Steel Company commenced the recovery of benzol, and the distillation of toluol, at the request of the military authorities. The toluol is shipped to the Province of Quebec for nitration and the manufacture of the high explosive tri-nitro-toluol. Previous to 1915 the benzol had not been recovered.



D. H. McDOUGALL,

General manager, Dominion Steel Corporation.

Mine inspection in Nova Scotia is carried out by a staff of Deputy Inspectors of Mines, reporting to the Inspector of Mines in Halifax, who is also the Deputy Commissioner of Public Works and Mines, reporting to the Commissioner of Works and Mines. The last named office is really that of Provincial Minister of Mines, and the holder is ex-officio a member of the Provincial Executive.

Coal in British Columbia

By E. Jacobs.

The total value of the mineral production of British Columbia in all years to the end of 1916 is shown in the official publications of the Province as having been \$558,560,715. Of this total, the proportion for gold, placer and lode, was \$165,970,887, that for coal and coke was \$165,825,315, that for copper was \$114,559,364, while silver, lead, zinc, and miscellaneous minerals including structural materials and other non-metalliferous products, made up the remainder.

Brief Review of Production Figures.

The production of coal in British Columbia was begun in 1836, but it was only on a comparatively small scale, for the aggregate output for fifty years, 1836-1885, is shown in the official records to have been but 3,029,011 long tons, which was an average of 60,580 tons a year over that long period. It was not until 1891, which was the fifty-sixth year of production, that the year's output exceeded one million tons. For 1890 the output was recorded as having been 678,140 tons and for 1891 1,029,097 tons, but for five of the six next following years the annual total output was less than 1,000,000 tons a year. After that, however, commencing with 1898, there was a gradual increase until in 1910 the total net production, that is after deduction of the coal used in making 218,029 long tons of coke, was 2,800,046 tons, which was the maximum yearly net output for all years. The gross production of coal for 1910 and each of the six following years to 1916, inclusive, is on record as having been as under:

B. C. Coal Production (Tons of 2,240 lb.).

For 1910	3,139,235
" 1911	2,297,718
" 1912	3,025,709
" 1913	2,570,760
" 1914	2,166,428
" 1915	1,972,580
" 1916	2,485,580

At the time of writing the 1917 production figures are obtainable only to the end of August, later returns not yet being complete. For eight months the gross production of coal has been approximately 1,536,000 tons. This seems to indicate that there will be a smaller total output this year than last; not that the demand for coal has been less, but that for various reasons it has not been practicable thus far to make a larger production, nor is it expected conditions will admit of the decrease being made up during the remaining months of the year.

Reports on Coal in British Columbia.

Much information relative to the coal mining industry of the Province is included in the Annual Report of the Minister of Mines for British Columbia, which is obtainable gratis from the Provincial Department of Mines, Victoria. To those who have occasion to refer to statistics covering a long period, there is also the Annual Report on the Mineral Production of Canada, issued by the Mines Branch of the Canada Department of Mines and obtainable upon application to the Director of Mines, Ottawa. The latter publication, though, is necessarily delayed in completion, so that it is not up-to-date, the revision of production statistics and the compilation of tables of figures involving much time

and labor. For instance, the 1914 revised report is the latest yet received. On page 235 of that report can be found a comprehensive table showing the progress of the coal-producing industry of British Columbia over a period of more than fifty years, while other tables also included in the report show the production of districts and of individual collieries during 1913 and 1914, respectively, and this information, while not taking in the progress of the last two years, serves to give a good general idea of the geographical distribution of the coal-producing districts and the proportion of total output of the various collieries in the Province.

Another publication by the Mines Branch of the Canada Department of Mines, giving information relative to the coal fields of British Columbia, as well as of other parts of the Dominion, is that entitled "Economic Minerals and Industries of Canada," this being No. 322 of the Mines Branch publications. The following excerpts are from that report:

"In British Columbia there are three main districts in which coal mining operations are being actively pursued. These are the Crowsnest Pass region, in the eastern part of the Province; the Nicola Valley district, in the central part; and the east coast of Vancouver Island. Beside these, other coal basins are known and more or less prospected, but at present are too remote from means of communication to be of immediate economic value, although they constitute a reserve of fossil fuels with great possibilities.

"**Crowsnest Pass Coal Field.**—The Crowsnest Pass coal field is situated immediately west of the summit of the Rocky mountains, in Crowsnest pass. It is all included within the Province of British Columbia, excepting a small portion which crosses the watershed into the Province of Alberta. The Crowsnest branch of the Canadian Pacific railway crosses the northern part of the coal field, and skirts its western edge for a distance of twenty-five miles. The rocks of the coal field are of Cretaceous age. Mr. Jas. McEvoy has made an approximate estimate of the total available coal in this field. By taking the area covered by the coal measures as being 230 square miles, and assuming a workable thickness of coal seams of 100 ft., which does not appear to be excessive, he arrives at a total quantity of 22,595,200,000 tons. The opening of the coal mines in this field marked an epoch in the development of British Columbia. Before this time the smelting industries of the Kootenays, and of Washington in the United States, had to depend, in a great measure, on coke from the Coast coal mines, the transportation of which, added to a comparatively high initial cost, rendered this fuel very expensive; in fact, the cost of fuel to the smelteries has since then been reduced to about one-half. Three large companies are now operating, and their output last year was more than fifty per cent. of the total output of the Province.

"**Southern Interior Coal Fields.**—The southern interior of the Province contains a number of coal fields of growing importance. Near Princeton, Similkameen, one colliery has been already opened and has made shipments of lignitic coal; but the area of this field is great—probably nearly 50 square miles—so that there

appears a certainty that several other mines will eventually be opened.....The Nicola Valley coal field is situated to the south of Nicola lake. Although not as extensive as the Crowsnest field, nor the Vancouver Island field, it is yet of great economic importance. It stands midway between them, hence the coal of the Nicola valley is manifestly destined to find a market in a considerable part of central British Columbia.

"Vancouver Island Coal Field.—Vancouver island has been ever since 1836 the seat of a coal mining industry which in recent years has not only supplied a local demand but has been largely exported, to the State of California. The Vancouver Island fields, now being exploited, are situated on the east coast of the island. These coal measures may be naturally divided into two distinct fields, separated by a gap of twelve miles of crystalline rocks in the district of Nanoose. The northern area is the Comox field, and the southern one the Nanaimo field. Another field, until quite recently quite undeveloped, exists in the vicinity of Squash, about 125 miles to the north. Seven collieries are now in operation in the Vancouver Island district.

"The coals of the various seams, although each has its own individual characteristics, are, as a whole, much alike, and furnish a bituminous coal of fair grade, the amount of fixed carbon in the best quality ranging from 50 to 60 per cent., and the percentage of ash from 5 to 10 per cent. The most striking feature of the seams is their great variability in thickness and character. The thickness varies from a few inches to more than 30 feet, sometimes within a lateral distance of less than 100 feet."

Geological Survey of Canada Memoir No. 69, "Coal Fields of British Columbia," (No. 1465) by Dr. D. B. Dowling, gives much information relative to coal in this Province. There are numerous other published reports on coal measures occurring in British Columbia, generally dealing with individual fields, these including publications of both the Dominion Geological Survey and the British Columbia Department of Mines.

Big Coal Deposit.

The following is an excerpt from some Notes by W. F. Robertson, Provincial Mineralogist, as "Annual Report of the Minister of Mines, B.C.," for 1909, p. K. 163: "The Rocky Mountain coal fields, lying on either side of the main range of the Rocky mountains, respectively in the Province of British Columbia and the Province of Alberta, are undoubtedly the most extensive coal deposits in Canada, and, what is more important from a commercial point of view, are the only large coal fields of first class coal on the Pacific slope between Alaska and Mexico. While it has been a matter of common knowledge in British Columbia that these fields are large, it is questioned if more than a few people recognized their wonderful extent, or the enormous influence which they must have on the future of the country. What this influence must be can best be demonstrated by the illustration of what the coal deposits of Pennsylvania have done for that state—they have made it probably the greatest manufacturing state of the Union—and the condition of Western Canada today is that of the Eastern United States fifty years ago, except that we may look for a more rapid development due to the more general development of the rest of the continent and the improved transportation and other facilities now available. It seems, therefore, that Eastern British Columbia is destined to be, from the possession of its coal fields alone, the Pennsylvania of the Pacific slope, and that at no distant date."

Production of Coal in 1916 and 1917.

As already mentioned, the coal production figures for the current year to date are not obtainable at the time of writing. An approximate total for eight months to the end of August of nearly 1,536,000 long tons gross has been contributed by the mines in the several producing districts in the following proportions:

District.	Tons of 2,240 lb.
Crowsnest	289,464
Nicola and Princeton	93,314
Vancouver Island	1,153,220
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Total for eight months of 1917	1,535,998

Production in the Crowsnest district has been retarded this year by labor troubles and by disasters at two mines that had been considerable producers—one at the Coal Creek colliery and the other at Michel colliery, both owned by the Crow's Nest Pass Coal Company of Toronto. A fairly dependable idea of the proportions of total output of the various collieries may be obtained from the figures of production for 1916, as under:

	Tons of 2,240 lb.
Crowsnest district—	
Corbin Coal and Coke Co.	69,020
Crow's Nest Pass Coal Co.—	
Coal Creek colliery	569,131
Michel colliery	244,119
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	882,270
Similkameen district—	
Princeton Coal and Land Co.	29,458
Nicola Valley district—	
Inland Coal & Coke Co.	31,295
Merritt Collieries, Ltd.	338
Middlesboro Collieries, Ltd.	49,005
Pacific Coast Coal Syndicate	453
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	81,091
Vancouver Island—	
Canadian Collieries—	
Comox (Cumberland) colliery	449,014
Extension colliery	256,952
Western Fuel Company—	
No. 1 Shaft colliery	467,805
Reserve Shaft colliery	86,805
Pacific Coast Coal Mines, Ltd.	153,112
Nanoose Collieries	630
Vancouver - Nanaimo Coal Mining Co.	78,443
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	1,492,761
Gross production for 1916	2,485,580

The disposal of the coal produced in 1916 is shown in the next following table, which will serve to indicate in a general way what becomes of the coal produced in the Province:

Coal and Coke Produced, Exported, etc., During Year 1916.

Sales and Output for Year.	Tons of 2,240 lb.	
	Coal.	Coke.
Sold for consumption in Canada	858,052	233,456
Sold for export to U. S.	837,879	34,377
Sold for export to other countries	6,166	
Total sales	1,702,097	267,833

Lost in washing	197,190	
Used in making coke ..	401,487	
Used under colliery boilers, etc.	203,085	
Total for colliery use ..	801,762	
	2,503,859	
Stocks on hand first of year.....	33,358	2,633
Stocks on hand last of year.....	15,079	2,525
Difference taken from stock during year.....	18,279	108
Output of collieries for year	2,485,580	267,725

The next following table gives information as to number and class of men and boys employed in the coal mines last year, and the proportions of them engaged in various occupations:

Number of Hands Employed, Etc.

Character of Labor.	Under Ground.	Above Ground.	Totals.
Supervision and clerical assistance	178	86	264
Whites—Miners	1,647	....	1,647
Miners' helpers	100	....	100
Laborers	777	478	1,255
Mechanics and skilled labor	527	362	889
Boys	71	57	128
Japanese	151	....	151
Chinese	239	383	622
Indians	4	....	4
Totals	3,694	1,366	5,060

Another table appearing yearly in the Annual Report of the Minister of Mines shows the output of coal and the per capita production of the various districts. The following covers a period of five years—1912-1916:

Output and Per Capita Production of Various B. C. Coal Districts.

