

CANADIAN MINING JOURNAL

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No. 13.

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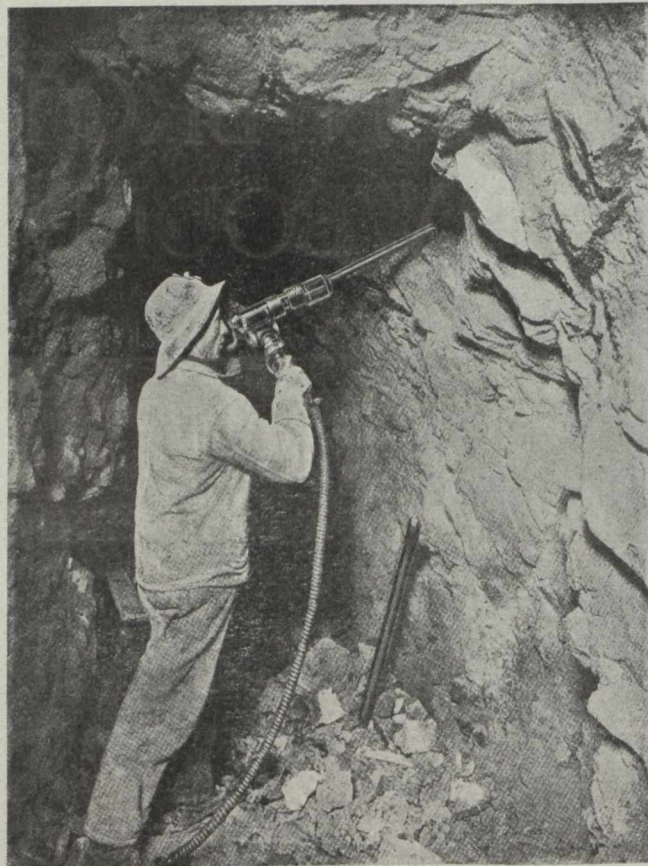
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Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

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

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

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

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

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

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

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

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1918.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.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

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

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

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

Memoir 109. The Harricanaw-Turgeon basin, northern Quebec, by T. L. Tanton.

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

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

Memoir 112. Geology of the district belt of southwestern Alberta, by J. S. Stewart.

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

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

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

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

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

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

Map 1585. Mackenzie River basin. Geology.

Map 1680. Portions of Grenville, Harrington, Chatham and Wentworth townships, Argenteuil county, Quebec. Geology.

Map 1708. Bridge river, Lillooet district, B.C. Topography.

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

Map 1714. The Niagara peninsula, Ontario. Geology.

Map 1715. The Ontario peninsula. Geology.

Map 1724. Sheep River, Alberta. Geology.

Map 1726. Athapapuskow Lake region. Geology.

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

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

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



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

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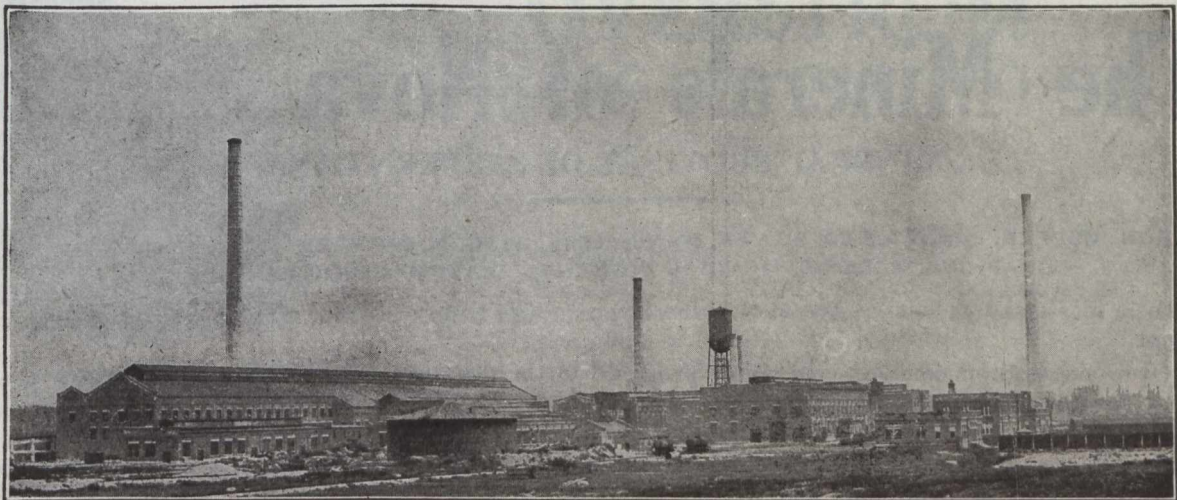
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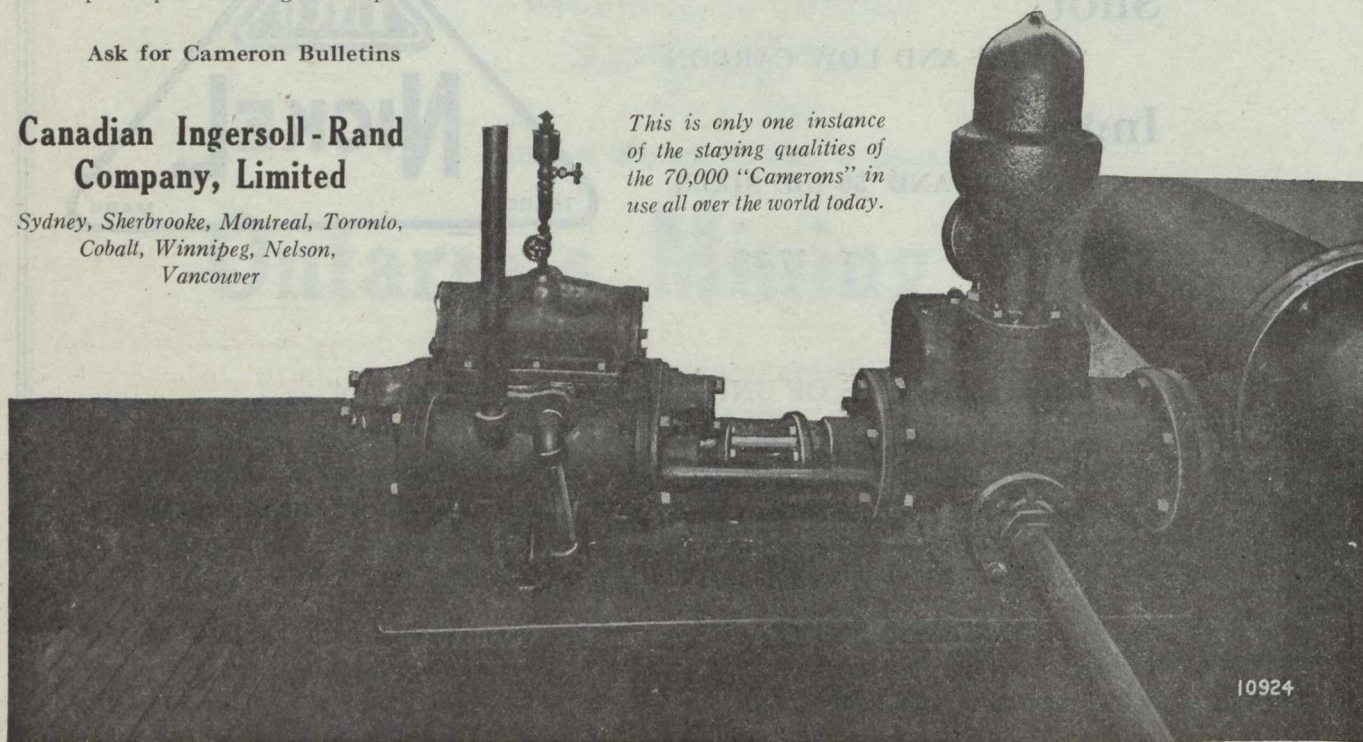
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Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

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.

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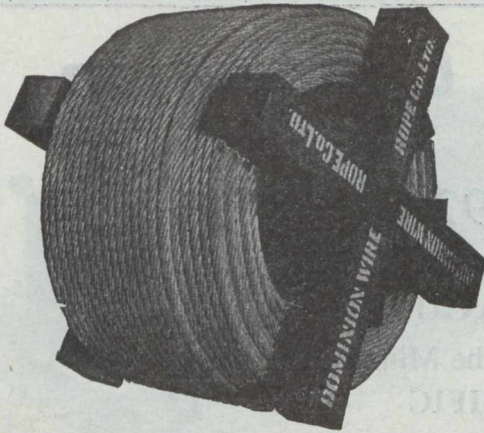
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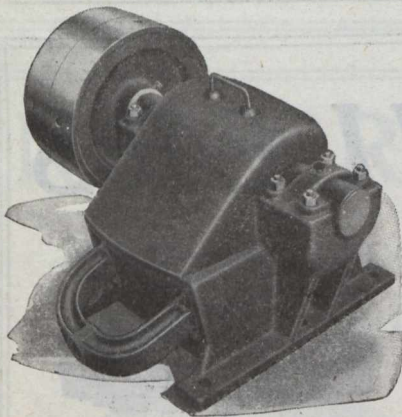
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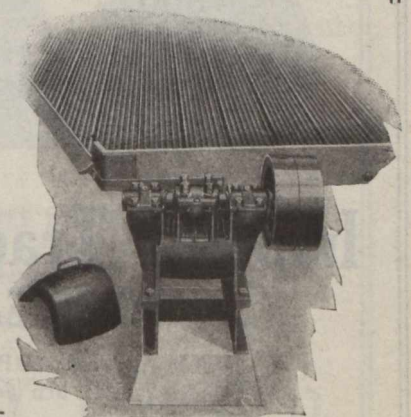
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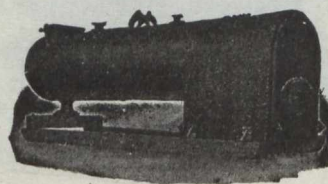
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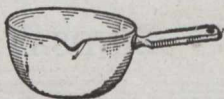
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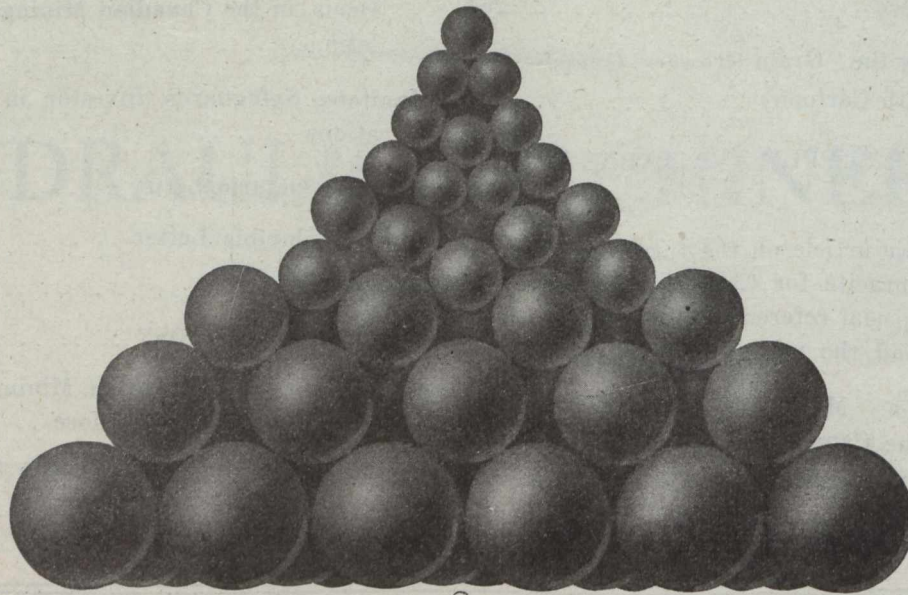
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EDITORIAL

Legislation Prescribing the Status and Practice of Engineers

In this issue will be found a précis of a draft act, now before the British Columbia Legislature, the short title of which is cited as the "Engineering Profession Act." The draft act is the result of consultation between technical societies in British Columbia, and is understood to have been amended in accordance with representations made by members of the Canadian Mining Institute resident in British Columbia.

The specification of the practice of a professional engineer by the Act is very comprehensive, including as it does the civil, railway, hydraulic, steamship, electric, sanitary, mining, metallurgical and chemical engineer; the mine surveyor, the geologist, the petrologist; the "development of rocks, minerals (including coal, petroleum, natural gas, and other fluid substances of value)," and "all other engineering works." Definition of "engineering work" savors of an attempt to set bounds to the infinite. If "engineering" as it is sketched in the interpretation clause of the draft act does not comprehend the entire sum of human knowledge, it goes more than halfway. Take for example the phrase: "Investigations relating to the examination, surveying, exploration and development of rocks, minerals, rock structures, geological processes and the application of geology to practical problems of the industries, arts and engineering." In this all-comprehending phrase there must be included the prospector, the ordinary mining engineer, the chemist, the metallurgist, the mineralogist, the petrologist, the paleobotanist, the paleontologist, and speculative and practising geologist in all his infinite variety.