Year.	District.	Gross Tons of Coal Mined During Year.	Total No. of Employees at Producing Collieries.	Tons of Coal Mined per Employee for Year.	No. of Men Employed Underground in Producing Collieries.	Tons of Coal Mined per Employee for Year.
1912	East Kootenay District	1,261,212	2,410	523	1,780	721
	Coast District	1,764,497	4,720	374	3,495	446
	Whole Province	3,025,709	7,130	424	5,275	534
1913	East Kootenay District	1,331,725	2,666	500	1,965	784
	Coast District	1,239,035	3,777	328	2,865	624
	Whole Province	2,570,760	6,443	399	4,830	673
1914	East Kootenay District	955,183	2,397	399	1,749	532
	Coast District	1,211,245	3,335	363	2,518	547
	Whole Province	2,166,428	5,732	379	4,267	481
1915	East Kootenay District	852,572	1,748	488	1,183	508
	Coast District	1,120,008	3,230	347	2,512	708
	Whole Province	1,972,580	4,978	396	3,695	504
1916	East Kootenay District	882,270	1,674	527	1,125	574
	Coast District	1,603,310	3,386	474	2,569	678
	Whole Province	2,485,580	5,060	491	3,694	433

(Note.—The Coast District, as above, includes Nicola and Princeton.)

In this connection, the Provincial Mineralogist remarks: "While no figures can be given as to the actual cost of mining in the different fields, the per capita production of these fields is of interest, as having a bearing upon the working costs and as indicating the mining facilities existing and the improvement made in these conditions from year to year."

Quantities of Coal and Coke.

In the last Annual Report of the Minister of Mines there are also included two tables showing quantities and value of coal and coke, respectively, produced in all years to 1916, inclusive. The first of these tables

shows that the total net quantity of coal, that is less coal used in making coke, has been 44,894,609 tons of 2,240 lb., and that the total value has been \$145,440,340. It appears in the Mines Branch report, already mentioned, that prior to 1874 the value was calculated at \$4 a ton; then, for twenty-three years to 1906, inclusive, it was \$3 a ton, and since that year it has been placed at \$3.50 a ton.

The total quantity of coke produced in all years, 1895-1916, was 3,615,465 long tons, valued at \$20,388,975. Prior to 1907 coke was valued at \$5 a ton; in that year a change was made to \$6 a ton, which is the rate used ever since. The Mines Branch report gives the number of coke ovens in British Columbia at the end of 1914 as having been 1,570. As there were 130 at Union Bay, Vancouver Island, it is concluded that the remaining 1,440 were all in the Crownsnest district—at Carbondale, Fernie, Hosmer, and Michel. The Canadian Collieries (Dunsmuir) Limited, recently built 170 more beehive ovens, bringing the number up to 300 at Union Bay, and increasing the total number in the Province to 1540.

Crownsnest District Coal Mines.

The Crownsnest Pass coal field is situated on the western slope of the Rocky mountains and at a distance of about 375 miles due east from the Pacific Coast. The field is in Fort Steele mining division, East Kootenay, and is about 40 miles north from the International Boundary line. Coal is said to have been discovered in this part of the country about thirty-five years ago. Its stated existence here was alluded to in the Report of Progress of the Geological Survey of Canada for 1880-2. It was again referred to in the report for 1882-4. The coal-bearing area was approximately defined and examined in a preliminary

way by Dr. Geo. M. Dawson in 1883. Later, in 1891, after some of the measures had been prospected, it was visited by Dr. Selwyn, also of the Geological Survey.

The history of the development of these fields dates back to 1887. In June of that year Mr. Wm. Fernie, then of Fort Steele, East Kootenay, and Lt.-Col. Baker, then member of the Provincial Legislature for the district, decided to prospect the coal measures, the existence of which had been reported to them by Mr. Michael Phillips, an old Hudson's Bay Company employee. Every summer, for eight or nine years, Mr.

Fernie took men from Fort Steele to the Elk River district, where they prospected the coal seams outcropping there. A syndicate was formed in Victoria to acquire and develop these coal seams. Eventually a company was organized to take over the syndicate's holdings, and a charter authorizing the construction of the British Columbia Southern railway, was obtained from the Provincial Government, of which Lieut.-Col. Baker was by that time a member. But about ten years (1887-1897) elapsed before these pioneers achieved their object and began to see a return for all their patient and persistent effort. Their reward came with the eventual closing of an agreement with the Canadian Pacific Railway Co. for the construction of the Crow's Nest railway. Meanwhile the Crow's Nest Pass Coal Company had acquired the coal lands.

The further history of the development of the coal mines is practically that of the Crow's Nest Pass Coal Company until about 1909. In one year's Annual Report of the Minister of Mines it is stated that "until within the year 1909 there was only one company actually producing coal in the East Kootenay district—that is, the Crow's Nest Pass Coal Company, although this company operated three separate collieries; but during that year two new companies, namely, the Hosmer Mines, Limited, at Hosmer, and the Corbin Coal & Coke Co., at Corbin, were producing. These new companies began to ship coal toward the latter part of 1908, and as they have extensive and fully-equipped collieries, have now become important factors in the coal production of the district." Incidentally, it may be mentioned that about the middle of 1914 operations were suspended at the Hosmer colliery, and it is understood the mines there have been abandoned.

Crow's Nest Pass Coal Co.'s Mines.—This company's Coal Creek colliery is situated on Coal Creek, about five miles from the town of Fernie, with which it is connected by a branch railway. The coke ovens of this colliery are at Fernie. The company's Michel colliery is situated on Michel creek, about twenty-three miles northeast from Fernie, on the C. P. R. Co.'s Crow's Nest railway. The Great Northern railway also connects with this colliery, passing through Morrissey and Fernie en route. The Carbonado colliery is on Morrissey creek, about fourteen miles southeast of Fernie; no coal mining has been done at Carbonado for about eight years.

Mines being operated at Coal Creek colliery are the No. 1 North, and B. North, with development in progress in No. 9; these mines are on the north side of the valley. On the south side the mines in operation are No. 1 South, No. 1 East, No. 2 and No. 3. The coal from all these mines, the district inspector's last published report states, is conveyed to a central tippie of steel construction, 840 ft. in length, extending across the valley. It is equipped with two revolving dumps, screens, and two picking tables, all of which are worked by electric power. Underneath the tippie are two box-car loaders operated by hydraulic pistons. The several seams of coal occurring at Coal Creek have been very productive during the period of nearly twenty years since the production of coal was commenced here.

Mines being operated at Michel colliery are No. 3 East, on the south side of the valley, and New No. 8, on the north side. The tippie across the valley is built of steel and it is equipped with two shaker screens and two picking belts, the machinery in connection being operated by electricity. There are also two

Ottumwa box-car loaders, worked by steam. The coke ovens at this colliery have been built in close proximity to the tippie, so the distance the slack has to be hauled to the ovens is very short.

Corbin Coal & Coke Co.'s Mines.—This company's colliery is on McGillivray creek, the south branch of Michel creek, near the summit of the Rocky mountains. A branch line of railway leaves the C.P.R. Co.'s Crow's Nest railway at McGillivray station (formerly The Loop) and follows up the south fork for about fourteen miles to the colliery, which comprises Nos. 1, 3, and 4 mines. Last year coal was mined from Nos. 3 and 4, No. 1 mine having sealed on account of fire burning in it. This year production has also been from Nos. 3 and 4 mines. Of No. 3 mine, known as "the Big Showing," one of the district mine inspectors wrote:

"This is an open pit or surface operation, and is about 1,200 feet higher than the Corbin townsite, or about 6,200 feet above sea-level. It is reached by a standard-gauge switchback railway eight miles in length, owned and operated by the Corbin company. Shay locomotives are used for hauling the railway cars, as the grades are very heavy in places.

"The seam here is several hundred feet thick and is standing practically vertical. There is comparatively little cover on the seam, and this is removed in benches by steam-shovels. It is sometimes necessary to blast the overburden, and this is done by driving several 'coyote' holes in the side of the hill. These holes are then chambered at the back end and loaded with a heavy charge of black powder, as much as 3,000 lb. being in one hole. After blasting, the work of removing the debris is completed by the steam-shovels, leaving a clean face of coal. The coal is then loaded direct into railway cars by the steam-shovels."

Hosmer Mines.—The Hosmer mines were opened in coal measures occurring high up the hills to the east of the Elk river, between Fernie and Michel. A tippie of steel construction, with storage-bins for 2,600 tons of coal, 200 tons of rock, and 3,000 tons of slack for the coke-ovens, was erected and 240 beehive coke-ovens having an output capacity of 300 tons of coke a day were built. Altogether the equipment was one of the most complete in the Province, but the coal seams were so broken and disturbed that finally the endeavor to mine the coal was given up by the owners, the Canadian Pacific Railway Co.

Princeton and Nicola Valley.

Princeton Coal & Land Co.'s Colliery.—This property is situated near the town of Princeton, at the junction of the Similkameen and Tulameen rivers. The output of coal in 1916 of nearly 30,000 long tons was the largest the company had made in any year up to that date. This year production is expected to be considerably larger; a recent month's output, working 23 days, was 3,800 tons. Equipment includes a screening plant with a capacity of 500 tons a day.

Nicola Valley Collieries.—These are four in number, owned respectively by the Inland Coal & Coke Co.; Merritt Collieries, Ltd.; Middlesboro Collieries, Ltd., and Pacific Coast Coal Syndicate. The Merritt Collieries, Ltd., late in 1916 acquired the property known as the Diamond Vale colliery, which had been inoperative about three years. It is not yet a large producer of coal. Neither has the Pacific Coast Coal Syndicate yet made a considerable output.

The Inland Coal & Coke Co. operates the Coal Hill colliery. Last year it employed an average of 98 men. In 1913 it employed an average of 177 men and produced 114,000 tons of coal; since then the yearly out-

put of coal has shown a steady decrease, the use of fuel oil especially in railway locomotives, having adversely affected the market for coal from this district.

The Middlesboro colliery comprises Nos. 2, 4, 4 East, and 7 mines. Last year No. 2 mine was not worked. The output in 1916 of only 49,000 tons with 832 men employed compares unfavorably with that of 1911 in which latter year production was 191,290 tons with an average of 487 men. However, the 1916 results were a slight improvement on those of 1915, and it is reported there is still further advance this year. The tippie has appliances for screening and picking coal, a box-car loader is included in the equipment, and power plant and machine shop are equal to the requirements of much larger operations.

Vancouver Island Coal Mines.

Vancouver Island coal mines produced in 1916 sixty per cent. of the gross output of coal of the whole Province; for the eight expired months of 1917 for which production statistics are available, the proportion is nearly seventy-four per cent. The suspension of production during three or four months of non-production at Crowsnest mines during the miners' strike doubtless is largely accountable for this increased percentage. Nevertheless there is much activity at Vancouver Island collieries; in fact, it is stated that the Canadian Collieries company alone could give employment to fully one thousand more men were they obtainable, but they are not.

Canadian Collieries Mines.—The Canadian Collieries (Dunsmuir) Limited, during 1911 acquired all the colliery interests of the Wellington Colliery Company, Ltd., long known as the Dunsmuir collieries, and has since been operating the Comox and Extension collieries.

The several mines of the Comox colliery are situated near Cumberland, in Comox district of Vancouver Island, distant about seventy miles from Nanaimo. A railway about twenty miles in length connects the various mines with Union Bay, which is the shipping place for these mines.

Mines known as Nos. 4 and 7 slopes and Nos. 5, 6 and 8 shafts, have been operated in recent years, but at the present time Nos. 6 and 8 are idle. The importance of these mines is indicated by the fact that in 1916 their output was nearly one-fifth of the total production of all the coal mines in the Province, while it has probably been even larger this year. Many particulars of plant and equipment may be found in the Annual Report of the Minister of Mines. Summarizing, it may be stated briefly that during recent years large sums of money have been spent in thoroughly modernizing the plant, providing effective screening and sizing facilities for the coal, handling to and on the railway, washing and loading at Union bay, coking the slack, substituting electric for steam power, and to this end establishing an important hydro-electric power generation system, improving the railway and its rolling stock, and in various other ways providing for the considerable expansion of the coal-mining and shipping business of the company.

Extension colliery comprises Nos. 1, 2, 3 and 4 mines, situated about ten miles southwest of Nanaimo. Considerable improvement has been made at this colliery during the last two or three years, development of mines having been pushed and equipment added to. Coal is shipped at Ladysmith, Oyster Bay, where there

is a washery and excellent facilities for loading coal on to vessels of all sizes.

The Canadian Collieries company is opening a new mine south of the old Alexandra mine, near South Wellington. A slope is being driven, to reach the Douglas seam of coal, which has been so productive in other parts of this district.

Western Fuel Co.'s Mines.—This company is operating the Nanaimo colliery consisting of No. 1 Shaft (Esplanade), Nanaimo, and connecting mines; also the Reserve Shaft mine, situated about five miles south of Nanaimo, with the shipping docks at which port it has railway connection. The Reserve is a comparatively new mine, having been developed within the last four or five years. While its output of coal is not yet nearly so large as that of the No. 1 Shaft mine, which was closed about 1904; production from 476,800 tons from No 1 in 1916, it will become increasingly productive as the years shall pass.

The Western Fuel Co. has re-opened the Harewood mine, which was closed about 1904; production from this mine is now about 400 tons a day.

Pacific Coast Coal Mines, Ltd. This company has about worked out its old mine at South Wellington, and is now concentrating its attention on its Morden mine, opened several years ago, and situated two miles east of the old mine. Production from the Morden colliery in September was about 9,000 tons. The company has extended its shipping docks at Boat Harbor to deep water and has provided modern coal-loading plant; it will be practicable soon to there load very large vessels, and the expectation is that a considerable share of the coal-bunkering business will come to this port.

At Suquash also on the east coast of Vancouver island, near Malcolm island, the company has large and important reserves of coal, the further development of which is planned for the near future.

Other Collieries.—The British Columbia Coal Mining Co. has acquired the colliery of the Vancouver-Nanaimo Coal Mining Co., with mine situated about two miles west of Nanaimo, on what is known as the Old Wellington seam. Recently fire in the mine necessitated its being sealed off for a time, but it is expected that production of coal will shortly be resumed.

The Nanoose colliery is working a mine at Nanoose bay, situated about five miles northwest of what is known as North Wellington, which latter was formerly operated by the old Dunsmuir company and known as the Old Wellington seam. Production from this colliery is as yet small.

Other Coal Fields.

Coal is known to occur in many other parts of the Province, as yet in most instances without railway connections for transportation purposes. The most important of these fields is that in the neighborhood of the Upper Elk and Fording rivers, in the Rocky mountain region of East Kootenay. There is also coal in the Flathead country, toward the extreme south-eastern part of the Province. In country tributary to the Grand Trunk Pacific railway, east of Hazelton district, and, too, in the country about the headwaters of the Skeena river, in what is known as the Groundhog basin, coal measures occur that are stated to promise an important production of coal when conditions shall be favorable for its being mined and shipped. Still other coal occurrences are known, but on most of them little or no development work has been done.

Coal Mining in Alberta

Alberta has enormous supplies of coal and coal mining in that province is a big industry. There are 289 coal mines in operation, and 8,023 men are employed.

Owing to the exceptional conditions existing at the present time, statistics with reference to coal production in Alberta are being collected and published every quarter, instead of annually as in previous years. The following tables give particulars with reference to the output produced during each quarter of the year 1916, also the production during the first three-quarters of the year 1917.

	1916.	1917.
Lignite—		
First Quarter	695,953	744,700
Second Quarter	235,824	227,879
Third Quarter	434,936	619,467
Fourth Quarter	806,088	.....
Bituminous—		
First Quarter	478,249	649,318
Second Quarter	573,173	177,579
Third Quarter	648,197	671,442
Fourth Quarter	635,640	.....
Anthracite—		
First Quarter	35,009	37,817
Second Quarter	36,052	11,387
Third Quarter	35,661	33,643
Fourth Quarter	33,822	.....

Mr. John T. Stirling, Chief Inspector of Mines, estimates that the total production for the year 1917 will be approximately 4,700,000 tons, which makes the production in 1917 a little more than the production in 1916, notwithstanding the fact that the output has been interfered with considerably by labor trouble. All the anthracite and bituminous mines in the province and practically all the lignite mines in the Lethbridge and Drumheller districts were idle for practically the whole of the months of April, May and June. The output is still being severely interfered with owing to local strikes in different parts of the province.

The number of men employed in the coal mining industry in Alberta is now 8,023, which shows an increase of 1,096 for the same period 1916. The largest increase of coal production in the province has taken place in the Drumheller field, where the output has increased practically 93 per cent. over the year 1916.

There are now in operation in the province three mine rescue cars and five mine rescue stations. The material for the equipment for a mine rescue station at Mountain Park is now on the ground and it is intended to have the station in operation at this point within the next two months.

Thirty-three new mines have been opened in the province during the present year, making a total of 289 now in operation. Owing to the increased output and the fact that the consumers, as a rule, are stocking coal much earlier than usual this year, it would appear that the Prairie Provinces are fairly well supplied with fuel and, as a matter of fact, are probably in a better condition than they have been for the last five years at this time.

During the nine months ending September 30th, 1917, 2,213,501 tons of coal was imported from the United States through ports in Western Canada, as compared with 2,217,650 tons through the same ports during the same period 1916. This coal is being consumed in the

territory which should be supplied with coal from the Alberta mines.

A considerable portion of the output in the Edmonton district has been obtained by means of what is known as the stripping method. The Cardiff Collieries Ltd., one of the largest producing mines in this district, is making arrangements whereby all the coal in future will be obtained by stripping the surface, by means of a drag line scraper.

In addition to the coal mines already mentioned, two copper mines have been put into operation in the territory west of Banff.

In 1916 there were in operation in Alberta 279 coal mines. The production was 4,648,604 tons coal. There were employed underground 5,536 men. Since the first of the year no less than twenty-seven new mines have been opened, the most important of these being those of the Western Gem Mining Co., Atlas Coal Co., Scranton Coal Co., and Hamilton Coal Co., in the Drumheller district; of the Cadomin Coal Co., in Mountain Park; the Crown Coal Co., Elcan; the Edmonton Collieries, Clover Bar; and the Taber Coal Co., at Taber. The Departmental Bulletin giving the figures of coal production for the second quarter (ending June 30th), and also for the half-year of 1917, shows that as compared with production returns for the corresponding period of 1916, the coal output during the first six months of this year has declined to the extent of about two hundred thousand tons, the figures being 2,054,260 tons and 1,858,680 tons respectively. Among recent developments of interest it may be mentioned that sinking is now in progress on the new mine that is being opened by the Edmonton Collieries in the Clover Bar district, that the mining of coal by the stripping process is about to be adopted at the Cardiff Collieries' mine, near Cardiff; and that the North American Collieries' have taken over and are now operating the Red Deer Valley Coal Co.'s mine, near Drumheller, and also the property formerly worked by Marcus L. Hyde, Limited. At this latter mine, by the way, the stripping method of working is employed. At the Regal Collieries, Taber, some important improvements have been completed recently.

A NEW CABLE TERMINAL.

A new style of outdoor (Type D.O.A.) cable terminal has recently been placed on the market by the Standard Underground Cable Co. of Canada, Limited, Hamilton, Ont. It is known as the Protected Disconnection style. All the copper parts are covered by a porcelain hood, which permits the disconnection of the aerial extension wire even while the circuit is alive.

MANGANESE ORE FROM BUTTE.

Interest in the mining of manganese in the Butte district, Montana, has been heightened by the shipment from the Emma mine by the Anaconda Copper Mining Co. of five cars of the so-called "pink" manganese ore, mineralogically known as rhodocrosite, a carbonate of manganese, an average car sample of which carried 39 per cent. manganese and less than 5 per cent. silica.

How to Save Coal for War Purposes

So much is being said about the shortage of bituminous coal, and the general public realizes so little the important gains in output made by the operators under trying conditions, last summer, over all previous records, that the statement just issued by the United States Geological Survey, Department of the Interior, on production in 1917 compared with 1916 is particularly timely. In commenting on this report, prepared by the statisticians of the Geological Survey, Director Geo. Otis Smith points out that the shortage is not due to the failure of the soft-coal mines to produce more coal than in the past, for the country on September 1 was about a month ahead of last year in output and is expected to finish the year with an increase of 10 per cent. over 1916, the banner year, and of 25 per cent. over 1915.

The tremendous increase in manufacturing and transportation activity this year has created a demand for soft coal in excess of any in the past, an increase in demand that is difficult to measure in terms of tons but that is certainly more than the 10 per cent. by which production has increased. To meet this demand the mines have been producing soft coal at a rate never before equaled.

Talking to a representative gathering of men who are to assist the Fuel Administration in the different states, at their meeting in Washington with Dr. H. A. Garfield, Van H. Manning, director of the U. S. Bureau of Mines, said concerning the necessity of urging the economical use of fuels:

"The economical use of fuel has proved to be no simple problem. The coal, the equipment, and the human variables make hard and fast general rules impossible.

"Americans have been as wasteful of coal as of other resources, largely because coal has been abundant. To many consumers it has seemed hardly worth while to give time and thought to the saving of coal.

"Conditions have suddenly changed. Today it is everybody's business to save coal. Coal is the foundation stone of industry. Without it the production of equipment for war must halt. Transportation facilities must stand still. One man's careless and wasteful use may mean an idle factory or a cold house for his neighbor. With the world looking to us largely for its coal supply, with increased demands at home, with a scarcity of available labor, with overtaxed transportation facilities, the consumer of coal must pause and give serious consideration to the problem which confronts the country.

"If the consumers can be aroused to an intelligent consideration of the burning of coal, they can begin to save ten per cent. of the production (600,000,000) at once. With more effort, through instruction and a moderate remodeling of coal burning equipment, which could all be accomplished during the war, a further considerable saving can be made. The possible coal saving when present practice is compared with the best ideal practice, is very large. If it were possible to supply the need of this country for light, heat and power through the highest type of mechanical devices, and if we could make a skilled coal user out of the average user, we could probably get along with half as much coal as we are now consuming. This ideal is far beyond present realization.

"The immediate problem is a difficult one. We cannot scrap all out-of-date power plants. We must start by doing the best with what we have. We must begin saving coal at once. The problem is personal. It deals with the human element. We must reach the man with the shovel.

"About fifteen million people shovel the twenty per cent. of our coal used for domestic purposes. Only about two hundred and fifty thousand firemen shovel the sixty-odd per cent. of our coal used by power plants and railroads. While we must appeal to the householder to save coal it is vastly more important to reach the fireman through whose hands the larger part of our coal passes.

"The householder must realize that when he throws a shovelful of anthracite coal into his furnace its value is equivalent to half a pound of sugar, or half a loaf of bread, or a pint of milk. He must appreciate that it is worth while to examine his house and to overhaul his heating equipment. Weather strips, double windows, pipe coverings, clean flues and chimneys, and tight fittings in ash-pit, doors, dampers and furnace parts will all pay. Damper control is one of the chief secrets of economical heating. Clean surfaces are most essential, as soot is a poorer conductor of heat than asbestos. Care, attention, and taking pains will be the greatest factors in saving domestic coal.

"The fireman is, however, the biggest single factor to be considered in a campaign to secure the largest saving of coal. Many manufacturers have made a serious mistake in failing to consider the fireman as a skilled worker. Too often he is treated as a roustabout. He is not well instructed nor given proper labor saving devices. As coal increases in price, or becomes difficult to get, the fireman handles more and more of his employer's money. His efficiency means more in dollars and cents. This is an encouraging feature in the situation. It means a better recognition of the importance of the fireman, more efficient work on his part, and a consequent increased saving of coal. The viewpoint is changing. It is no longer cheaper to pay for the coal than to educate the firemen.