Frankly, we do not believe that legislation of this comprehensive, and therefore necessarily unspecific character, can be enforced in practice. The powers which would reside in the Council of a Professional Association such as the Act proposes would be immense, but very indefinite. Because of the wide sweep of distinct professions which the Act attempts to take in under the generic term "engineering," the powers given to the proposed Association would be much wider, and not comparable with those given to professional associations such as control the medical, dental and similar professions. In these cases, the limits of professional qualification are nicely and exactly drawn,

but what chiefly recommends the conference of special powers upon the professions of which the medical profession is the best example is that they deal in matters of health, extending almost to powers of life and death. In the case of engineers—using the wide-open definition of the draft Act, it cannot be urged that matters of public health, or the preservation of human life, are so intimately concerned. Where the public safety is touched in engineering performance and design, the existing laws contain all that is necessary, inasmuch as the safety of bridges, dams, factories, ships, electric transmission and grain elevators are all most carefully provided for in public regulations of long standing. In the case of mining, statutory regulations exist in every province, providing for the safety of appliances, and requiring certification of the competency of mine officials. In questions of public safety, therefore, the functions of a Professional Association such as is suggested by this draft Act, would duplicate public statutes of great variety and very long establishment.

As concerns the expenditure of public and private monies, the situation is different. It is well known that much money has been foolishly expended through incompetent direction, but is this a question that permits of statutory regulation? To attempt it trenches upon sumptuary legislation, and, no matter what Statutes are enacted, he that pays the piper will always call the tune.

The objects of the Association proposed—that is to say, the attainable objects—therefore resolve themselves into the raising of the status of the "engineer," or in other words, a desire to secure his more definite recognition by the public, and to raise his emoluments. This is an understandable, and, within proper limits, a laudable aim.

It is, however, open to the gravest question whether compulsory regulation by statute is the best manner in which to effect the aim mentioned, with which aim, we desire to emphasise, no fault can be found. The question is, nevertheless an open one.

We would suggest, however, that there is no question as to the unwisdom of attempting to regulate the engineering profession under an interpretation so wide, and at the same time, so impracticably indefinite as that prescribed in the British Columbia Act.

When the Act was introduced into the British Columbia Legislature, after having had a stormy passage through the Private Bills Committee, it met the severest criticism from Premier Oliver, and Mr. J. H. Schofield, the Member for Trail, B. C. Mr. Schofield said the Act was bitterly opposed by prospectors, miners and smelters. The Premier expressed his most determined opposition to the Act, as drafted, basing his viewpoint on a belief that practically trained men had often succeeded where scientifically trained men had not. Mr. Anderson, who introduced the Act, said the text did not warrant the construction put upon it by the Premier.

This reception is probably typical of the criticism that will be levelled against any legislation seeking to enforce a close corporation for "engineers," and it is significant that the criticism levelled against the draft act was based upon its wide interpretation of what constituted engineering practice.

We believe the formation of an association of professional engineers, such as is proposed by the draft act under discussion is unworkable because of the fundamentally erroneous conception of the possibility of comprising within the scope of one incorporated body all the ramifications of the activities of the engineer. We also believe that this conception, if persisted in, will limit the usefulness of the engineer by attempting to set bounds to the boundless.

It is suggested that the manner in which the engineer can gain that public recognition which is his undoubted right is through the strengthening of existing professional societies, each functioning within the limits of its own specialized activities. When our professional societies have so arranged their own internal affairs as to be able to place upon their members the stamp of professional competence and rectitude, and to discipline unworthy members; and have educated the public to accept the society stamp as a guarantee of those things that are desirable in an engineer, then, and not till then, have our societies any right to ask governments to attempt that which, so far, our professional societies have not yet found it within their ability to compass.

There are one or two details in the British Columbia draft act that should not have been included, namely the provision that the Secretary of the Associations should be bonded for one thousand dollars, and the power which it is proposed to grant to the Council to suspend a member who should have been convicted of a criminal offence. The definition of "crime" is capable of even less exact determination than the scope of the qualifications and the practice of the engineer. The indelicacy of the provision as to bonding the Secretary should be sufficiently obvious.

Mr. Theo. Denis, the Superintendent of Mines for the Province of Quebec, writes to the March "Bulletin" of the C. M. Institute on the effect of engineer-

ing legislation in Quebec, and as his point of view deserves consideration by mining men in other provinces, the letter is re-published in this issue.

Mr. McEvoy's designedly neutral and philosophical examination of the trend of engineering status legislation did not evoke at Toronto the discussion it was desired to bring about, a matter, we believe, for regret. The Council of the Institute, as the President clearly explained, is fully awake to the circumscription of the liberties of the mining profession that is threatened by ill-considered legislation, should such legislation when enacted, be found operable. In the impossibility of defining the indefinite will probably reside the strongest safeguard of all.

AN EQUAL CHANCE.

R. E. HORE.

In view of the present activity of some engineers in pressing for the legislation designed to bring about corporation control of the engineering profession, I would draw attention to a part of President Herbert C. Hoover's inaugural address at the recent meeting of the American Institute of Mining and Metallurgy, Mr. Hoover declared:

"For generations the American people have been developing a social philosophy as part of their democracy. This philosophy has stood this period of test in the fire of common sense; it is in substance, that there should be an equality of opportunity—an equal chance—to every citizen. This view that every individual should, within his lifetime, not be handicapped in securing that particular niche in the community to which his abilities and character entitle him is itself the negation of class. Human beings are not equal in those qualities. But a society that is based upon a constant flux of individuals in the community, upon the basis of ability and character, is a moving virile mass; it is not a stratification of classes. Its inspiration is individual initiative. Its stimulus is competition. Its safeguard is education. Its greatest mentor is free speech and voluntary organization for public good. Its expression in legislation is the common sense and common will of the majority. It is the essence of the democracy that progress of the mass must arise from progress of the individual. It does not permit the presence in the community of those who would not give full meed of service."

An other paragraph from Mr. Hoover's speech that is particularly interesting in view of the strong present tendency towards organization along class lines is the following:

"If we cling to our national ideals, it will mean the final isolation and the political abandonment of the minor groups who hope for domination of the government, either by "interests" or by radical social theories through the control of our political machinery. I sometimes feel that lawful radicalism in politics is less dangerous than reaction, for radicalism is blatant and displays itself in the open; unlawful radicalism can be handled by the police. Reaction too often fools the people

through subtle channels of obstruction and progressive platitudes. There is little danger of radicalism ever controlling a country with so large a farmer population, except in one contingency. That contingency is from a reflex of continued attempt to control this country by "interests" and other forms of our domestic reactionaries."

Mr. Hoover's remarks about his own country are applicable also to Canada. Class organizations are properly regarded with distrust by the community, for in them self interest dominates. They become most dangerous when they conceal their activities under a cloak of professed public service.

When one class organizes to make itself more strongly felt as an influence in public affairs, the elementary and expected result is that other classes will in self protection take similar steps. Such organizations may be regarded as necessary so long as the others exist and their formation is easily justified, as a natural defensive move. If such organizations make their weight felt for the good of the community and are willing and satisfied to make progress with the community and not at its expense they are desirable institutions and will live. In proportion as they do not, their life is likely to be short and unimportant.—R.E.H.

Good Advice by the Grain Growers' Guide

Seeing that the metropolitan newspapers which are held in much repute and have large circulation in the farming districts do not endeavor to protect the rural capitalist against accepting at face value the advertisements of mining stocks and oil flotations that appear in these newspapers, but, on the contrary deliberately throw temptation in his way for the sake of the advertising revenue, the "Grain Growers' Guide" of Winnipeg, which boasts a circulation of 76,000 copies weekly, has commenced a counter propaganda, the forceful nature of which may be judged from the cartoon herewith reproduced.

There is now going on in the technical press, and elsewhere, a not disinterested controversy which im-

plies that many mines which are today in the dividend-paying class were floated by the sale of stock of small par value, attractively advertised through the newspapers. This may well be the case, but does not make it any less the part of un wisdom in the farmer to invest his money in mining or oil stocks on the strength of a newspaper advertisement. The cobbler should stick to his last, and it would anyway be difficult to find a more paying investment than farming in these days. The "Grain Growers' Guide" will have the approval of all who have the best interests of mining at heart in advising the farmer not to sink his money in ventures about which he knows just enough to make his knowledge worse than ignorance.



How to Entertain the Agent Who Peddles Worthless Mining Stock

—From "The Grain Growers' Guide".

The Anthracite Supply Available to Canada

Combination of Decreasing Reserves, Increasing Populations in United States and in Canada, Increasing Per Capita Consumption in Both Countries; and Relatively Greater Rapidity of Anthracite Exhaustion in Fields nearest to Canada calls for Immediate and Continuous Attention of Canadian Government—Within Thirty Years Wyoming Anthracite Supply available for Canada is threatened by Exhaustion of Mines—As Canada has least claim on Anthracite Supply, and is situated furthest from Source of Supply she must initiate precautionary measures—Canada's Coal Supply is Paramount Factor in National Independence and Commercial Survival

The writer of the article which follows desires publication to be made anonymously, but we may state that the article was written at our special request, made because of the special qualifications for dealing authoritatively with the anthracite supply of Canada possessed by the author, who has a thorough knowledge of the problem of Canadian coal supply, obtained in Canada, combined with an equally complete knowledge of the anthracite mines of the United States.

Our coal-mining readers will appreciate correctly the condition of the anthracite reserve of the United States when the mining of such thin seams of anthracite as are described in the article has become an accepted commonplace; and will not fail to deduce from the facts presented the conclusion that Canada must in the future draw its anthracite supply from a reserve which is rapidly becoming smaller and more difficult to mine, and therefore increasingly expensive to produce and transport to distant markets. It should not be forgotten that as coal becomes increasingly costly to mine, the cost of its transportation increases in a proportionately greater ratio.

Anthracite shipments reached the record figures of 77,062,787 tons in 1917, and 75,894,217 in 1918.* Of this amount, approximately 6,640,923 tons (8.6 per cent) were produced from "Banks" and "Washeries," leaving a fresh mined shipment in 1918 of 69,253,294 tons. To obtain the actual mined tonnage, the fuel consumed at the mines and preparation losses have to be added, approximately an average of 25 per cent, so that the anthracite coal fields may be considered as being depleted in round numbers at a rate of 90,000,000 tons annually.**

The country has just passed through several years of unprecedented industrial activity, which has helped to keep the demand at an unusually high mark, and although there may and quite possibly will be a reaction, during which production will fall, such an ebb and flow in consumption is just what has taken place in the past, the ultimate result having been a consistent and persistent growth in the market at the rate of approximately 20 per cent in each of the last three decades.

* From the Coal Trade, 1919—Error or misprint of 500,000 in grand total.

** 1913, 91,525,000; 1914, 90,821,000; 1915, 88,995,000; 1916, 87,587,000; 1917, 99,612,000; 1918, 98,826,000; 1919, 86,200,000 (estimated by U.S. Geo. Survey).

The demand for domestic sizes will certainly be maintained as long as the growth of the population increases; consumption of steam sizes follows the rise and fall of activity in industrials, and the clash of consumption as to time and period of demand is the cause, not only of occasional scarcity of certain classes of fuel, but a source of loss to the operators. Domestic coal cannot be produced without a sale or storage of steam sizes, nor can steam fuel within economic limits be disposed of without a production of domestic sizes. The population increase in the three states of Pennsylvania, New York and New Jersey, where almost 60 per cent of the anthracites produced is consumed, was from 19,315,892 in 1910 to 23,324,287 in 1917.

Fresh mined production fell off in 1918 over 1917 2,000,000 tons, but it increased to the extent of 8,000,000 tons in 1917 over 1916.

Year.	Total Shipment.	Bank Coal.	Fresh Mined Shipments.
1909.....	61,969,885	3,694,470	58,275,415
1910.....	64,905,786	3,296,318	61,609,468
1911.....	69,833,801	3,171,678	66,662,123
1912.....	64,667,248	3,155,150	61,512,098
1913.....	70,758,312	2,090,170	68,668,142
1914.....	69,947,357	1,719,547	68,227,810
1915.....	68,179,474	2,492,639	65,686,835
1916.....	67,060,356	3,133,609	63,926,747
1917.....	77,062,787	5,413,139	71,649,648
1918.....	76,307,687	6,640,923	69,666,764

This increase took place in face of the loss of men to munition industries, and then the army, and the difficulty of obtaining necessary material for the extension of plant and development work. From 1910 to 1918, approximately 10 per cent of new collieries were opened, and the present production has been brought about partly by this new development and partly by the expansion of existing operations. The limit to existing capacity has perhaps not yet been reached, but it is possibly not more than ten million tons away.