"In carrying out a campaign to promote the saving of coal, let the appeal be made to the householder to cut down his consumption in every way possible, but above all, give serious consideration to methods by which a systematic relationship may be established between the office and the fireman. Encourage the manufacturer to take a keener interest in his fuel consumption and to back up his fireman by giving him the best information and equipment available. This problem has two phases—first, to arouse the interest of the manufacturer and his engineer and fireman and to point out the part which they can play in relieving the present crisis in coal supply. Second—to furnish whatever technical information may be desirable and which will be immediately applicable to accomplish the result sought."

O. E. LEROY KILLED.

Our readers will be sorry to learn of the death of Capt. O. E. Leroy, who was killed in action last week. Capt. Leroy was one of the ablest economic geologists in the service of the Canadian Government, and was a man who had many friends in all parts of the Dominion. He was well liked by his associates and was one of the most popular members of the Canadian Mining Institutes.

Coal and Coke Production

January to June, 1917.

The Mines Branch of the Department of Mines has received from the principal coal mine operators, returns of their production during the first six months of 1917 on the basis of which the following estimates have been made of the total production during this period.

The record of exports and imports is compiled from the published reports of the Customs Department and for imports represents the quantities of coal entered for consumption.

The production of coke includes only the coke made in bee-hive or by-product ovens and does not include coke made by gas companies in retorts.

Second Quarter 1917.

Province	April.	May.	June.	Total 2nd Quarter.	Total Six Months.
Nova Scotia	489,665	504,104	584,188	1,577,947	3,058,216
New Brunswick	14,876	13,620	13,589	42,085	93,485
Saskatchewan	13,460	18,085	21,516	53,061	139,023
Alberta	210,856	97,328	97,663	405,847	1,763,506
British Columbia	156,884	156,511	151,094	464,489	1,100,190
Production	885,731	789,648	868,050	2,543,429	6,354,420
Imports:					
Bituminous	1,331,449	893,055	1,260,652	3,485,156	6,392,378
Anthracite	347,390	318,782	551,105	1,217,277	2,231,859
Total	1,678,839	1,211,837	1,811,757	4,702,433	8,624,237
Exports	94,665	109,167	120,025	323,857	825,427

BABBITT METALS.

In the Oct. 27 number of "Hardware and Metals," Mr. W. G. Harris, President of the Canada Metal Companies, has an interesting article on babbitt metals. He has had long experience and writes with authority. His advice to users is as follows:

Bearings to be filled should always be dry and free from oil. Heating the shell and mandrel to from 100 degrees to 150 degrees C. before the babbitt is poured into it tends to prevent blow holes and similar defects, and also prevents the lining from shrinking away from the shell. Babbitt bearings must not be jarred while the metal is solidifying, since any disturbance at this temperature tends to enlargement of the crystals and corresponding brittleness. Pour the babbitt metal at as low a temperature as is consistent with the filling of the moulds. Red hot metal is overheated and has a tendency to form a dense grain. Avoid red hot metal. Stir well before pouring. Keep metal pure and do not mix with others for best results. When peening, strike in the centre, hitting lightly and work to the outside. In pouring have riser and pour down on the shaft. Do not tighten upper half of box hard until bearing is settled. Clay mixed with oil, making a putty like mass, is the best agent with which to stop up the ends, riser, and gate, as it will not cause the metal to spit or fly when it comes in contact with it.

The quality of the bearing metal in a machine lengthens its life, and in view of this fact it is surprising that knowledge in regard to bearing metal is not more general.

In the Sydney district probably 60 per cent. of the mine employees are native Nova Scotians, from 10 to 15 per cent. are of non-English-speaking nationalities, chiefly Italians, Frenchmen, Belgians, Germans, Austrians, Russians, and Slavs of various countries. The remainder are persons born in the British Isles, or in Newfoundland; the latter place being an important contributor to the labor supply of Nova Scotia. In Inverness county, and at the mainland collieries, the percentage of Nova Scotians and others of British nationality is greater.

UNDERGROUND HAULAGE IN NOVA SCOTIA COAL MINES.

Horses are used underground in large numbers in Nova Scotia coal mines, but the tendency is now to avoid their use as much as possible and to substitute mechanical haulage. The horses used average from 4 feet 8 inches to 5 feet 2 inches in height, and cost between \$180 and \$200 each. Mules are not used in Nova Scotia mines. The price of pit horses has doubled within ten years, and suitable animals are very difficult to obtain. For many reasons it may be expected that mechanical haulage will eventually supersede the use of horses underground.

In Nos. 2 and 9 collieries of the Dominion Coal Company, compressed air locomotives are used for haulage in and out along the main roads leading to the pit bot-

tom. The main haulages are mostly operated by engines working on the surface, chiefly steam-driven, but in several recent installations, electrically operated. The auxiliary haulages underground are in one or two instances electrically operated, but are mostly driven by compressed air.

POWER HAMMERS FOR MINES.

The Mayer Brothers Company, Mankato, Minn., has been making power hammers for 25 years, and is yet able to claim that the first one made is still in use and so far as known none have gone into the scrap heap. The hammers are guaranteed forever against defective material and workmanship. More than 1,000 of these power hammers are used by mining companies in the United States, especially in the coal mines. They are used for general smithing and forging work, which every mining company has to do to a considerable extent. In connection with special dies, also manufactured by Mayer Brothers, they are also used for manufacturing, reshaping and sharpening pick points, chisel bits, puncher picks and other various kinds of mining tools.

PERSONAL AND GENERAL.

It is understood that the firm of MacKinnon, Holmes & Co., Limited, have recently received from the Imperial authorities a large order for marine work which will keep their plant in operation for many months to come.

Mr. J. B. Tyrrell has returned to Toronto from Newfoundland. He expects to leave shortly for London, Eng.

Mr. E. P. Mathewson will give an address on nickel at a public meeting, under the auspices of the Royal Canadian Institute, in the Physics building, University of Toronto, Saturday, Nov. 24th, at 8 p.m.

Several small mines have been opened in the Peace River district, Alberta, and although these mines are operated on a small scale at present, it is probable that with the increased settlement that is taking place in the district north of Edmonton, these mines should be fairly large producers in the near future.

A Mining Week in Vancouver

Vancouver, B.C., Nov. 5.—This western city has been chosen ground for a mining week, and its advent was heralded by posters and handbills which conveyed to the persons interested that there would be doings at the opening of new premises of Chamber of Mines in the Dominion building. Its new life is largely due to an old member who, after a considerable absence, blew into the city and started to make things hum. As he brought a wife with him, ladies had to be taken into account, and consequently after much trepidation the committee announced that "Ladies will serve refreshments from 4 to 6 p.m." It was assumed that the men would need some refreshment and encouragement after their arduous labors at the opening ceremony.

The program covered five days of the week, and commenced with a luncheon. Hon. Martin Burrell, Dominion Minister of Mines, ably fulfilled the duties of principal speaker. As this luncheon clashed with that of the Canadian Club a small attendance was feared, but 116 interested men were present. Mr. Nicol Thompson was in the chair. No particular secrets were divulged.

In the afternoon the B. C. Minister of Mines came to the fore, supported by Messrs. Walters and Willson. Mr. Thompson was again in the chair and there was a very encouraging attendance of citizens. Mr. Sloan specially referred to the importance of the iron industry and was evidently fully alive to the importance of its introduction. He was well satisfied with the Chamber of Mines premises and thought that the chamber could not fail to be of great benefit to the Province, which possessed such unbounded wealth in its rocks. Many ladies were present and after the speechifying they, headed by Mrs. Clabon, Campbell-Johnson, and Beech, served ample supplies of the confectionary art, and refreshing cups of tea and coffee. This refreshment business added a very enjoyable feature to the day's proceedings.

On Tuesday afternoon Prof. Turnbull gave a most lucid explanation and practical demonstration of the oil flotation process for concentrating ores. All the experiments worked out successfully. Many ladies were present at this lecture, and in fact at all the lectures during the week. In the evening a crowded audience faced Professor Hodge, who lectured on "Ore Bodies and How to Recognize Them." The lecture was illustrated by a large number of lantern slides.

On Wednesday afternoon, Mr. Dudley Michel of the B. C. Department of Mines exhibited and described the latest form of apparatus designed for use in the rescue of miners after disasters and fighting underground fires. He showed also a new form of pulmotor for the resuscitation of men who have been gassed. In the rescue apparatus pure oxygen gas is used; but in the pulmotor air and oxygen.

In the evening Judge Howey charmed a crowded audience with his history and personal experiences on the Cariboo Trail, illustrated with an ample lot of excellent lantern slides. As most people know, Judge Howey is the best living authority on this period of B. C. history.

On Thursday Professor J. G. Davidson gave a very interesting lecture and demonstration on "Smelter

Smoke and Coal Smoke," and also some lantern views to assist his descriptions. The deposition of tar fog was the principal point.

In the evening Mr. James Ashworth lectured on "Coal Economies" and having been slated to give an illustration on coal mining, he used several of his lantern slides showing mine rescue apparatus and some unique pictures of a colliery explosion, also ancient miners' safety lamps.

Mr. Ashworth was followed the same evening by Mr. A. E. Haggan, who gave a mining history of B. C. and treated a dry subject in a pleasant and instructive manner.

On Friday an interested crowd of boys from the High School, with their parents and others, gathered to look around and hear short addresses from Messrs. Cunliffe, Sharp, Eldridge, Bland, Clabon and Ashworth, who also showed them a series of lantern slides. Thus came to an end a week which was described by one daily paper a "huge success."—J. A.

OBITUARY.

Geo. T. Holloway.

A cablegram received at the Department of Lands, Forests and Mines last week contained the news of the death of Mr. George T. Holloway in London on the 24th ultimo. Mr. Holloway was the nominee of the British Government on the Royal Ontario Nickel Commission, and was appointed chairman of that body, the other members of which were Dr. W. G. Miller, McGregor Young, K.C., and T. W. Gibson. The report of the Commission was issued last spring, and is regarded as a complete treatise on nickel.

Mr. Holloway was an eminent metallurgist, with long experience in the investigation of the properties of metals, and was head of George T. Holloway & Company, Limited, at 13 Emmett street, Limehouse, London, England. He was an associate of the Royal College of Science, London, Vice-President of the Institution of Mining and Metallurgy, and was also connected with the Institute of Metals, and a member of the Mineral Resources Committee of the Imperial Institute.

The work of the Commission occupied about a year and a half, from September, 1915, to March, 1917, and after its completion Mr. Holloway returned to England. He was then, in May last, in poor health, and grew steadily weaker until the end. Mr. Holloway was a man of much personal charm and made many friends during his sojourn in Canada.

Tommy Irving.

The death of Lieut.-Col. T. C. Irving, Jr., D.S.O., he having been killed while "carrying on" in France the other day, was received with deep regret by a large body of Canadians. It is not too much to say that Lt.-Col. Irving was one of the most popular club and business men in Toronto. The eldest son of T. C. Irving, "Tommy" Irving, Jr., was born in Toronto in 1879. He chose engineering as a profession and took his course at Toronto and McGill Universities. At Toronto University he took a keen interest in sport and was manager of the third Rugby team in 1900.

In business life he was originally associated with F. H. Clergué as chief assistant, and was identified particularly with the development of the Helen Mine and the building of the Algoma Central Railway, which now forms part of the Lake Superior Corporation. Latterly he was vice-president of Robt. W. Hunt & Co., Ltd.

OVER-PRODUCTION OF LEAD.

Producers of lead have been seeking a level at which they could induce consumers to take some of the accumulation off their hands. With the price now lodged at 5½ cents a pound that level has about been reached in the belief of large trade interests. This new low figure represents a drop of 7 cents a pound from the highest level at which lead ever sold—12½ cents a pound.

Inflated prices, accompanied by over-production and now accumulation of the metal, tell the story of the lead market in few words. Lead never should have gone above nine cents a pound, but when it advanced to 12½ cents under the stimulus of rumors that the United States Government was to buy a tonnage equal to one-half of the 1916 output, nothing more was needed to urge producers, large and small, to expand their operations to the limit.

Similar conditions exist in spelter with demand practically at a standstill. Both these metals will now be governed by the law of supply and demand and with prices at their present levels the need for committees to work in behalf of government purchase has disappeared.

A rather unpalatable flavor has been left in the mouths of some of the lead producers by action of the government representatives who had agreed to pay for certain tonnages a straight price of eight cents a pound. Before all of the deliveries had been completed under these arrangements the market price had dropped below the eight-cent level and has since continued to decline. The government agencies now state that they will pay no more than market prices for their requirements.

The over-production and accumulation of spelter had been relieved to some extent by curtailment of output. This curtailment of late has been quite extensive and effective.—Boston News Bureau.

THE LEAD SITUATION IN B. C.

Victoria, B.C., Oct. 30.—Overshadowing every other interest in the British Columbia mining world in the past week has been the lead situation in the Kootenays, which was fully dealt with in the Victoria Daily Times when the announcement of the acceptable Federal action was published.

S. G. Blaylock, assistant general manager of the Consolidated Company, explained the situation on Wednesday to the operators in Nelson in part as follows:

"The very high prices of lead which were occasioned by the tremendous demand for munitions purposes, had restricted the use of lead for other purposes. As a matter of fact, any form of lead manufactured product became almost prohibitive in price to the consumer. Our sales outside of munition lead were insignificant. Besides the natural restriction due to the price, was the fact that there was considerable price cutting in Eastern Canada by American producers. I must say that we were met with absolute fairness by every mine owner present at that meeting, and we still felt hopeful that the munition board would see their way clear to take our lead at the price we paid for it.

"Since then, there have been negotiations with the board and we now find that the utmost that it will agree to is to take 1,200 tons of lead per month until February 28, 1918. After that there is no assurance whatever of any market for lead in Canada, except from the manufacturers for other purposes than munitions and this demand is very light.

The restricted orders of the munitions board and the fact that they are not going to give us the price that we have paid for all of the lead which we have already bought in anticipation of their requirements and have in stock, is liable to be a very serious loss to the smelter, more particularly should the price of lead remain down or 'slump' still further. These receipts will all be paid for—much of them on the old basis of the munitions board purchases of St. Louis, price plus freight—long before we could market it at the rate of 1,200 tons per month.

"The solution of the present difficulty is as stated above: First, to reduce our stock to a proper operating basis for the limited market in Canada, and at the same time to use every effort to market our lead outside of Canada, in China and Japan, if we can overcome the Australian competition and secure space on the steamers; or even selling the lead in the United States. In order that this may be done, it would seem necessary to make an absolute pool of all of the lead so that allowing the usual 60 days for reducing the ore to fine metal, sales would be shared pro rata at whatever is obtained between all producers and only to the extent that sales are actually made. In other words, to hold the lead for account of the shipper until it is sold.

"From the above it ought to be clear that the reason we are accepting lead ore shipments carrying less than 4 per cent. zinc is that they may be used to dilute the high zinc ores: in other words, to use Canadian ores as much as possible, instead of foreign ores, but, unfortunately, the acceptance of these ores involves an addition to the amount of lead to be sold, and it seems possible that the extra metallurgical losses might be less than what we would lose on account of market conditions.

"It will be necessary, therefore, if we are to continue to receive even these ores, to modify the settlement scheme on such ores so that final settlement will not be made until such time as we have marketed first, the metal on hand at present and then the product from these ores."

In connection with the above statement from Mr. Blaylock it will be recalled that on the following day, Hon. William Sloan was able to inform the convention by wire to the effect that, subsequent to the personal representations of Premier Brewster at the national capital, the Imperial Munitions Board had agreed to place an order for 6,000 tons of lead with the smelter. It was estimated then that the product of the smelter would be taken care of until March next.

In addition to the order so placed the convention was also informed that the Federal Government would make immediate arrangements for the removal of the embargo prohibiting the export of silver, lead and zinc to the United States. By this latter procedure it is believed that a wider market still for British Columbia metals will be found.

The subject of remission of the duty on similar metals going from Canada to the United States has also been taken up with Ottawa and while the successful termination of these negotiations is at the moment problematical, the increased demand for the ores in question in the manufacture of munitions in the republic to the south may be an important factor in this regard. With such an arrangement consummated there would be an equal field for British Columbia with commensurate extension of business on this side of the international boundary.—Victoria Daily Times.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

In the account of Coal Mining in British Columbia, sent earlier, it was stated that the production of coal in the Province during eight months to the end of August, 1917, had been 1,536,000 long tons. Since then the figures for September have been received, namely, 195,485 tons, making the total for nine months of the year 1,731,485 long tons. This represents the gross output, that is, including the coal used in making coke. The average monthly production has therefore been 192,387 tons. The total for the whole of the year 1916 was 2,485,580 tons, or an average of 207,132 tons. It would seem unlikely that the current year's gross production of coal will be as large as that of last year, for to make it so the output for the last three months of the year would have to average 251,367 tons a month, or about 59,000 tons a month more than the average for the expired nine months of the year.

The following information relative to a new coal-mining property on Vancouver island was published recently in a local newspaper: "At Nanoose bay, on the eastern coast of Vancouver island, an embryo city has come into being. There is being built a new mining town that some day may become a city of importance in the Province. The name of the new town is Grant, and at the present time it consists of buildings connected with a coal mine owned by the Nanoose Collieries Co. New houses are being constructed for the employees of the mine, and a school-house is in course of erection. When the construction work shall be completed there will be quite a flourishing little town at the bay, which is twelve miles from Nanaimo. The Grant mine is at present in a fine state of development. One hundred and fifty tons of coal is being produced daily, and it is expected that the output will be increased considerably as soon as the new workings shall be opened. The coal is being shipped on scows to Seattle, Washington."

The Fernie Free Press, published in the largest town in the Crowsnest district of British Columbia, states that the Commission investigating the cost of living has been visiting the various towns in the district, and while the evidence taken shows that there has been some increase in certain articles since last April, on the whole there has been very little change. The increased cost has been largely in dry goods. The Commission is expected to make its report very shortly, when, if the increase shall warrant it, the coal-miners' wages will be advanced sufficiently to cover the difference.

The Canadian Collieries (Dunsmuir) Limited, a short time ago, built 170 more coke-ovens at Union bay, Vancouver island, making the total number of ovens there 300. Owing to a shortage of labor, however, it is unable to supply sufficient coal to keep all those ovens in operation, with the result that about 200 are in use making coke, and the remaining 100 are at present unused. It is stated that the company could give employment to fully one thousand more men at its coal mines on Vancouver island if the men could be obtained, but, as they cannot, the supply of coal is short accordingly.

In its account of the official opening of the Vancouver Chamber of Mines, on Oct. 29, the Vancouver, B.C., Daily Province stated that "Mr. Nicol Thompson, of Vancouver, mentioned that the previous week, as advisor to the Fuel Controller, he made an inspection

of the Vancouver Island coal mines, travelling for three miles under the Gulf of Georgia in visiting the various coal seams. Labor conditions in the mines were improving and the output for October would be considerably above that for September. The mines at Nanaimo, for instance, could employ at least another one thousand men and that without increasing overhead expenses to any marked extent. With more men there would be more production at a lower cost per ton. The present mine managers are doing what they can to increase production of coal, and Mr. Thompson does not expect any shortage this winter of domestic coal, although it is possible that conditions may be somewhat different with regard to steam coal for which there is an abnormal demand on account of the Admiralty needs."

A statement of the receipts and expenditures up to October 20, in connection with the Coal Creek Colliery Explosion Fund, published recently in the Fernie B.C., Free Press, shows total receipts to date to have been \$20,042.15, and disbursements \$3,003.94, leaving a balance at credit in the bank of \$17,038.21. This fund has been raised for the relief of dependents of the thirty-four men who lost their lives in an explosion that occurred last April in one of the Coal Creek mines of the Crow's Nest Pass Coal Co., and of other sufferers from that disaster. Included in the total was an amount of \$10,000 contributed by the Dominion Government.

The Vancouver Daily Province states that, "at the request of the Dominion Advisory Council of Scientific and Industrial Research, Dr. J. G. Davidson, head of the Department of Physics at the University of British Columbia, will soon leave Vancouver for Ottawa to superintend the installation of a by-product coke oven plant in Eastern Canada. He will be away from British Columbia several months. Dr. Davidson stated that for three years he had experimented with the application of an electrical method of cleaning smoke and dust from gases, and extracting smoke from coal gas in gas plants and by-product ovens. This work had proved satisfactory to the council, and an appropriation had been made for the installation of the process on a bank of by-product ovens. The object is to eliminate in new plants much of the machinery used in the older ones. Dr. Davidson pointed out that the importance of coal tar, on account of its derivatives, benzol and toluol, had been realized by the United States Government in its war preparations to such an extent that manufacturers of machinery had been asked to give precedence to making equipment for by-product ovens."

NORTHERN ONTARIO.

Preston.

The Preston property, which at one time was under option to the Preston East Dome mining company, has been taken under option by the Hayden Mining Company interests. This property comprises forty acres and is adjacent to the Dome Mines. A few years ago a shaft was driven to a depth of fifty feet and a couple of cars of ore were shipped. Sampling will begin at once and it is expected development will soon be under way.

Dome.

A new innovation by the directorate of the Dome Mining Company is the semi-annual report, the first of which was received by shareholders recently, covering operation of the mine for a period of six months

ending on the 30th of September. The gross income realized by the company was \$701,810. The total operating costs for the half year amounted to \$524,575, thus leaving net earnings of \$167,234. This increased the surplus of the company to \$864,285. However, from this amount there was deducted \$141,164 for depreciation of plant; \$27,415 for war taxes and \$100,000 has been paid in dividends, leaving a surplus of \$595,706. This shows clearly that production operations at the Dome mines are not being profitably carried on at the present time. This unfavorable situation is wholly attributable to the scarcity of labor and the high cost of material. However, when the tremendous ore reserves are taken into consideration this feature of the report should not be considered at all alarming. It has recently been reported that the company intend sinking a shaft on the property to the depth of 1,500 ft. Ore reserves in the last estimate given by the company did not figure on anything below the 600-ft. level.

Hollinger.

The Hollinger Mining Company is about prepared to try out its new addition to the mill which increases the capacity of this plant by 1,000 tons per day. This brings the possible daily production to a little over \$25,000 per day or about \$9,000,000 per year. That it was possible to make this increase in milling equipment with labor conditions which prevail at the present time, is greatly to the credit of this company. Some idea of the immensity of the Hollinger mine may be gleaned from the fact that, were sufficient labor available, the Hollinger Consolidated could be turning out upwards of one and one-half tons of solid gold every thirty days, or over one thousand dollars per hour.

Schumacher.

With the installation of a little extra crushing equipment at the Schumacher mill the tonnage treated could easily be brought up to 200 tons per day. The daily average being treated at the present time is about 180 tons per day and the mill heads are not far short of seven dollars per ton, while operating costs are being maintained around four dollars per ton. Conditions at the Schumacher at the present time are the best in the history of this company. Recovery is approximating \$35,000 per month or \$420,000 per annum.

Newray.

The Newray mining company's property, now that it has been optioned to the Crown Reserve mining company, will in all probability receive the development necessary to prove it. The operations at this mine will now be under the direction of Mr. Summerhayes of the Porcupine Crown Mines. At one time during the history of this company it had the earmarks of being a winner and at that time was in a position to pay about \$120,000 in dividends. The developments in future at this mine will be watched with more than usual interest.

Dome Lake.

Development work at the Dome Lake Mines during the past six months has been exceedingly encouraging and the company have developed ore of an estimated value of \$82,008. The grade of ore developed averages around \$9.03 to the ton. In figuring these ore reserves the results of considerable diamond drilling

has not been taken into account. It is estimated that when the mill additions now being installed are completed the property will be on a profit-producing basis. The report issued is very conservative, but at the same time gives much promise for the future of the company.