Wyoming Field of Greatest Interest to Canadian Consumer.

Hard coal is sold under the trade names of Wyoming or Lackawanna, Lehigh and Schuylkill, corresponding roughly to the three great natural divisions of the coal fields. From the point of view of the Canadian consumer, the Wyoming field is of peculiar interest and importance. It is the most northerly of the three and nearest to the Canadian market; the transportation systems which serve it connect naturally and directly to export points to Canada, and undoubtedly by far the largest tonnage that reaches the

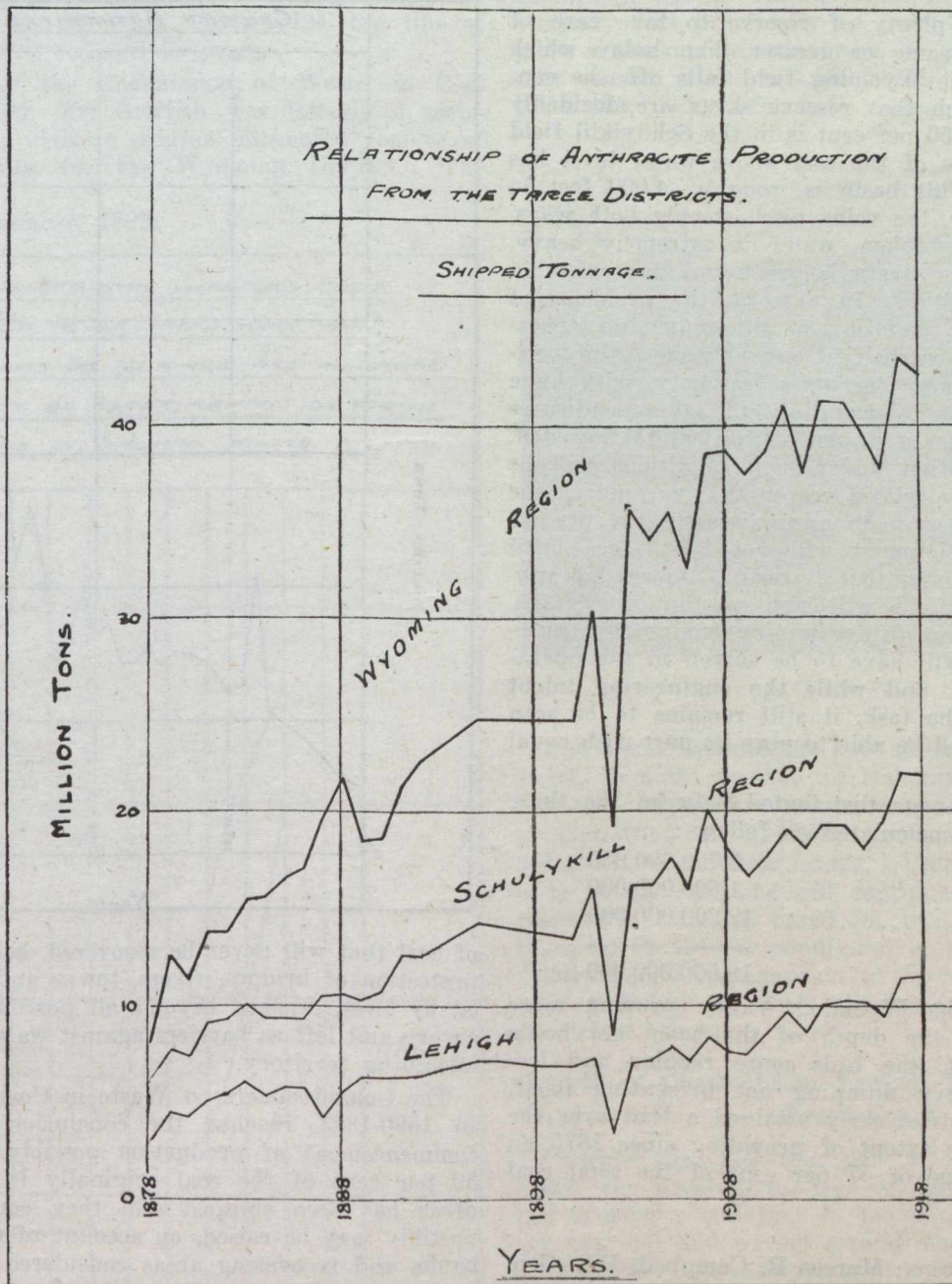
Dominion originates in this field, this being particularly true of eastern middle Canada, where exists the Dominion's greatest consumption.

To originate all the tonnage for this market from either the Lehigh or the Schuylkill districts would not only lengthen the transportation considerably, and necessitate much cross hauling, but of much more importance, however, than a resulting increased cost and probable irregularity of delivery to the consumer, will be the new distribution factors entering into the questions of production and demand, when the time comes that through decreasing activity in the Wyoming field, the Canadian demand, and other trade previously supplied from that area, begins to fall on the other districts.

In the natural sequence of trade, supply and demand, those markets most convenient to the new pro-

ducing centres, linked to them by strategic transportation routes and presently being supplied from them, will be attended to first. In this connection it is interesting to note that the estimates of unmined anthracite based on figures prepared by William Griffith and published over twenty years ago, show the percentage of control of future supply to be arranged as follows. This arrangement has not materially altered to date:

Delaware, Lackawanna & Western	6.55
Delaware & Hudson Co.	2.29
Erie & Wyoming Valley R.R.	1.82
Erie R. R. Co.77
New York, Ontario & Western28
New York, Susquehanna & Western R.R. Co... .54	
Delaware, Susquehanna & Schuylkill R.R. Co... 1.38	
*Pennsylvania R.R.	6.24



SHIPMENTS OF ANTHRACITE OVER PAST FORTY YEARS FROM THE THREE PRODUCING DISTRICTS.

Central Railroad of New Jersey	17.30
Lehigh Valley R.R. Co.	16.87
Philadelphia & Reading Ry.	42.25
Uncontrolled tonnage	x3.71

* Hanna interests.

x Published in The Coal Trade, 1919.

Condensed, this table shows that the reserve adjacent to transportation roads serving the Wyoming, as compared with the other districts, to be as below:

	1896.	1920.
	P.c.	P.c.
Wyoming	12.25	10.40
Lehigh	84.03	85.88
Schuykill		

While there is plenty of reserve to take care of any demand, the same or greater than today which may exist when the Wyoming field falls off, the conditions under which that reserve exists are decidedly interesting. Over 50 per cent is in the Schuykill field where the majority of the coal above water level has been extracted. This basin is, roughly, 4,000 feet in depth at its centre, the veins pitch steeply both ways, are contorted and broken, water is extremely heavy, the pressure of the strata is great and gas exists in considerable quantities. In a word, the problems of mining, timbering, ventilation, pumping and transportation are here intensified and extreme. Only collieries with very large territorial capacity, with huge daily production and demanding colossal expenditures are going to produce a return on the capital invested. Naturally, exploitation under such conditions will be slow and it is quite within reason that as long as the present fields can cater to approximately the present demand, this development will not take place until such a condition arises that instead of increasing production, the one field will rise as the other falls. Some of the greatest future mining engineering problems in America will have to be solved in the operation of this field, and while the engineering talent will be equal to the task, it still remains to be seen whether finance will be able to play its part with equal courage.

The original tonnage distributed between the three districts, has been calculated as follows:

Wyoming	5,700,000,000
Lehigh	1,600,000,000
Schuykill	12,200,000,000

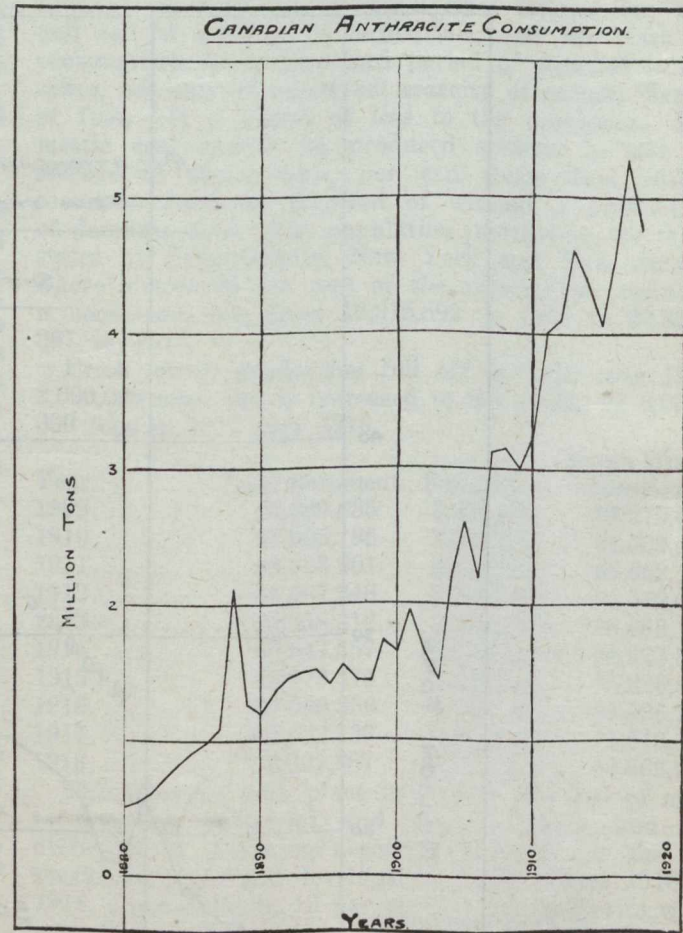
19,500,000,000 tons[†]

The veins in the Wyoming Valley proving more readily accessible, the depth of the basin not being relatively so great, the beds more regular and less disturbed and heavy dumping not presenting itself, mining in that district early attained a lead over the other areas, to the extent of providing since 1875 an approximate average of 57 per cent of the total coal produced.

[†] 21,000,000,000 tons; Marcus R. Campbell, U.S. Geo. Survey, 1917.

Report of the Commission appointed to investigate the waste of coal mining with the view to the utilizing of the waste.—Commonwealth of Pennsylvania, 1893.

In common with all other coal fields, much coal was irretrievably lost in the early days of hard coal mining, and the consequent recovery was extremely poor. As the greater proportion of the production was from the Wyoming region, it follows that the loss of coal was there at its greatest. In the remaining tonnage, and in the Schuykill District, where the largest untouched reserves exist, the future recovery will be high. Poor mining practice resulting mainly in taking too large a proportion of coal in the first mining, brought about "squeezes" destroying over large areas not only the remaining available coal in that vein, but also affecting similar areas in veins above and rendering beds below tender and difficult to mine. On the other hand, some territories considered unminable and abandoned, have since been re-mined, not only once but three times; and while this has a tendency to balance the other losses, there is still a large percentage



of coal that will never be recovered, being required for protection of bridges, rivers, towns and cities, destroyed by fires, crushed beyond all possible chance of recovery and left as barriers against water troubles from adjoining territory.

The Commissioners on Waste in Coal Mining, sitting in 1890-1893, reached the conclusion that since the commencement of production possibly not more than 30 per cent of the coal originally in the mined out areas has been shipped and they consider that this possibly may be raised, on account of re-working culm banks and recovering areas considered lost, to 40 per cent.¹

In an estimate of the Wyoming field by William

¹ Commonwealth of Pennsylvania sitting in 1893.