Porcupine V. N. T.

Similar conditions are being met with on the 600-ft. level of the Porcupine V. N. T. property as were encountered on the McIntyre, and other properties in the immediate neighborhood. The vein at this depth has not only widened out considerably, but also contains a higher grade of ore. It has been determined on adjoining properties that values generally have increased with depth and a diamond drill hole on the McIntyre to a depth of over a quarter of a mile demonstrated ore of a better average value than that already developed throughout the mine, which ranges around \$10 to the ton.

Coniagas.

A contract has been let for the sinking of the shaft on the Ankerite property at Porcupine to a depth of 500 ft. This shaft will be of the three-compartment type and will also be used to develop the Maidens-McDonald property, which is also owned by the Coniagas mining company of Cobalt. Considerable ore of a commercial grade has been developed on the Ankerite and one of the finest mining plants for its size in the camp has been installed.

Keora.

The Keora property in Whitney Township is about to be diamond drilled again. A contract has been let and the work will be commenced at once. This will be the second diamond drilling programme to be carried out on this property.

Kirkland Lake.

Development work at the Kirkland Lake Gold is going ahead rapidly and at the present time drifting is progressing on four different levels. At the 400-ft. level drifting has been carried on for a distance of approximately 700 ft. from the shaft and all but about 60 ft. of this drift is in ore. The estimate of ore already broken down and in sight at this property is placed at three-quarters of a million dollars. It is fully expected that by the time the new 150-ton mill is in readiness for operation over a million dollars in ore will have been developed. The recent cutting of the westward continuation of the Kirkland Lake Gold vein on the Elliott-Kirkland is almost conclusive evidence that this auriferous zone crosses the full width of the Kirkland Lake which is about one-quarter of a mile. It may now be said definitely that the auriferous zone of the Kirkland Lake camp extends from the Tough-Oakes to the Elliott Kirkland, both properties inclusive.

Teck-Hughes.

With a return to pre-war conditions it seems highly probable that Teck-Hughes will be in line for an enlargement of the mill. A winze has been sunk from the 400 to the 600 ft. level of the property and a station is being cut preparatory to driving a cross-cut to a point directly beneath the main shaft when a raise will be put up to connect these workings. The Teck-Hughes mill report for September shows a running time of 60.8 per cent. of total and 1,028 tons treated with an average mill head of \$7.93 per ton.

Elliott-Kirkland.

At the Elliott-Kirkland property arrangements are being made to sink the shaft to the 500-ft. level. Drifting is being carried on at the 300-ft. level both east and west. The crosscut which encountered this vein is also being carried on to the contact to determine whether or not any parallel orebodies exist.

Canadian Kirkland.

The find of visible gold recently made on the Canadian Kirkland property is perhaps the most important find yet made on this property. The vein in which this gold occurs is approximately sixteen feet in width and is highly mineralized. Another vein of much promise about twelve feet in width has also been opened up on this property and a shaft sunk to a depth of about thirty-five feet. Across the width of the shaft at this depth the values are said to average about seven dollars to the ton. This property together with the Hunton-Kirkland and the Ontario-Kirkland comprise the principal properties of the south auriferous zone of the growing Kirkland Lake camp. Canadian Kirkland is looked upon with a good deal of favor by mining men of the Kirkland Lake camp.

Minaker-Kirkland.

A new vein in which the ore is said to assay comparatively high has been discovered on the Minaker-Kirkland property. The vein so far is about four feet in width and crosses the north-west corner of the Minaker-Kirkland from the Lake Shore to the Kirkland Porphyry. The vein is heavily mineralized and a little visible gold occurs. This is perhaps the most important discovery to date on this property.

Hurricanaw.

A number of prospectors have returned to Timmins for the winter from the Hurricanaw district and have fetched with them some promising samples of gold from a number of claims in this district. A number of test pits have been sunk on claims in this district during the past summer and fall and fairly encouraging results have been encountered.

Lake Shore.

The new mill building for the Lake Shore mill is almost completed and a good deal of the machinery for the 80-ton plant is already on the ground, and installation will commence immediately. It is expected the mill will be in operation early in the coming year.

Gowganda.

A company is being formed to work on claim No. M. R. 1702, township of Nicol, in the Gowganda Mining District. This claim is near Leroy Lake and has been reported on favorably by Mr. Charles Spearman. A vein about six inches in width has been opened up and considerable silver encountered. The composition of the vein is calcite and in places the values run exceptionally high. The formation is diabase and basalt.

Satisfactory progress is reported by a number of mining companies of Cobalt which have entered the Gowganda district and are sampling properties. During the past two weeks the La Rose Mining Company and the Mining Corporation of Canada have both interested themselves in properties in this district, and a number of mines which have not operated for some time are being opened up again, and will undergo further development.

Corkill.

A discovery of silver is reported to have been made in the township of Corkill in the Gowganda mining

division, about fifteen or twenty miles south-west of Elk Lake. The discovery was first reported to have been made in Wallis township, which adjoins Corkill, but it has been definitely established that it is Corkill near the boundary of Wallis.

South Bay Power.

The assets of the South Bay Power Company have passed into the hands of the receiver. This company was organized about a year ago to develop a water-power at Hanging Stone Falls, where it was thought 1,500 h.p. could be developed at a cost of about \$250,000. Work was energetically pushed last winter, but in the spring operations were suspended, to be resumed in the summer, it was announced, and the present report of the failure of the company was received with considerable surprise.

Rickard Township Claims Optioned.

The Mining Corporation of Canada has taken an option on the claims on which the sensational gold discovery was recently made in the township of Rickard. The ultimate price to be paid for the property is said to be the largest since the famous Timmins-Hollinger deal in 1909, and is said to be in the neighborhood of \$350,000. The main vein on the property ranges from twenty to more than forty feet in width and is composed of quartz in which plentiful sprinklings of free gold occur. There are also a number of smaller veins on the property and from surface indications it would appear as if the proposition would be a big one. The gold on this property was accidentally discovered by two Swedes who were cruising for pulpwood in the district and the comparatively short time elapsing from time of discovery until optioning of the property to one of Cobalt's biggest mining companies demonstrated quite plainly the possibilities there are for the prospector in the unexplored parts of the northland, within very easy reach of the railway.

Discovery in Bernhardt.

A promising discovery of native silver has been made in the township of Bernhardt, a few miles north from Kirkland Lake. A test pit is said to have been put down on a six-inch vein and at a depth of a few feet it is said to have opened out to a width of two feet and contains very encouraging silver values.

Alexandra.

The Alexandra mining company's property at Cobalt has been acquired by the Mining Corporation of Canada and work has already commenced. This property consists of twenty acres and is located between the Savage property of the McKinley-Darragh-Savage and the old Bailey Cobalt mining company's property. Considerable work has been done previously on this property consisting of shaft sinking and diamond drilling, and a number of promising veins were opened up.

Importance of Silver Industry.

The Cobalt silver mines are producing silver at the rate of approximately \$60,000 per every twenty-four hours, or at the rate of \$2,496 every sixty minutes, night and day, which in solid bullion amounts to two and one-half tons per day or nine hundred tons annually, which would require a train of thirty cars carrying thirty tons each to transport this pure silver. The payroll is \$4,500,000 per year and supplies to the amount of \$3,000,000 are purchased, making a total expenditure of \$7,500,000. The importance of the silver mining industry to the province of Ontario and Dominion of Canada is apparent.

ONTARIO'S PRODUCTION OF METALS.

The report of the Bureau of Mines shows the following output of the various minerals and the value with comparisons:

	Quantity.		—Values—	
	Nine Months.		Nine Months.	
	1917.	1916.	1917.	
Gold, ozs.	343,490	\$7,513,734	\$6,754,535	
Silver, ozs.	15,236,002	9,750,040	12,001,875	
Cobalt (metallic), lbs.	295,866	146,467	433,739	
Nickel (metallic), lbs.	166,921	7,618	67,499	
Nickel (oxide), lbs.	10,831	6,381	3,025	
Cobalt (oxide), lbs.	276,769	231,947	323,162	
Other cobalt and nickel com- pounds, lbs.	276,217	22,890	30,025	
Molybdenite, lbs.	65,827	15,845	83,550	
Copper ore, tons	2,658	21,685	33,419	
Nickel in matte, tons....	31,064	15,523,000	15,532,000	
Copper in matte, tons....	15,928	6,285,930	6,371,200	
*Iron ore (exported), tons.	98,757	.....	412,401	
*Pig iron from domestic ore, tons	48,820	.....	936,118	
*Lead, tons	540	.....	136,948	
Total.			\$43,119,496	

*1916 figures are not available for the last three items.

Markets

NEW YORK MARKETS.

Connellsville Coke—Spot or contract *\$6.00.
 * Fixed under Lever Act.
 Straits tin, spot, f.o.b., nominal, 70.00 cents.
 Copper (Government price), 23.50 cents.
 Prime Lake, no market.
 Electrolytic, no market.
 Casting, no market.
 Lead, Trust price, 6.25 cents.
 Lead, outside, nominal, 6.25 to 6.50 cents.
 Spelter, prompt western shipment, 7.67½ cents.
 Antimony—Chinese and Japanese, nominal, 14.00 cents.
 Aluminum, nominal—
 No. 1 Virgin 98-99 per cent., 35.00 to 37.00 cents.
 Pure 98-99 per cent. remelt, 33.00 to 35.00 cents.
 No. 12 alloy remelt, 25.00 to 27.00 cents.
 Powdered aluminum, 75.00 to 85.00 cents.
 Metallic magnesium—99 per cent. plus, \$2.00 to \$2.50.
 Nickel—Shot and ingot, 50.00 cents.
 Electrolytic, 55.00 cents.
 Cadmium, nominal, \$1.45 to \$1.50.
 Palladium, \$115.00.
 Quicksilver (Nov. shipment from California), \$100.00.
 Platinum—Pure, \$105.00.
 10 per cent. Iridium, \$111.00.
 Cobalt (metallic), \$2.70.
 Tungsten—
 Wolframite, \$23.00 to \$25.00.
 Scheelite, \$26.00.
 Gravel Fluorspar: f.o.b. mines—
 Prompt, \$28.00 to \$30.00.
 Contract, year 1918, \$25.00.
 Silver (official), 86½ cents.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet Copper—
 Hot rolled, *35.00 to 37.00 cents.
 Cold rolled, *36.00 to 38.00 cents.
 (Shipments from stock 2c per pound extra.)
 Copper bottoms, *49.00 cents.
 Copper in rods (round), *38.00 cents.
 (Square and rectangular), *39.00 cents.
 Copper wire, nominal, Nov., 30.00 to 31.00 cents.
 Copper wire, Dec., 28.00 to 29.00 cents.
 High brass—
 Sheets, *30.25 to 32.25 cents.
 Wire and light rods, *30.25 to 32.25.
 Heavy rods, *27.25 to 29.25 cents.
 Low brass—sheet, wire and rods, *36.75 cents.
 Tubing—
 Brazed bronze, *48.25 to 48.50 cents.
 Brazed brass, *43.75 to 44.75 cents.
 Seamless copper, *41.50 to 44.50 cents.
 Seamless brass, *38.00 to 42.00 cents.
 Seamless bronze, *52.00 cents.
 Full lead sheets, 11.75 cents.
 Cut lead sheets, 12.00 cents.
 Sheet zinc, f.o.b., smelter, 19.00 cents.
 *For delivery at mill convenience.

TORONTO MARKETS.