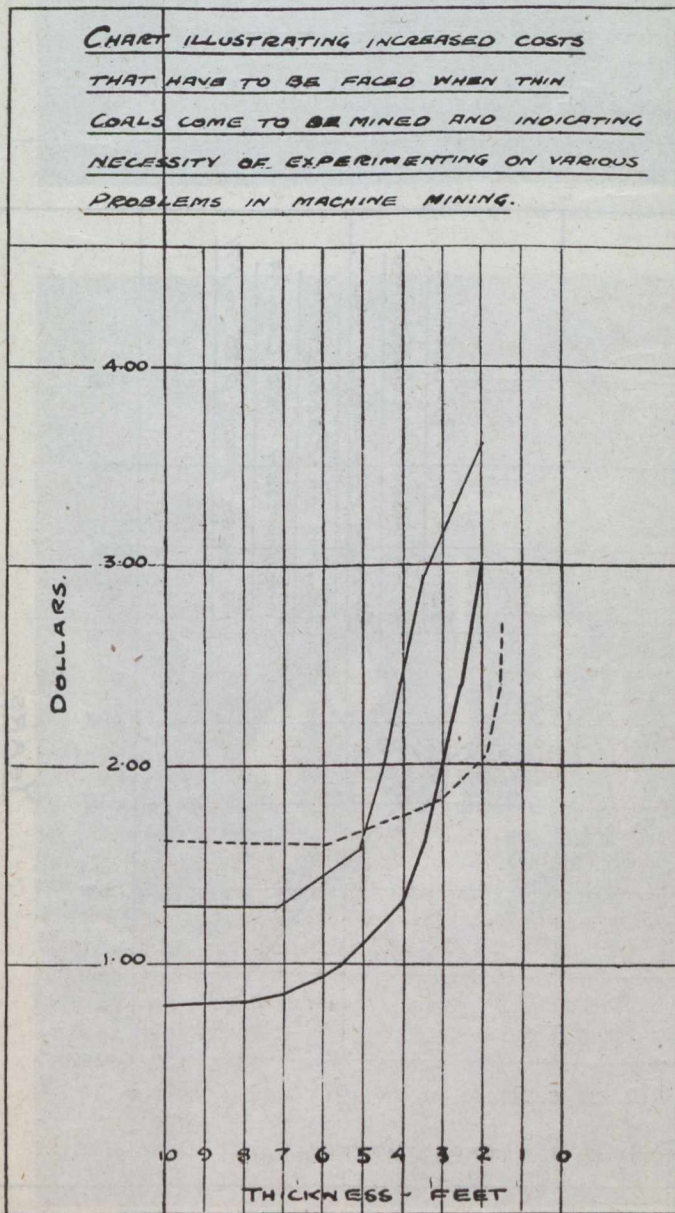
Griffith, figures relative to the life of this field are stated as follows:²

Original reserve	5,057,808,560
Total shipments to 1892	383,244,241
Loss in preparation	76,648,478
Total production	459,892,709
Balance untouched	4,597,913,186
Future recovery	50 per cent
Balance minable	2,298,906,593

which at the then rate of production of 24,000,000 tons annually showed that the basin would be exhausted in 95 years. Since 1892, 1,320,744,581 more tons have been taken out, which on the same calculation would leave a present minable reserve of 1,638,534,302 tons, and that in turn at the now existing rate of extraction, which quite possibly may be exceeded for a few years, will give a life of 32 years. In other words, during the 27 years (1892-1919) the life of this field has been reduced 63 years.

The report of the Commission of Waste on Coal Mining, of which Mr. Griffith was latterly a member, started out with an original estimated reserve of 5,700,000,000 tons for the Wyoming District. The

² Colliery Engineer, 1892.



U.S. Geological Survey reports a shipment to date of 1,243,863,982 tons. At the time the Commission was sitting, the average recovery of coal was given as 45.6 per cent, and that coal sold at Collieries and used as fuel was 10 per cent. As the prediction as to the sale of "Bank" coal has been verified, an increase in recovery is justifiable which makes the total ratio of shipped tonnage to mined over tonnage that it represents, say approximately 40 per cent, giving an extraction of 3,100,000,000 tons, and leaving a balance of unmined coal of 2,600,000,000 tons.

Modern practice makes the difference between shipments and production approximately 25 per cent, to which has to be added the percentage of recovery in mining, in this case estimated at 80 per cent. Much coal considered unworkable is now being recovered in re-mining, and the return in the newer sections of the territory will practically be over 90 per cent. This gives a marketable tonnage of 65 per cent of the present reserve, equal to 1,560,000,000 tons, which would allow the field a life of 31 years.

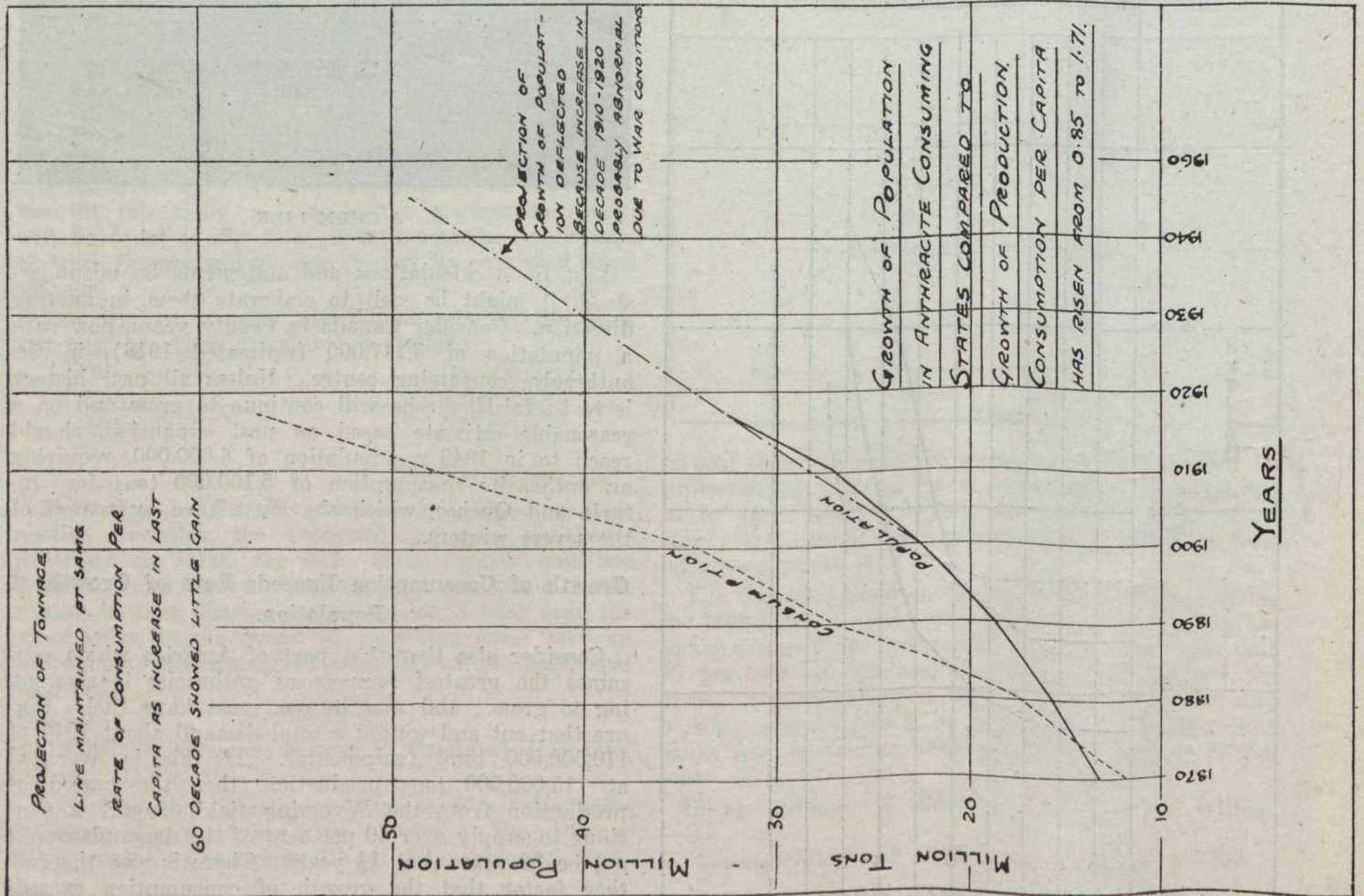
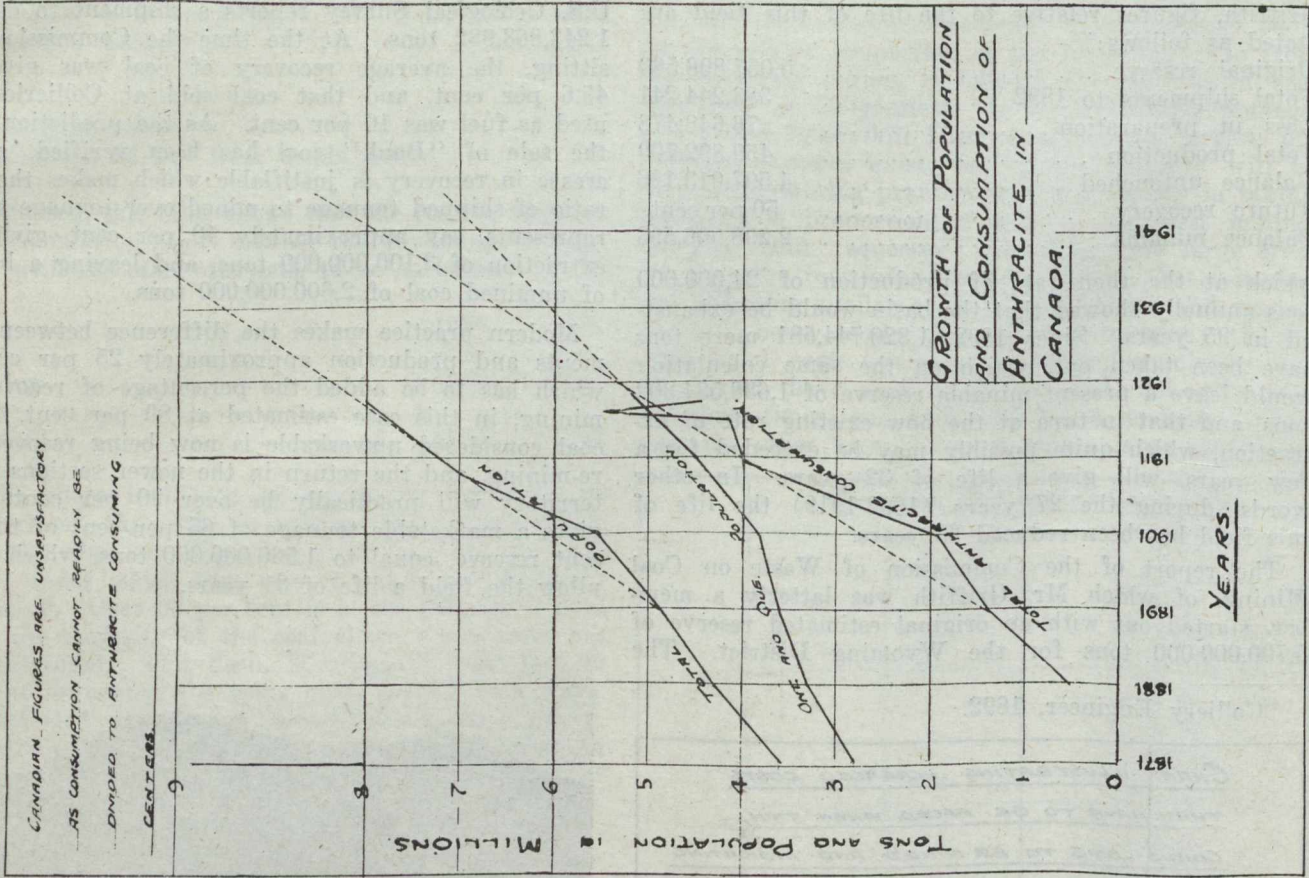


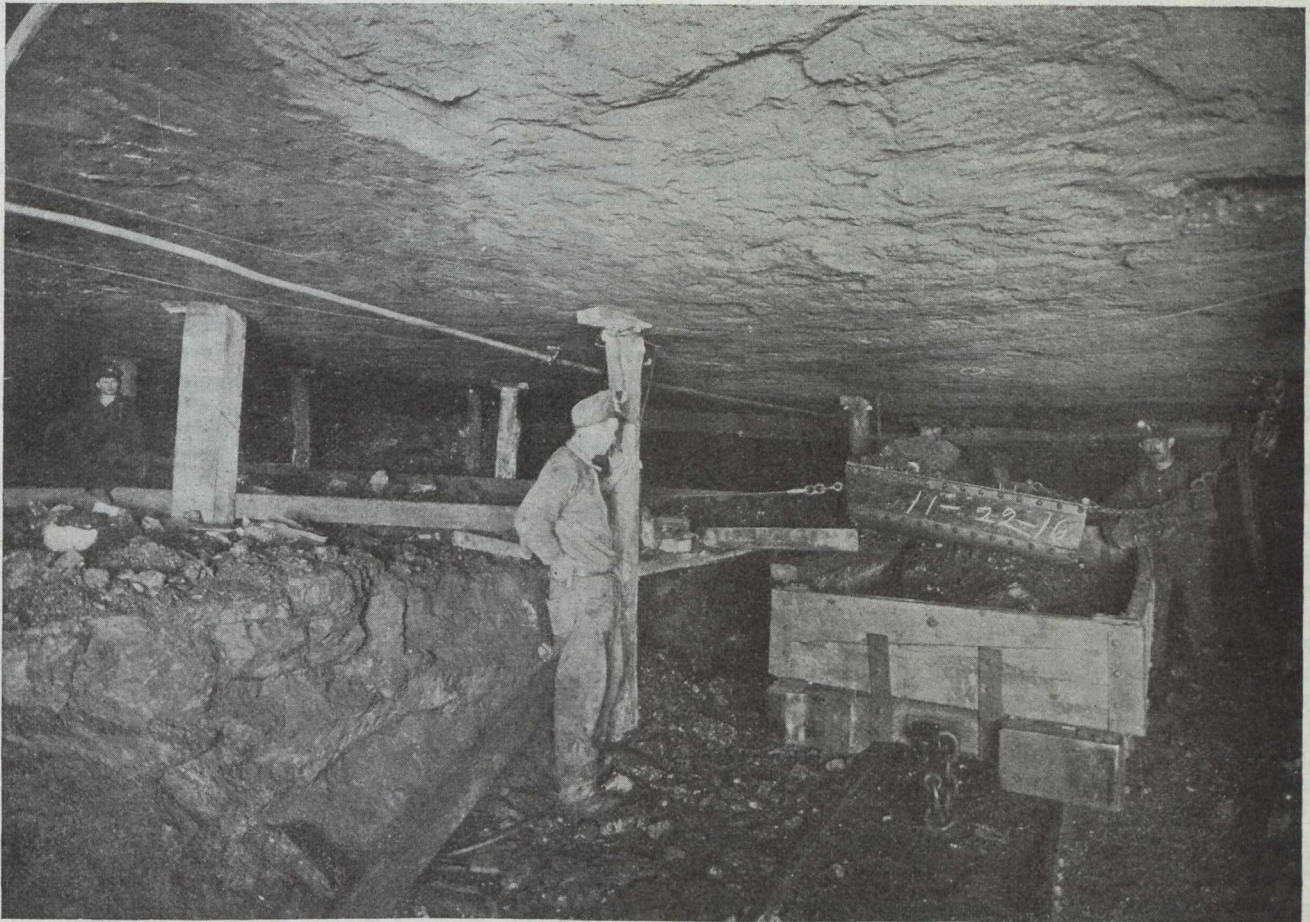
A CULM PILE.

Lest these calculations and statements be misunderstood, it might be well to elaborate them in another direction. Consider Canada in twenty years, now with a population of 5,147,000 (estimated 1918), in the anthracite consuming centre. Unless all past history is to be falsified, she will continue to grow and on a reasonable estimate based on past expansion, should reach to in 1940 a population of 6,800,000, requiring an anthracite consumption of 5,100,000 tons for Ontario and Quebec, which she must have by reason of the severe winters.

Growth of Consumption Exceeds Rate of Growth of Population.

Consider also that that part of America which consumes the greatest tonnage of anthracite is also going to grow, and that it, too, must have fuel. Figure that out and we get a total demand about 1940 of 110,000,000 tons (shipments). If this is averaged at 115,000,000 tons production, then the period of production from the Wyoming field, should it continue to supply over 50 per cent of the demand, would not be 32 years, but 14 years. There is also the further factor that the growth of consumption exceeds the growth of population, or in other language, the





CONVEYING ANTHRACITE DOWN A CHAMBER.



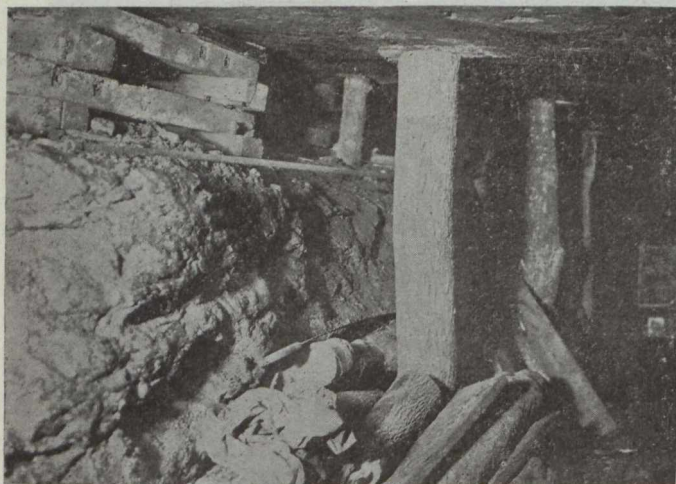
LOADING AT THE FOOT OF THE CHAMBER. NOTE THINNESS OF SEAM.

consumption per capita has increased steadily. In 1871 it was only .72 in the anthracite consuming states, now it is 1.95 at its highest. In Canada it is still only a little less than one-half that of this side:

Again, if we assume that a 100 million is about the production capacity of existing operations, this leaves 19,000,000 a year to get from fresh ventures and is equivalent to an investment of \$76,000,000 distributed over 20 years. In the present attitude of labor, the condition of the country in general, the situation of the coals in the Schuylkill region, the railway position, and other matters of national importance, that capital is not going to be spent just now—it will wait a more favorable period.

Thirty Years Will See Great Decline in Production of Wyoming Field.

While these latter calculations as to tonnage to be produced will never be attained, they probably help to show that it is not unreasonable to consider thirty years as making a very considerable change in the productive capacity of the Wyoming field, and the end of that period will witness a tightening of the flow of fuel to Canada. This does not imply in the least that the life of the Wyoming field is going to stop abruptly in thirty years—no district ceases mining so suddenly; but it does indicate before the thirty years have swept past, that production in this field is going to steadily and rapidly decline, and in so doing accentuate the difficulties of placing dependence on this fuel as the only source of heat in a country with the climate of Canada.



WOODEN CRIBS USED IN LONGWALL MINING IN THIN SEAM OF ANTHRACITE.

There are, of course, at least two factors that will operate before the rise in production, which the growth of population predicts is even approximately attained. Production cannot continue to increase indefinitely, and the economic substitution of another fuel for anthracite must eventually take place and is, to some small extent, already being tried. The question of future production has already been touched on in regard to present capacity, and costs of new developments, while there is also a limit to the territory or land area on which new mining can take place.

Of the possible substitutes, only two appear to have any chance of univesral application as opposed to mere local solutions, coke and oil. The consumption of coke as a domestic fuel is growing, and will increase. Oil fuel has played an important part in power production, and has now invaded the domestic field as in-

dicated by the introduction of oil fuel into the heating plants of some of the large New York buildings. Inasmuch, however, as the production of oil is only about one leap ahead of the consumption, and as it has its own field of activity to provide for, a steadily growing one, oil fuel does not yet appear over the horizon as a rival to hard coal in the average domestic anthracite market.

It is to be noted that neither of these sources of relief can so far be considered as possible for Canada. Oil, because the Ontario production is too small to be an important factor and of admittedly uncertain future while other sources imply importation like anthracite or a long haul from presently unknown western fields. Coke, because this possibility has not been given proper study as part of a sufficiently broad and national investigation of the fuel problem.

The normal distribution of domestic sizes of anthracite produced is calculated below:

	% of normal distribution	1918-1919 allotment	% of distribution 1918-1919
Penna., N.Y., N.J.	58.9	29,375,784	54.0
Maine, R.I., Conn., Mass., Vt., N.H.	15.5	10,331,000	19.0
Ala., Ark., Dela., Dist. of Col., Md., Fla., Ga., Ky., La., Miss. N.C. S.C., Okla., Tenn., Va., and West Va.	2.4	1,938,970	3.4
Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N.D., S.D., Ohio, Wis., Colo., Cal., Ida, Mont., Ore., Wash. and Wyo.	11.8	5,761,945	10.6
Railroad Fuel	7.0	2,481,754	4.5
Exported to Canada	4.4	3,602,000	6.6
Miscellaneous Exports		51,930	0.8
Army & Navy Camps & Cant.		600,000	1.1
Total	100.0	54,345,783	100.0*

*Coal Trade 1919.

This proportion has been steadily maintained for a number of years prior to 1916. Total Canadian exports are given below:—

Year	Tons	% of Total Shipments
1913	4,154,386	5.8
1914	3,830,244	5.4
1915	3,540,406	5.2
1916	4,165,652	6.2
1917	5,350,817	6.9
1918	4,435,593	5.7

Anthracite exported to Canada is distributed from this side as follows:—

	1917	1918
Buffalo District	2,911,208	2,483,761
Dakota District	14,344	3,165
Duluth Superior District	4,862	1,092
Michigan District	826	11,451
Ohio	96,736	34,976
Rochester	643,161	648,171
St. Lawrence	1,551,859	1,356,842
Vermont	127,821	21,497
Total	5,350,817	4,560,955

and it is received in Canada through these districts:

	1917
Nova Scotia	71,263
New Brunswick	100,555
P. E. I.	5,147
Quebec	1,664,095
Ontario Central	2,963,940
Western Ontario & Manitoba	443,016
Saskatchewan	71,514
Total	5,319,530

from which it appears that there is approximately the following relationship between exports and imports:—

Vermont supplies New Brunswick (P.E.I., and Nova Scotia, largely water shipments from New England ports.

St. Lawrence supplies Quebec and the western part of New Brunswick.

Buffalo supplies Central Ontario and part of the head of the lake shipments.

	Total	Buffalo	Dakota	Duluth Superior	Mich.	Ohio.	Roch.	St. Lawrence	Vermont
Novia Scotia	71,263								71,263
New Brunswick	100,555							60,144	55,411
P. E. I.	5,147								5,147
Quebec	1,664,095						172,389	1,491,715	
Cent. Ont.	2,963,940	2,493,061					470,881		
West. Ont. & Man.	443,016	508,147							
Sask.	71,514		14,344	4,862	826	21,484			
Total	5,319,530	3,001,208	14,344	4,862	826	21,484	643,161	1,551,859	131,821

The consumption per capita of domestic sizes in America is given below, to which the figures covering the same period for Canada is added:

1916—1917			
	Population	Consumption	Consumption Per Capita
Connecticut	1,719,623	1,952,900	1.14
Delaware	234,710	223,503	0.95
Dist. of Columbia	345,856	517,760	1.49
Maine	646,588	556,683	0.86
Maryland	1,292,091	933,889	0.72
Massachusetts	3,939,561	5,027,993	1.27
New Hampshire	403,886	314,945	0.78
New Jersey	3,255,407	4,961,622	1.52
New York	11,187,798	14,169,809	1.27
Pennsylvania	8,981,082	6,815,650	0.76
Rhode Island	573,583	664,008	1.16
Vermont	296,426	316,850	1.07
Average.....			1.15
(Estimated) 1918	1917		
Quebec	2,326,000	1,664,095	.71
Ontario	2,821,000	2,963,940	1.05
Manitoba	619,000	443,339*	.72
Average.....			.83

* Includes head of the Lakes.

Canada's consumption in that area where the population is greatest, and when other sources of fuel for this purpose are not presently available is, therefore, not yet equal to that of the heaviest anthracite consuming community of America.

Canada is the Last Applicant at the Final Source of Fuel.

These deductions point to these considerations: that Canada being the most distant market, the most indirect to reach, the last applicant at the final source of this fuel, will in all probability witness in future years many a recurrence of the situation of 1917-1918, when coal was scarce and hard to get. When the united demand is moderate and the production going well, Canada will be supplied, but when the demand is heavy and production low, Canada will again be a participant at the interesting function of allotment of fuel supplies; a fact, which must inevitably be a detriment to her economic and social development. That drawback takes place and is present in a period in her history when expansion is not long past mere commencement. And on top of these statements, it has to be remembered that Canada can only ask for consideration; she has no voice in any proposals developing or conserving production for her future necessities, no control over efforts to expand this industry; no means to compel any change in policy, and

no authority to force her needs. While nothing brought forward in these papers need be accepted as a definitely established fact,—rather the figures are to be conceived as illustrating the future by the light of the past, still the importance of this fuel question to Canada cannot be comfortably explained away by the fact that there is enough coal in the whole of the anthracite fields to last two hundred years. Rather the position should be that by virtue of this situation and the geographical position of Central Canada to her own fuel supplies, it is essential that Canada earlier than any other market should promptly initiate the means, conduct the experiments and plan the campaign to reach complete or some measure of independence in this direction. The little problem should be handled as a national question and not by way of a variety of efforts at local relief. What ever is being done in the latter direction should be welded in as part of a larger programme.

Modern Methods of Extraction Preval in the Wyoming Field.

These facts, figures and fancies on the present and future importance of the Wyoming field to the Canadian market, and the trend of the Canadian consumption arouses considerable interest in what is being done to offset the future decreasing life, and so prolong the capability of the field to maintain a maximum of production. Progress along these lines largely centres on modern efforts to attain maximum recovery, the mining and operation of the thin veins, and the utilization of coal at present going to the culm dump.

In the estimates quoted above, no veins under 30 inches were included. But since that date, beds down to 24 inches are being mined. Ultimately, it is possible that this present limit will be carried down to 18 inches. Unfortunately beds between the limits of 24 and 18 inches cannot be left untouched as a small future reserve, because not only of their physical situation in the general stratification of all the properties, but also because of the economic question of cost.

In all these fields, thin veins alternate with thick veins, consequently in mining out these thick veins, there comes a time when the robbing of thick coals becomes retarded by the presence of an overlying coal. A decision has, therefore, to be reached as to whether this thin coal shall be mined or abandoned. As the coal becomes thinner, it becomes easier to make this decision because the ultimate possibility of mining such a bed is then more remote.