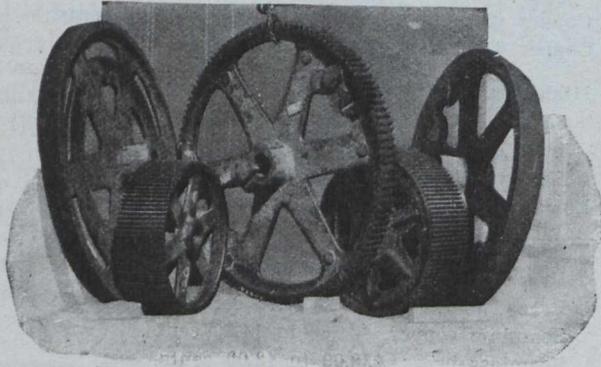
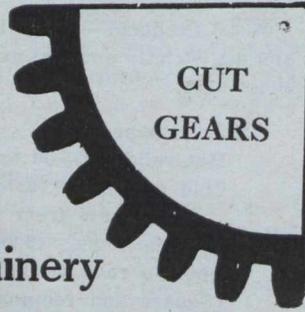
Cobalt oxide, black, \$1.50 per lb.
 Cobalt oxide, grey, \$1.65 per lb.
 Cobalt metal, \$2.25 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 15 cents per lb.
 Nov. 12, 1917—(Quotations from Canada Metal Co., Toronto)
 Spelter, 10½ cents per lb.
 Lead, 9 cents per lb.
 Tin, 65 cents per lb.
 Antimony, 16 cents per lb.
 Copper, casting, 34 cents per lb.
 Electrolytic, 34 cents per lb.
 Ingot brass, yellow, 20 cents; red, 25½ cents per lb.
 Nov. 12, 1917—(Quotations from Elias Rogers Co., Toronto)
 Coal, anthracite, \$9.50 per ton.
 Coal, bituminous, nominal, \$9.00 per ton.

SILVER PRICES.

		New York.	London.
		cents.	pence.
October	20.....	83½	42¾
"	22.....	83	42½
"	23.....	82½	41¾
"	24.....	82½	41¾
"	25.....	82½	41¾
"	26.....	83¼	42¼
"	27.....	83¼	42¼
"	29.....	84¾	43
"	30.....	90½	46
"	31.....	90½	45¾
November	1.....	89¾	45¾
"	2.....	88¾	45½
"	5.....	87¾	44½
"	6.....	Holiday	44¼
"	7.....	86¾	44

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associated with tin, lead or zinc for smelting purposes, SEEK INFORMATION CONCERNING MINES OR MINING DISTRICTS producing such material.

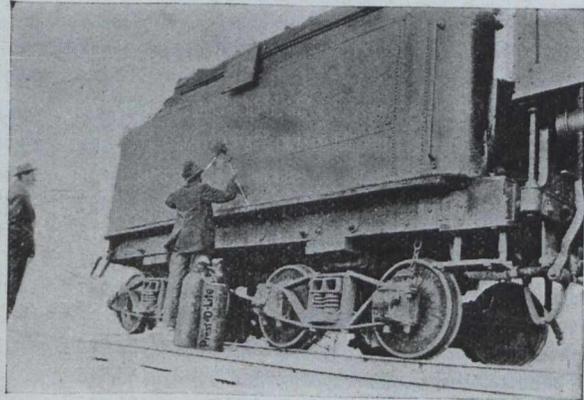
They are prepared to acquire a going concern or would assist in the development of promising prospects, by arrangement after investigation and on the receipt of reports and samples with full information re finance, means of transport from the mines to the Coast and the cost of shipping the products in normal times to England.

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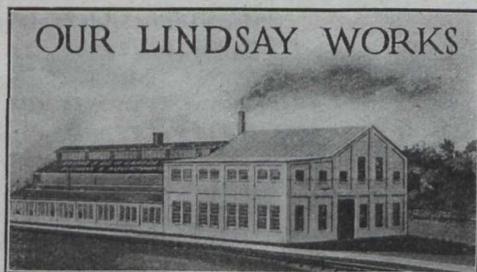
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Prices, etc., on request

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We have started our new Plate Mill, and are Manufacturing Plate from $\frac{1}{4}$ in. to $\frac{3}{4}$ in. thick, 24 in. wide, any weight up to 500 pounds.

Dominion Steel Foundry Co., Limited

Hamilton, Ont.

COAL CRUSHING ROLLS

The crushing of coal is most satisfactorily done by means of **rolls** with **pointed teeth** or with **corrugations**. The main rolls, which are used for the preliminary reduction, are almost invariably of the pointed tooth type. We are prepared to furnish coal crushing rolls with inserted steel teeth or those with teeth cast on segments which are bolted to the roll bodies.

The reduction of run-of-mine bituminous coal down to three-eighths inch size is generally done by means of a set of **crushing rolls** with **pointed teeth** and a **disintegrator**.

The rolls used in our **disintegrator** are grooved their entire length, and are operated at a differential speed. The differential effect produces both a crushing and a tearing action on the small lumps of coal, and results in a finer reduction than could be obtained with similar rolls operated at the same speed.

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The Minister of Finance offers for Public Subscription

Canada's Victory Loan

Issue of

\$150,000,000. 5½ % Gold Bonds

Bearing interest from December 1st, 1917, and offered in three maturities, the choice of which is optional with the subscribers, as follows:

5 year Bonds due December 1st, 1922
10 year Bonds due December 1st, 1927
20 year Bonds due December 1st, 1937

This Loan is authorized under Act of the Parliament of Canada, and both principal and interest are a charge upon the Consolidated Revenue Fund.

The amount of this issue is \$150,000,000, exclusive of the amount (if any) paid for by the surrender of bonds of previous issues. The Minister of Finance, however, reserves the right to allot the whole or any part of the amount subscribed in excess of \$150,000,000.

**The Proceeds of this Loan will be used for War purposes only, and will be spent wholly in Canada.
Principal and Interest payable in Gold
Denominations: \$50, \$100, \$500 and \$1,000**

Subscriptions must be in sums of \$50 or multiples thereof.

Principal payable without charge at the office of the Minister of Finance and Receiver General at Ottawa, or at the Office of the Assistant Receiver General at Halifax, St. John, Charlottetown, Montreal, Toronto, Winnipeg, Regina, Calgary and Victoria.

Interest payable without charge, half-yearly, June 1st and December 1st, at any branch in Canada of any Chartered Bank.

Bearer or Registered Bonds

Bonds may be registered as to principal or as to principal and interest

Scrip certificates, non-negotiable, or payable to bearer, in accordance with the choice of the applicant for registered or bearer bonds, will be issued after allotment in exchange for provisional receipts. When these scrip certificates have been paid in full, and payment endorsed thereon by the bank receiving the money, they may be exchanged for bonds, when prepared, with coupons attached, payable to bearer, or registered as to principal, or for fully registered bonds when prepared, without coupons, in accordance with the application.

Delivery of interim certificates and of definitive bonds will be made through the Chartered Banks.

Bearer bonds with coupons will be issued in denominations of \$50, \$100, \$500, and \$1,000, and may be registered as to principal only. Fully registered bonds, the interest on which is paid direct to the owner by Government cheque, will be issued in denominations of \$1,000, \$5,000 or any authorized multiple of \$5,000.

Subject to the payment of 25 cents for each new bond issued, holders of fully registered bonds without coupons, will have the right to convert into bonds of the denomination of \$1,000 with coupons, and holders of bonds with coupons will have the right to convert into fully registered bonds of authorized denominations without coupons, at any time, on application to the Minister of Finance.

Surrender of Bonds

Holders of Dominion of Canada Debenture Stock, due October 1st, 1919, and of bonds of the three preceding Dominion of Canada War Loan Issues, have the privilege of surrendering their bonds in part payment for subscriptions to bonds of this issue, under the following conditions:—

Debenture Stock, due October 1st, 1919, at Par and Accrued Interest.

War Loan Bonds, due December 1st, 1925, at 97½ and Accrued Interest.

(The above will be accepted in part payment for bonds of any of the three maturities of this issue.)

War Loan Bonds, due October 1st, 1931, at 97½ and Accrued Interest.

War Loan Bonds, due March 1st, 1937, at 96 and Accrued Interest.

(These will be accepted in part payment for bonds of the 1937 maturity ONLY of this Issue.)

Bonds of the various maturities of this issue will, in the event of future issues of like maturity, or longer, made by the Government, other than issues made abroad, be accepted at par and accrued interest, as the equivalent of cash for the purpose of subscription to such issues.

Issue Price Par

Free from taxes—including any income tax—imposed in pursuance of legislation enacted by the Parliament of Canada.

Payment to be made as follows:

10% on December 1st, 1917	20% on March 1st, 1918
10% on January 2nd, 1918	20% on April 1st, 1918
20% on February 1st, 1918	20% on May 1st, 1918

A full half year's interest will be paid on 1st June, 1918

The Bonds therefore give a net interest yield to the investor of about:

5.61% on the 20 year Bonds

5.68% on the 10 year Bonds

5.81% on the 5 year Bonds

All payments are to be made to a Chartered Bank for the credit of the Minister of Finance. Failure to pay any instalment when due will render previous payments liable to forfeiture, and the allotment to cancellation. Subscriptions accompanied by a deposit of 10% of the amount subscribed, must be forwarded through the medium of a Chartered Bank. Any branch in Canada of any Chartered Bank will forward subscriptions and issue provisional receipts.

In case of partial allotments the surplus deposit will be applied toward payment of the amount due on the January instalment.

Subscriptions may be paid in full on January 2nd, 1918, or on any instalment due date thereafter under discount at the rate of 5½% per annum. Under this provision payments of the balance of subscriptions may be made as follows:

If paid on January 2nd, 1918, at the rate of 89.10795 per \$100.

If paid on February 1st, 1918, at the rate of 79.46959 per \$100.

If paid on March 1st, 1918, at the rate of 59.72274 per \$100.

If paid on April 1st, 1918, at the rate of 39.90959 per \$100.

Forms of application may be obtained from any branch in Canada of Any Chartered Bank, or from any Victory Loan Committee, or member thereof.

The books of the Loan will be kept at the Department of Finance, Ottawa.

Application will be made in due course for the listing of this issue on the Montreal and Toronto Stock Exchanges.

Subscription Lists will close on or before December 1st, 1917.

Department of Finance,
Ottawa, November 12th, 1917.

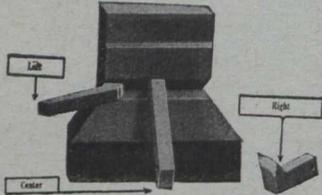


1 Man can do the work of 7

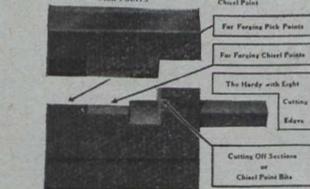
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Little Giant pick point dies



Little Giant Combination pick point and chisel bit dies



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Motor or Belt Driven

The work will be perfectly true and uniform. The correct cutting angles and the right sharpness is absolutely assured with every tool turned out.

The dies are made by skilled toolmakers of the finest steel and scientifically hardened to minimize wear. Their accuracy is retained for the longest period under continuous hard use.

Hundreds of the best known mines in the country have increased their output and reduced their labor cost by installing this remarkably efficient power hammer.

Its range of work is enormous. Special dies can be furnished when necessary. Built in 25, 50, 100, 250 and 500-lb. sizes.

Repair costs are extremely small for it is *guaranteed Forever* against defective material and workmanship. The greater quantity and better quality of the tools produced has enabled the Little Giant to pay for itself within a month in several instances.



Specifications	25 Lb.	50 Lb.	100 Lb.	250 Lb.	500 Lb.
Will forge stock up to.	1 1/2 sq. or 2 rd.	2 sq. or 2 1/2 rd.	3 sq. or 4 rd.	5 1/2 sq. or 7 rd.	7 sq. or 9 rd.
Upper die size of face.	1 1/2 x 3 in.	1 1/2 x 3 1/2 in.	1 1/2 x 3 1/2 in.	3 1/2 x 8 in.	4 1/2 x 10 in.
Lower die size of face.	2 x 3 in.	2 1/2 x 3 1/2 in.	3 x 6 in.	3 1/2 x 8 in.	4 1/2 x 10 in.
Lower die length of base.	5 in.	5 1/2 in.	6 in.	8 in.	10 in.
Variable length of stroke.	6 to 7 in.	8 to 11 in.	9 to 12 in.	12 to 15 in.	14 to 19 in.
Throat room.	6 in.	6 in.	7 1/2 in.	13 in.	15 in.
Weight of steel ram.	25 lb.	50 lb.	100 lb.	250 lb.	500 lb.
Weight of ham. comp.	800 lb.	1600 lb.	3300 lb.	5000 lb.	7000 lb.
Height over all.	5 ft 4 in.	5 ft 11 in.	6 ft 6 in.	7 ft 6 in.	9 ft.
Floor space required.	16x27 in.	20x30 in.	28x42 in.	30x54 in.	32x62 in.
Belt Pulley size.	3 1/2 x 10 in.	4 x 12 in.	5 x 14 in.	8 x 18 in.	9 x 24 in.
Revolutions per min.	400	350	300	200	150
Estimated H.P. required.	1/2	1 1/2	2 1/2	4	7 1/2
Price.	\$120	\$180	\$360	\$800	\$1350
Code word.	Babe	Boy	Man	Giant	Jumbo
Special					
Pick pt. dies-cd. wd					
Pick	\$25	\$25	\$35	\$50	\$65
Chisel bit dies-code word "Chibi"	not used	\$65	\$75	\$90	\$110
Com. pick point and chisel bit dies-code word "Pieni"	not used	\$75	\$85	\$100	\$125
Puncher Pickdies-code word "Punch"	not used	\$65	\$75	\$90	\$110
Motor Equipment					
Price, ex com with mot.	\$140	\$175	\$225	\$275	\$400
Motor furnished-code word "Motor"	1 Hp	2 Hp	3 Hp	5 Hp.	7 1/2 Hp.
Weight, Extra					
Shipped with hammer	180 lb	260 lb	310 lb	450 lb.	700 lb.
To equip used hammer	230 lb	320 lb	520 lb	700 lb.	1400 lb.

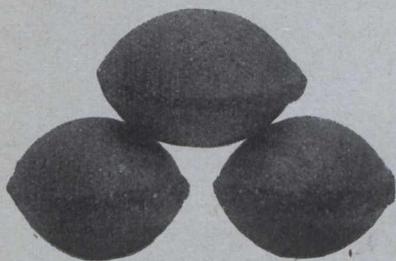
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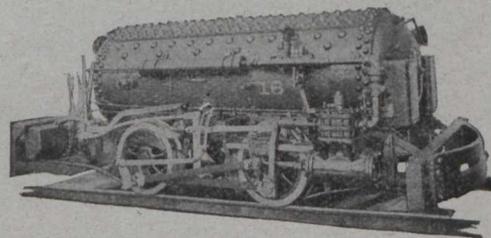
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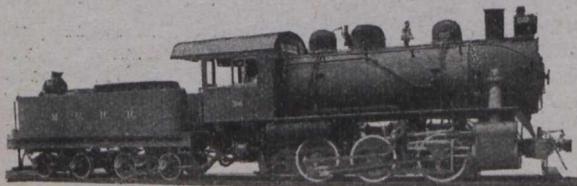
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HON. ARTHUR MEIGHEN, Minister.

R. G. McCONNELL, Deputy Minister.

MINES BRANCH

Recent Publications

- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.
- Feldspar in Canada. Report on, by H. S. de Schmid, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.
- Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.

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

- Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

GEOLOGICAL SURVEY

Recent Publications

- Memoir 85. Road Material Surveys in 1914, by L. Reinecke.
- Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.
- Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.
- Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.
- Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.
- Memoir 95. Onaping Map-Area, by W. H. Collins.
- Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.
- Memoir 97. Scroggie, Barker, Thistle and Kirkman Creeks, Yukon Territory, by D. D. Cairnes.
- Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.
- Map 57A. Frank, Alberta (showing the landslide of 1903).
- Map 63A. Moncton Sheet, Westmorland and Albert Counties, New Brunswick. Topography.
- Map 151A. Nansen and Victoria Creeks, Nisling River, Yukon Territory.
- Map 152A. Kluane Lake, Yukon Territory.
- Map 154A. Southwestern Yukon.
- Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.
- Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.
- Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.
- Map 166A. Portion of Flathead Coal Area, Kootenay District, B.C. Topography.
- Map 182A. Portion of Flathead Coal Area. Geology.
- Map 186A. Explored Routes between Lake Athabaska and Great Slave Lake on the Tazin, Taltson, Slave and Peace Rivers.
- Map 1667. Slocan Mining Area, Kootenay District, B.C.
- Map 1677. Coleraine Sheet, Megantic and Wolfe Counties, Quebec.

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

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

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

Communications should be addressed to **The Director, Geological Survey, Ottawa.**

To Users of the Callow Pneumatic Flotation Cell

USERS of the Callow Cell are naturally interested in knowing how the decision of the United States Circuit Court of Appeals for the Third District, in the Miami case, will affect their interests.

As we understand the prevailing opinion of Judge Woolley in the Miami case he has interpreted the Supreme Court decision in the Hyde case as meaning that "*invention resides not alone in the critical proportion of oil, but also in air and agitation,*" and again, "*in the co-action of the critical proportion of oil and air effected by an agitation greater than, and different from that which had been resorted to before,*" resulting in a froth concentrate of economical value," and further, that the Supreme Court did not limit the patent to "*agitation by mechanical means,*" but to agitation of a violent and persistent kind; "*it mixes the oil with the metal of the ore. This is old. Then, by its greater intensity and longer duration, it stirs the pulp into a froth.*"

Thus, this decision of the Third Circuit Court of Appeals has a most important bearing upon the art, because it holds that the mixing of the oil with the mineral is old, but it **leaves open the use of oil in connection with aeration-cells.**

Meanwhile the idea of a "*critical*" proportion of oil has been dis-

proved by practice in several mills within a short time after it was promulgated.

Judge Woolley says further, concerning the Callow Cell: "*Aeration is direct, and is not the result of or caused by agitation. On the contrary, agitation results from aeration and such agitation, though present in some measure, is not even approximately of the violence and duration of the agitation of the patent. The operation in the Callow Cell certainly possesses these distinguishing features from operation of the process where aeration is caused by agitation.*"

The Court further confirms this important dictum by saying: "*If the only agitation to which the pulp was subjected (after such agitation as in the prior art was necessary to mix the oil and ore) was the agitation of the Callow Cells, we would not say that that agitation amounted to or was the equivalent of the violent agitation of the patent disclosure and constituted infringement.*"

Apparently users of the Callow Cell may feel assured they do not infringe the method of agitation described in U.S. Patent No. 835,120 (less than 1% oil), No. 962,678 (soluble frothing agents), No. 1,099,699 (phenol or cresol in the cold without acid) since all three of the patents are of the same process, dependent upon a certain degree of violence and length of agitation and the production of the same characteristic froth, as set forth in their claims.

(Signed) J. M. Callow.



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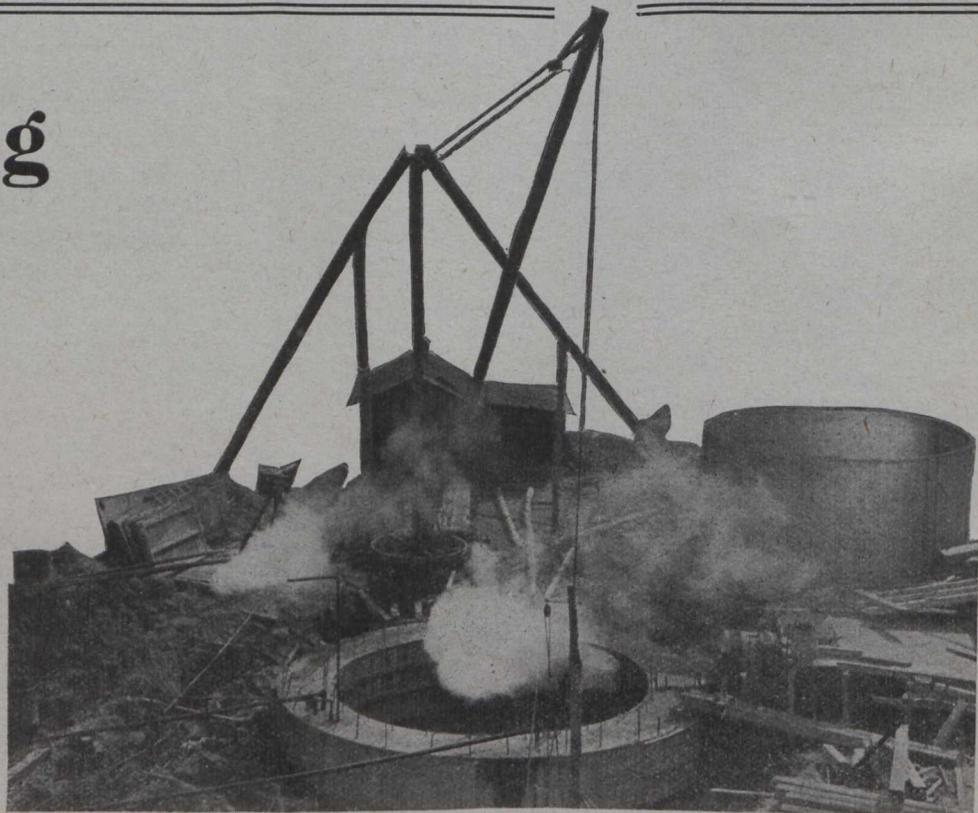
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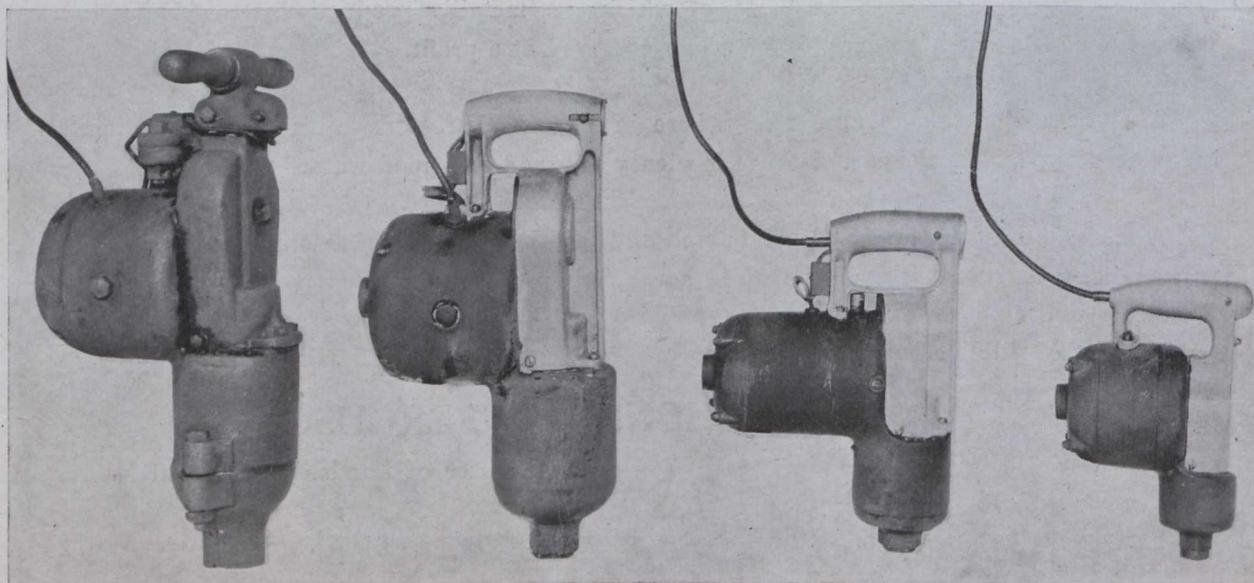
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