The extraction of a 24 inch coal is, comparative to the operation of neighboring thicker veins, not presently an economic success. The cost of mining a thin coal increases rapidly with the decrease in thickness, and the greatest proportionate increase is below the 30 inch limit. Mr. H. M. Chance compiled a curve of anthracite costs illustrating this point, which is reproduced below.* A similar chart for soft coal mining in Canada appeared in 1913. Both show clearly that the proportionate rise in cost is due to decrease in vein size. To Mr. Chance's curve, an addition has been made representing the variation of costs due to thickness under conditions that are more recent than those depicted in 1909. At that date machine mining in the anthracite region was only in its infancy, while today it is, and must become more so, a very important factor in thin coal production. The additional dotted line indicates roughly that despite the increases in wages and materials, the application of machine mining has kept the balance of the cost of thin coal mining quite comparable with the previous calculated figures.

Thin Seams Should be Mined To-day.

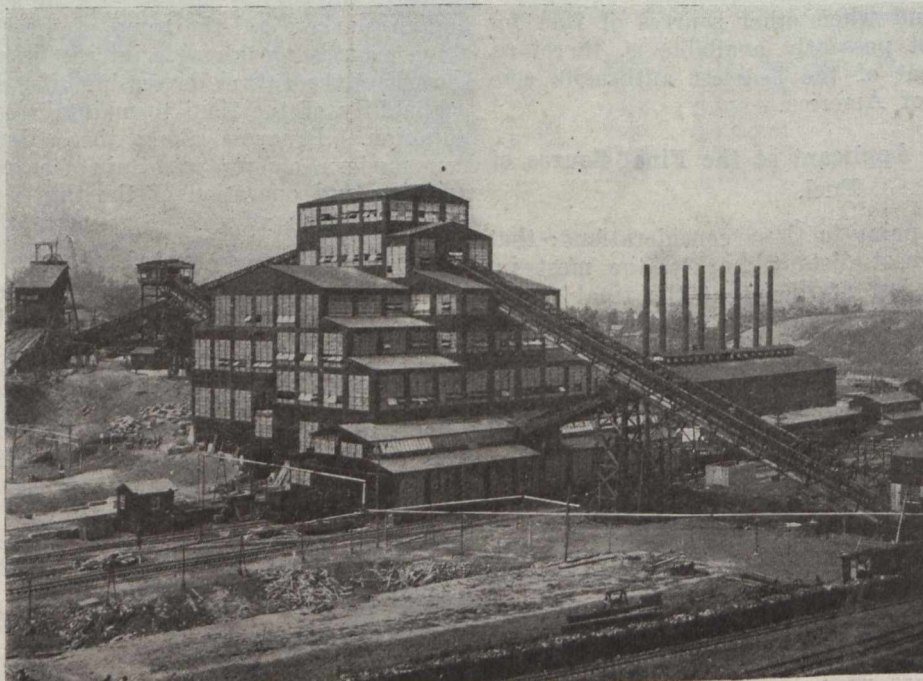
Out of the recognition of the approaching exhaustion of the fields, the principle has been evolved that a proportionate tonnage of thin coal to the relative tonnage of thin coal still in the ground should be mined. This is a sound economic policy in any coal mining field, and had it been recognized years ago, the extra cost of mining these coals, so as to avoid a loss of minable coal and obtain release of underlying veins, would not have been felt. The sooner any company whose operations are so great as to be inevitably bound up with the progress of the field and

* Engineering and Mining Journal, July 20, 1909. (see page 269 of this issue.)

whose life will approximate that of the field itself, recognizes this, a guarantee is obtained that the costs of production will be maintained at the lowest average figures. This may be mining for posterity, but coal being a natural resource which should be conserved as much as possible, this is the proper plan to follow.

Modern methods of extraction present a vast change for the better. Twenty or thirty years ago, or somewhat earlier, a larger percentage was extracted in the first mining and thereafter the bed abandoned as exhausted. This resulted in small pillars which later crushed, gave rise to squeezed territory affecting large areas of often unworked coal. In cases where it was at all possible, these old areas have been re-entered and worked over again. Under more enlightened management, the tonnage extracted in first mining has been considerably reduced, large pillars left behind, more regularity and design exhibited in the work, and where the robbing of these pillars was some time away in the future, or they were to be mined under improved surface property, the chambers were filled with mine rock, or flushed with culm or ashes. Under such conditions, very little coal is lost and recovery will be at a maximum.

The preparation of anthracite for market is a science fully comparable to the metallurgical problems encountered in the concentration of many base metal ores. As the coal is mined it comes to the breaker with a varying percentage of waste material, according to the character of the vein being mined and the carefulness or otherwise of the miner. The coal beds range in quality from those of pure coal to those containing large percentages of intermixed material. Such veins can be cleaned either by the miner in the mine, or in the breaker. Where the foreign material is in the form of a layer of rock that separates readily from the coal, the miner in most cases separates the rock



A MODERN ANTHRACITE BREAKER.

by gobbing it in his chamber, but as the veins become more intermixed with slate and "bone," it becomes more economical to clean it in the breaker. Very careful attention is paid to the amount of foreign material sent out by the miner in the care of coal. Standard discipline is well maintained.

In the preparation of this fuel, the following dimensions show the standards, round and square, utilized in screening the coal:—

	Through		Over	
	Square	Round	Square	Round
Grate	4"	4*"	2 3/4"	3-1/8"
Egg	2 3/4	3-1/8	2	2 1/4
Stove	2	2 1/4	1-3/8	1-9/16
Nut	1-3/8	1-9/16	3/4	7/8
Pea	3/4	7/8	1/2	9/16
Buckwheat	1/2	9/16	1/4	5/16
Rice	1/4	5/16	1/8	3/16
Barley	1/8	3/16		3/32

The allowable percentages of foreign matter are approximately as follows:—

Broken	3%	Chestnut	15%
Egg	4%	Pea	18%
Stove	7%	Buckwheat	20%

Competition and demand in normal times control the percentages of waste, and also the percentage of over and under size in the different classes of fuel as marketed. In former days it was difficult to find a market for pea coal, and much of it went out to the dump. Then it became saleable as a steam fuel, and latterly is well established as a house fuel. This process of extending the usefulness of the various sizes of fuel is still going on, and buckwheat, once entirely unsaleable, has now passed into the steam class of fuel, and is encroaching on the domestic market, home furnaces being now available to burn this size.

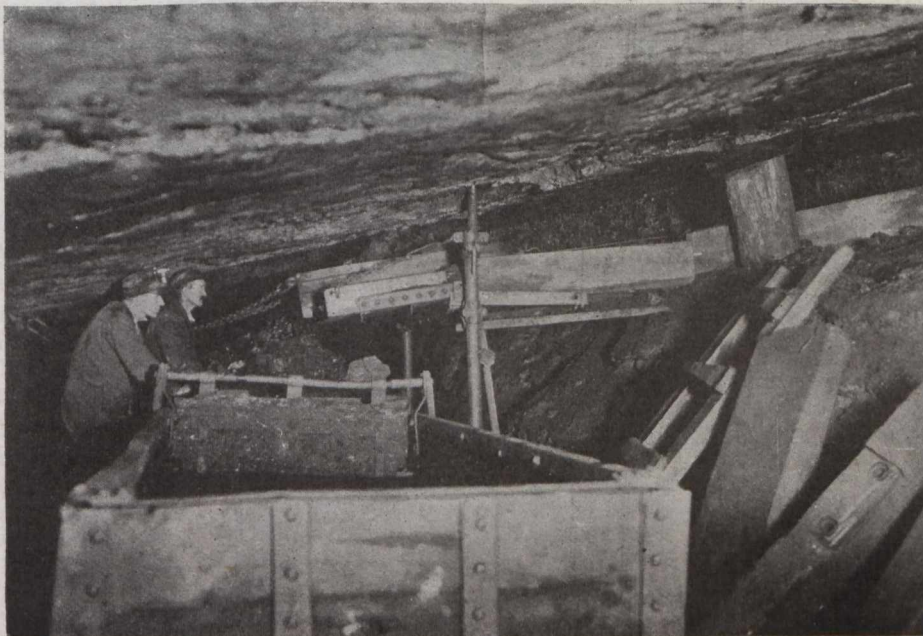
Culm Piles Becoming Valuable.

Far-sighted operators long ago foresaw the coming utilization of the smaller sizes, and in many cases carefully dumped that material separate from the breaker and mine refuse. This has at different times given rise to absurd statements of millions of tons lying available on the surface not being utilized and

inferentially, if not directly stated, being held for higher prices. The truth is that the domestic consumer who most commonly believed such statements, would not have purchased and even if purchased, would not have known how to burn the small sized material these banks contain. These coal piles are now rapidly disappearing, and as each successive scarcity of steam sizes appears, there is a fresh activity in their disposal. The improvement in preparation and utilization of the finer sizes is still going on until now the question of culm is receiving attention. Ultimately as already stated, instead of a loss of about 25 per cent of coal in preparation, this will be reduced to an unavoidable loss of 10 per cent, and the whole of the coal mined with either be used at the colliery or marketed.

Utilization of culm has taken place through direct consumption in dust burning boilers, or conversion into briquettes or coking. Direct consumption as dust will doubtless come in the future; it is already successfully established in certain phases of the copper industry. As practiced as a direct steam raiser, certain difficulties are experienced still to be removed in practice and, mostly brought about by the scouring action of the anthracite dust.

Briquette production has been going on for a number of years on a modified and successful scale, and will increase in the future; while still another method employs a coke oven process in the production of anthracite coke. In both coke oven work and briquetting, the troublesome question has been the reduction of the ash, and it is in accomplishing this that the preparation process has adapted still other features of the metal mining industry. Normally the percentage of ash in culm will range from 20 to 60 per cent, consequently any fuel made from this material would be unsaleable unless the ash contents would be reduced. To accomplish that, coal mining has borrowed from metal mining and introduced the Dorr thickener and classifier as a means to that end. It also appears as if the concentrating table would ultimately be used for a further reclamation of culm. The Dorr opera-



LOADING FROM A LONGWALL FACE. NOTE AGAIN THE THINNESS OF THE SEAM.

tion so far as applied to the anthracite fields has been productive of some interesting results.

While considerable progress has been made, and more will yet result, in this direction, the field for conversation is now somewhat limited and, this work however interesting and necessary, will not materially alter the situation. The production of culm is small, work in the direction of thin coal mining does not offer any great inducement for expansion, mining recovery is as high as it ever will be, and such improvement as is possible in breaker practice will not contribute materially to a better outlook. The initiative in all this work and its expense has been entirely borne by private enterprise, and it is disheartening to realize that the amount so expended is considerably

more than the Canadian Government has publicly allocated for any investigation of the fuel problem of the Dominion. Mr. F. W. Gray, now the Editor of this Journal, presented in a recent bulletin one phase of this question. In this paper is presented another portion of the tale, and one that emphasizes and carries with it the same lesson, viz.: that the future fuel supply of Canada and its population, is a subject large and important enough to justify the continued attention of the Government and should not be taken up and side-tracked as crises from varying causes rise and disappear. It is a problem greater and of more Dominion wide economic importance than much of the work now being undertaken by numerous Government Departments.



STRIPPING AN ANTHRACITE SEAM



ROCK ROAD OR "CUTTING SIDE" LEADING TO A LONGWALL FACE

Thickness Vein Thickness Coal Length Face of Chamber No. of Jackhammers No. of Scrapers No. of Machines Men Drilling Men on Machine Men Loading Total Men Employed Grade	Pillar Robbing Jackhammers Conveyor		Chamber Mining Mining Machine Hand		Chamber Mining Jackhammers Conveyor		Chamber Mining Machine and Conveyor		Longwall Mining Machine and Chain		Longwall Mining Machine and Conveyor		
	Loading	250'	55" 49" 40" 250'	72" 72" 46" 400'	33" 36" 400'	29" 29" 250'	33" 33" 250'	37" 27" 250'	36" 36" 250'	49" 43" 300'	31" 31" 220'	22" 22" 200'	31" 28" 190'
	2	1	—	—	1	1	1	1	1	1	1	1	1
	1	1	—	—	—	—	—	—	—	—	—	—	—
	—	—	3	1	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	19	10	—	—	—	—	—	—	—	—	—
	9	7	33	15	7	7	9	9	9	10	23	12	12
	6°	3°	4°	2°	6°	4°	0°	4°	0°	4°	3°	8°	2°
	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.	MX. AV.
Tons per 8-Hour Day	60	46	214	195	100	71	66	37	29	43	35	53	49
Tons per Man per Day	6.4	5.1	5.4	4.2	6.5	5.9	7.2	6.7	5.5	5.1	5.2	4.1	6.1
	5.0	7.5	6.9	4.4	3.7	3.9	2.8	5.2	3.6	5.5	4.0	4.6	3.5

DATA ON MACHINE MINING PERFORMANCES—WYOMING ANTHRACITE FIELD

**STATISTICS OF ANTHRACITE PRODUCTION IN THE UNITED STATES
AND CANADIAN ANTHRACITE CONSUMPTION 1878-1918**

Year	Production From Wyoming Region	Production From Schuylkill Region	Production From Lehigh Region	Canadian Consumption of Anthracite
1878	8,085,587	6,282,226	3,237,449	
1879	12,586,293	8,960,829	4,595,567	
1880	11,419,279	7,554,742	4,463,221	516,729
1881	13,951,383	9,253,958	5,294,676	572,092
1882	13,971,371	9,459,288	5,689,437	638,273
1883	15,604,492	10,074,726	6,113,809	754,891
1884	15,677,753	9,478,314	5,562,226	868,000
1885	16,236,470	9,488,426	5,898,634	910,324
1886	17,031,826	9,381,407	5,723,129	995,425
1887	19,684,929	10,609,028	4,347,061	1,100,165
1888	21,852,365	10,654,116	5,639,236	2,138,627
1889	18,647,925	10,474,364	6,285,421	1,291,705
1890	18,657,694	10,867,821	6,329,658	1,201,335
1891	21,325,239	12,741,258	6,381,838	1,399,067
1892	22,815,480	12,626,784	6,451,076	1,479,106
1893				1,500,550
1894				1,530,522
1895	24,943,421	14,269,932	7,298,124	1,404,342
1896				1,574,355
1897				1,457,295
1898				1,460,701
1899				1,745,460
1900	24,686,125	13,502,732	6,918,627	1,654,401
1901	30,337,036	16,019,591	7,211,974	1,933,283
1902	19,258,763	8,471,391	3,470,736	1,652,451
1903	35,723,258	16,474,790	7,164,783	1,456,713
1904	34,006,009	16,379,292	7,107,220	2,275,018
1905	35,857,897	17,703,099	7,849,205	2,604,137
1906	32,640,693	16,011,285	7,046,617	2,200,163
1907	38,638,452	20,141,288	8,329,653	3,141,873
1908	38,872,295	18,006,464	7,786,255	3,160,110
1909	37,573,467	16,864,147	7,532,271	3,017,844
1910	38,433,227	17,845,020	8,627,539	3,266,235
1911	41,033,354	19,188,300	9,682,147	4,020,577
1912	37,653,164	18,213,960	8,800,125	4,184,017
1913	41,160,906	19,417,385	10,180,021	4,642,057
1914	41,258,463	19,416,586	10,272,308	4,435,010
1915	39,945,344	18,043,709	10,190,421	4,072,192
1916	37,945,335	19,677,476	9,437,545	4,570,815
1917	43,577,769	22,028,055	11,456,963	5,320,198
1918	42,746,038	22,009,607	11,552,042	4,785,160

CANADIAN COAL MEN

Mr. O. E. S. WHITESIDE

President of the Mining Institute, 1920-21

The Canadian Mining Institute has elected Mr. O. E. S. Whiteside to the office of President, a proceeding that is notable in that following Mr. D. H. McDougall, the Institute will have two presidents, in immediate succession who are coal miners in active charge of coal mining. Mr. Whiteside is likely to be a good president, first because of his own qualifications for the position, and second, because of the importance of the section of the Institute's activities that he represents.

The "Bulletin" for March has the following succinct account of Mr. Whiteside's career, from which it will be seen that Mr. Whiteside's purview of the operating and financial of colliery management is very wide and practical. The new President's record of labor accomplished on behalf of the Institute also recommends strongly the wisdom of the unanimous choice of Mr. Whiteside for this office. The "Bulletin" states:

"Mr. O. E. S. Whiteside was born at Metcalf, Ontario. His early education was obtained at the Ottawa Collegiate Institute from which he entered McGill University in 1890, securing the Jeffrey Burland scholarship. He graduated with first class honors in natural science

in 1894, with the degree of B.A. Sc. Later, in 1900, he took his master's degree. After graduation he was employed for a few months in the McGill observatory before going to Alberta where he has been continuously employed ever since although he has found time on numerous occasions to visit the coal mining areas, not only of Canada and the United States, but of England and the continent as well. Mr. Whiteside spent his first nine years in Alberta with the H. W. McNeil Co, Limited, at their Anthracite and Canmore collieries, first as mining engineer and later as general superintendent. In 1904 he accepted an appointment as general manager of the West Canadian Collieries, Limited, at Frank, where he remained until 1908, when he resigned to accept his present position as general manager of the International Coal and Coke Company's mines and works at Coleman.

Mr. Whiteside is a charter member of the Institute and has always taken the keenest interest in its affairs. He has been a member of Council for the terms 1910-12 and 1914-16, and has been closely connected with the activities of the Rocky Mountain Branch, of which he was one of the original organizers. He was also one of the organizers of the Western Coal Operators' Association, which was formed about fourteen years ago, and was elected President of the Association this year.

**PRECIS OF PRELIMINARY DRAFT OF PROPOSED
BILL RESPECTING THE ENGINEERING PRO-
FESSION BEFORE THE BRITISH
COLUMBIA LEGISLATURE.**

**Interpretation: The practice of a Professional Engineer
Within the Meaning of this Act.**

"(b) The practice of a Professional Engineer within the meaning of this Act embraces advising on, reporting on, valuation, laying out and the design, carrying out, direction of the construction, installation, improvements of public utilities, factories, industrial works, railways, bridges, tunnels, highways, roads, canals, harbours, harbour works, river improvements, light-houses, wet docks, dry docks, dredges, cranes, floating docks, ship design and construction and other similar works, steam engines, turbines, pumps, internal combustion engines, and other similar mechanical structures, air ships and aeroplanes, electrical machinery and apparatus, chemical operations, processes, apparatus, and machinery, and works for the development, transmission or application of power, light and heat, launch ways, marine ways, grain elevators, municipal works, irrigation works, water works, water purification plants, sewerage works, sewage disposal works, drainage works, incinerators, hydraulic works, mining properties, mining operations, mining and concentrating machinery and apparatus, mine and concentrator buildings and structures, oil and gas wells, mineral deposits, metallurgical works, metallurgical processes machinery and equipment, metallurgical buildings and structures, investigations relating to the examination, surveying, exploration and development of rocks, minerals (including coal, petroleum, natural gas, and other fluid substances of value), rock structures, geological processes and the application of geology to practical problems of the industries, arts and engineering, and all other engineering works, and all buildings necessary to the proper housing, installation and operation of the Engineering works embraced in this section.

"The execution as a Contractor of work designed by a Professional Engineer, the supervision or the construction of work as a foreman or superintendent or as an inspector, or as a roadmaster, trackmaster, bridge or building master, or superintendent of maintenance shall not be deemed to be the practice of a Professional Engineer within the meaning of this Act."

Provision for a Close Corporation.

All persons registered as Professional Engineers under this Act, shall constitute the Association of Professional Engineers of the Province of British Columbia, and shall be a body politic and corporate, with perpetual succession and common.

Association is given power to hold real estate, within specified limits, to pass by-laws not conflicting with the Act for governance, discipline, admission, etc.

Who May Practice.

Only such persons as hold membership in the Association, or license from the Association to practice. Persons having five years previous practice as a professional engineer under the definition of the Act, and residing in British Columbia at the date of the passing of the Act. Provision is made to permit persons to practice who come from other provinces of Canada, who fulfill specifications of membership and

pay the prescribed fees. The Act does not apply to government employees. Engineers who have been overseas are given full rights of members of the Association.

A provision which it is understood has been asked by representatives of the Canadian Mining Institute, reads as follows:

"Notwithstanding anything to the contrary in the Act, any person who is not a resident of British Columbia may practise without license in the Province for the purpose only of examining of, consulting on, advising on and reporting on properties and works in the said Province, in the interests of persons who are not residing in British Columbia. Such persons may also superintend operations, directly resulting under this Clause, for one continuous period of not exceeding three months, without license, provided that this privilege of superintendence shall not be permitted more than once in connection with such operations."

Powers of the Association.

The Act provides the form of corporate organization and specifies the officers to be appointed. Powers are given to expel members for unprofessional conduct, negligence, or misconduct, or for commission of a criminal offence if convicted by a competent Court. Rules of evidence and procedure are specified. Penalties are prescribed for persons practising as a professional engineer without license.

Provision is made for admission by examination, all of which is given to the discretion of the Council of the association. Provision is also made for joint action in these matters with other Councils of professional associations in other provinces of Canada. The names of licensed engineers will be recorded on a Register, and duly gazetted in the "British Columbia Gazette."

No person may be registered until he is 23 years of age, and has been engaged for eight years in some branch of engineering, except in the case of a graduate of a recognized engineering college, in which case the period is reduced to six years, which may include the term of instruction.

Provision is made for appeal to a Judge of the Supreme Court against refusal by the Council to issue a license to practice.

Within three months of the passage of the Act the Lieutenant-Governor-in-Council shall appoint a provisional Council of the Association consisting of eleven members, who shall elect their own officers.

ENGINEERING LEGISLATION IN QUEBEC

Mr. Theo. Denis writes in the "Bulletin":

The Engineering Institute presented a bill at this present session of the Quebec Legislature, transferring the powers of administration of the "Act Concerning the Practice of Civil Engineering" (1898) from the Council of the Canadian Society of Civil Engineers to a Provincial Board consisting of the members of Council of the Engineering Institute residents of the province, and this has revived attention to the Act in question, the bearing and arbitrary powers of which I had no conception until a few days ago. In the original Act the definition of a Civil Engineer is vague, and there has always existed a doubt as to whether or not it includes mining engineers and metallurgists.—One thing certain is that it includes all persons "advising on, making measurements for laying out, designing or supervising

the construction of railways, metallic bridges, wooden bridges, public highways, roads, canals, harbours, river improvements, lighthouses, and hydraulic, municipal, electrical, mechanical or other engineering works." No person is entitled to act as a civil engineer unless he is a "Corporate member of the Canadian Society of Civil Engineers," now the Engineering Institute of Canada.

So that, if I interpret the Act correctly, a mining engineer in charge of a mine a hundred miles from nowhere, a science graduate from a university, a man of eminence as an engineer, who wishes to build a road from his mine to his mill, or who wishes to build a flume for working his placer, is not allowed to design or supervise this work, but must secure the services of a "Corporate member of the Society" to do it. If he should undertake it himself, he is liable to a fine of \$200.00 for the first offence, and \$500.00 for each of the subsequent offences.

If I am wrong, I would like to be set right. If I am right, then the powers conferred by the old Act of 1898 are arbitrary in the extreme, much more so than any of the other acts respecting liberal professions. For, the medical Act does not fine me if I take quinine or aspirin for a cold without calling in a physician; if I have the nerve to do it I may pull out my own aching teeth without a dentist's permission; I am allowed to make plans for my chicken coop, or for my house without being fined \$500.00 by the corporation of architects, but a mining engineer may not design and build a two-foot gauge tramway from his headframe to his dump without incurring a liability to a \$200.00 fine for a first offence and \$500.00 for a second.

I consider such a statutory measure detrimental to the development of our mineral resources, inasmuch that foreign capital, being timid by nature, is liable, for slim causes, to be diverted into other fields, such as Government bonds, at a time when the cry is that "production, more production and greater production," is the only way out of the complicated anomalous economic situation which the world faces at present. I am of the opinion that steps should be taken to modify the arbitrary terms of the Act of 1898.

Quebec, Feb. 12, 1920

T. C. DENIS.

MANITOBA SAFEGUARDS INVESTOR IN MINING FLOTATIONS.

Amendments to the "Sales of Shares" Act have been adopted by the Local Legislature.

The chief points are that before placing Development Stock on the market a prospectus of the Company must be submitted to the Public Utilities Commissioner for approval. This must set forth the price paid for the property and the amount of Vendor's Stock, and all advertising must conform to statements set forth in the prospectus.

Further, that no Vendor's Stock may be offered on the market until the amount of money has been subscribed by Sale of Development Shares to warrant development of the Mine to a point where there is a reasonable prospect of the mine making a fair return to investors and the permission of the Public Utilities Commissioner must first be obtained there-after authorizing sale of Vendor's Stock.

Northern Ontario Letter

THE SILVER MINES.

The One Big Union, in Cobalt, has commenced a campaign of so-called "sniping" tactics. The membership is comparatively small, and is composed chiefly of the radical element. Also, it is opposed by the majority of the workers. While probably not able to cause any general labor disturbance, the organization by bending the will of its few fanatical followers may be able to create local disturbances, decidedly limited in their scope.

Wages, hours of labor and general conditions in Cobalt have long since been approved of by the great body of workers. Direct representation is made between the men and the companies by the appointment of workmens' committees at each mine. This being so, it is regarded as being exceptionally remarkable that, having no just excuse for promoting discord, that the O. B. U. executive should have the audacity to attempt such an experiment.

J. Cluney is secretary of the O. B. U. in Cobalt, last summer at a meeting of the workers here he was charged with having been a paid representative of the O. B. U. in Winnipeg at the time of the labor trouble there. He is a man with practically nothing at stake in this country, and one possessing extreme radical views which he constantly attempts to foist upon those who come in contact with him. So radical are his views as to cause not a few labor men to express the opinion that the government owes it to this country to take immediate steps to investigate the matter, and if able to secure proof of offences against constituted order, should take him into custody.

Production from the mines of Cobalt continues quite uniform, although shipments of bullion have been withheld for some weeks on account of the slight decline in quotations for silver. With silver averaging from 10 to 20 cents an ounce above the average obtaining during 1919, it is believed that the margin of profit will be increased to a point where it will not only offset the higher bonus to the men, but will also offset the gradual decline in output and still leave a greater net profit.

The indications are that the La Rose will have a moderately favorable year, owing to continued favorable developments on the Violet property, and new favorable results on the old University mine. The physical condition of the company's several properties would lead to the belief that the current year's earnings would be large, but for the fact that the cost sheet for 1919 showed that it cost the company \$1.05 for each ounce of silver mined.

A labor dispute, arising over the discharge of a few One Big Union members who attempted to slow down production at the McKinley-Darragh, retarded development work at that property for a few days during the past week, but production at normal capacity has been continued. The affair only served to temporarily reduce the number of men employed underground, for a few days. At the time of writing, full forces are engaged and those who were discharged have not been reinstated.

The Oxford-Cobalt has purchased a hoist from the Adanae, which it proposes to instal at shaft No. 2. The plan of operation is to sink a shaft to a depth of 200 feet, at which point lateral work will be carried on. The promoters of the enterprise appear to

be confident of being able to provide the necessary money for development work.

In discussing the project light narrow gauge railways from Elk Lake to Gowganda, one of the gentlemen involved in the proposition intimated to the "Journal" that provided the Ontario government grants the charter, the rails to the camp will actually be laid within only a few weeks. It is also learned that the leading operators still evince their desire to have a standard gauge railway, and that some hope is still entertained that the Elk Lake branch of the T. & N. O. Ry. may yet be extended. As to this, however, the belief is growing locally that the Ontario Government may gladly accept the present opportunity to let private interests take up the matter of transportation to Gowganda when by so doing the Government will be unburdened of at least a part of its responsibilities.

At the Kells property, in the township of Corkhill, in the Elk Lake district, the result of underground work to date has been exceedingly favorable. Samples just brought out which are said to come from a depth of about 80 feet, contain several thousand ounces of silver to the ton. The veins are similar in composition to the Cobalt district. Four of these narrow veins occur in close proximity to each other.

Mining Commissioner, T. E. Godson, K.C., will hear at least five mining disputes at his monthly sittings to be held in Haileybury on April 14th. The list is made up as follows:—

George R. Smailes vs. Philip Godson, K.C., will hear dispute in respect of mining claim L.S. 386, situated in Gauthier township, in the Larder Lake Mining Division.

A. P. Orr vs. Capt. Albert Johnston, which is a dispute in respect of mining claim L. 6204 and L. 6205, situated in lot 2 concession 6 in the township of Skead, in the Larder Lake Mining Division.

R. P. McGregor vs. S. W. Barber, being a dispute in respect of mining claim 18834 situated in the Gillies Limit, in the Temiskaming and Coleman Mining Division.

R. H. Douglas vs. M. P. MacDonald, a dispute involving mining claims M.R. 6087, 6088, 6089, and 6090 situated in the township of Cairo, in the Montreal River Mining Division.

Gibson and Kennedy vs. Smith, being an application for relief from forfeiture in respect of mining claim L. 4575, situated in the Larder Lake Mining Division.

On the White Reserve property, in the Maple Mountain part of the Elk Lake district, it is planned to commence work this spring provided sufficient men can be induced to go in to work. During the past winter it was found impossible to get men who would accept employment at the property owing to it being situated so far from a railway.

At a meeting of the shareholders of the Nipissing Extension Mines, Ltd., held on March 19th the following directors were elected.

Hon. Albert Loenig; A. J. Young; William E. Stevenson; D. Inglis Grant; and Joseph Montgomery.

At a meeting of the directors, held on March 24th, the following officers were appointed:—

A. J. Young, President; William E. Stevenson, Vice-president; Hon. Albert Loenig, Treasurer; Joseph

Montgomery, secretary; and Wm. R. Sweeny, Assistant secretary.

Major E. H. Birkett was re-appointed resident manager in charge of operations, and with F. J. Bourne as consulting engineer.

Following is a statement of ore shipments over the T. & N. O. Railway for the month ending February 28th, 1920, in tons of 2,000 lbs. as submitted by Arthur A. Cole.

Silver Ore.		Tons.
Cobalt Proper.		
1. Coniagas		65.03
2. Hudson Bay		30.32
3. La Rose		118.10
4. McKinley-Darragh		180.36
5. O'Brien		32.02
6. Temiskaming		31.86
		457.69

The above shipments were made to the following Companies;

Canada.		
Deloro Smelting and Refining Co., Marmora		219.71
Coniagas Smelter, Thorold		32.00
United States.		
American Smelting and Refining Co., Pueblo..		33.03
American Smelting & Refining Co., Perth Amboy		77.80
Pennsylvania Smelting Co., Carnegie		95.15
		457.69

Price of Silver.

Feb. 2nd. Highest	134.500
Feb. 24th. Lowest.	129.000
	Average 131,295

During the week ended March 26th, three Cobalt companies shipped one car of ore each, the total amounting to 231,176 pounds.

Following is a summary:—

Shipper	Cars	Pounds.
McKinley-Darragh	1	82,260
Coniagas	1	88,000
Hudson Bay	1	60,916
Total	3	231,176

During the corresponding period the Nipissing was the only bullion shipper, sending out 80 bars containing 106,624.45 fine ounces.

THE GOLD MINES.

The bill introduced in the House at Washington, having the support of the American Bankers' Association, and having for its aim the placing of a tax on all gold used in the arts, has aroused considerable interest in the gold producing districts of Northern Ontario.

While all measures tending toward a search for some method whereby the gold producing mines could be assisted meets with ready support in this country, yet the latest proposal is accepted with all due reserve. It seems to be the opinion of careful observers that the placing of a tax on gold used in the arts might well lead to complications, and might prove to be attended with expenses totally out of proportion to the advantages which it would bring. Not only that, but goldsmiths would be given added opportunity and temptation to melt down gold coins and possibly add

to the present unfavorable monetary status of the nations. It seems as though humanity will always clamor for gold trinkets. As long as this demand continues, it would not be sound business to have \$20 gold pieces minted while for an equal amount of gold the goldsmith would be obliged to pay \$30. It seems to suggest the necessity for dealing with all new gold produced.

The proposed new bill would tax the arts \$10 an ounce extra for all gold used, and would pay the proceeds to the gold producing companies. It is a plan that conveys the threat that it might only serve to create work for an additional army of office holders and tax collectors whose energies might be wasted in an unproductive occupation, while the real relief for the present economic problem lies in a greater number of hands being employed in producing something. The re-juggling of the world's gold, entailing the use of many men, and with the possibility of the expense of such an organization consuming the large part of the taxes collected does not appear to constitute a solution of the problem which is confronting some of the nations, if not the world.

In Northern Ontario the gold mining industry is on a comparative prosperous footing. Mines that have been closed down from two to three years are one by one resuming work. Those that have continued to operate during the past few years are increasing the scope of their activity, and on the whole the gold mining industry of this country is in a better position than ever before in Ontario's history. Barring unforeseen contingencies the year 1920 will not only bring some of the former producers back to their former standing, but will also add new producers to the list. It is a condition about which it is only reasonable that great optimism is being expressed, and also something which would tend to offer encouragement for the application of additional capital in the industry for the development of mines pending the return to normal conditions when the reward for the present improvement in mining methods will be realized. The truth is that economy is being practiced to a greater degree than ever before. It is due in part to greater experience and natural improvement, but is also due in a large measure to the fact that the hardships caused by the war made it absolutely necessary to establish the highest possible degree of efficiency, or go out of business.

The Dome Mines will end a comparatively successful fiscal year at March 31st. Having started up its mill last spring, and having treated a medium grade ore from which \$6.87 a ton was recovered during several months of operation, the net profit has been considerable, and has enabled the company to disburse two dividends each amounting to 2½ p. c. or a total of \$200.00. It is now believed that although able to earn fairly large profit, the company will not pay more than 2½ p. c. quarterly until such time as a surplus has been accumulated with which to meet any future emergency. The previous experience in this respect may cause a changed policy.

During 1919 the Davidson mine had only a moderately successful year. While it had been previously officially stated that the mill had been completed and had a capacity for treating 60 tons of ore daily, and that a large tonnage of fairly high grade ore had been blocked out, the figures for 1919 show that the mill treated an average of less than ten tons of ore daily and that the total recovery was but \$7.07 per ton, or a total output of \$2 under \$24,000.

The Teck-Hughes Gold Mines had a fairly successful year in 1919, the output amounting to \$169,590.41, as a result of having treated 18,387 tons of ore. This shows a recovery of \$9.22 a ton. The achievement is considered favorable due to such having been accomplished in spite of the prolonged labor strike at last summer in the Kirkland Lake camp. It is believed that under present conditions the company will this year be able to pay off a fair amount of the bonds held against it.

At the Kirkland Lake Gold Mines during 1919 the result of work was not so satisfactory it being shown that a total of but \$4.97 a ton was recovered from each ton of ore treated. Whether or not this is an indication that former estimates were not accurate, or whether it points to difficulty in obtaining the desired percentage of extraction is a matter of speculation. Opinion seems to lean to the latter being the cause, owing possibly to the presence of tellurides in the ore. A total tonnage of 11,324 tons were treated from which a total of \$56,262.59 was produced. The achievement was obviously not a profitable one for the reason that costs in the Kirkland Lake camp have in no case been reduced to below \$8 a ton.

On the Bidgood property, situated in the Eastern part of the Kirkland Lake district a contract has been let to sink a shaft to a depth of 300 feet, at which point some 2000 feet of lateral work will be done.

A charter has been granted to the Moffat-Hall Gold Mines, with property in Lebel township. The company is capitalized at \$3,000,000, made up of 3,000,000 shares of the per value of \$1 each.

A test shipment of ore recently made from the Clifton-Porcupine mine, showed an average gold content of \$66.45 a ton. While this is above the average of the ore so far developed, yet it is said to be the average of one of the ore shoots on the property. In the meantime development work is proceeding at the 200-ft. level and a good deal of success is being met with. The management states that provided the present favorable results continue, it is expected that plans for a mill will be taken into consideration.

PERSONALS.

Mr. A. G. Burrows and Mr. P. E. Hopkins, geologists of the Ontario Bureau of Mines are making underground studies at Kirkland Lake. They spent the greater part of the last field season in the Kirkland gold area, and are preparing a detailed report and map.

Mr. Balmer Neilly, formerly manager of the Penn Canadian mine at Cobalt and recently appointed secretary of the Ontario Mines Owners Association will move to Toronto shortly and open an office there for the Association.

NEW MONTREAL SALES OFFICE

The Engineering and Machine Works of Canada, Limited, St. Catherine, Ont., owing to the rapidly increasing demands for their products consisting of boilers of all types, horizontal, vertical, locomotive and marine, tanks, plate work of all descriptions, etc., and particularly in connection with their recent and very successful venture, the manufacture in Canada of the Keyston Light Traction Excavator, Model 4, have found it necessary to open another Eastern Sales Office in the Birks' Building, Montreal, where inquiries can be more quickly and satisfactorily handled. This is in addition to their Sales Office in the Sun Life Bldg., Sherbrooke, Que.

BRITISH COLUMBIA LETTER.

Victoria, B. C.

The forecasted Bill amending the Placer Mining Act of British Columbia has been presented to the Legislative Assembly by Hon. Wm. Sloan, Minister of Mines, and, as has been prophesied, provision is made for the elimination, by easy stages and in an equitable manner, of accumulated arrears of rentals on Placer Mining Leases, these now being estimated as approximating \$350,000.

Because of the standardized value of gold and the increased cost of plant, labour, supplies and every necessity in relation to its production interest in the development of the gold-bearing sands and gravels of British Columbia has fallen off in late years. The annual output of the precious metal from this source has declined. Consequently large sections of the placer mining districts are held under leases upon which the owners, unable to pay the yearly charges, owe considerable sums to the government and for some time have done little or no work.

This is a condition detrimental to the best interests of the mining industry but it is one requiring careful remedial treatment, it being necessary to guard the rights of the license holder who has invested heavily in development, contemplates further development but has been temporarily embarrassed financially and yet to assure that ground tied up by leases likely to continue inoperative shall be thrown open to others anxious to make them productive.

That this problem has been kept in mind by Mr. Sloan in the drafting of the Bill now before the House is quite clear. He has not the difficulty of the situation by providing a simple means of collecting the arrears. They are to be consolidated and the payment spread over a period of years. Besides there is introduced a uniform procedure for the obtaining and the protecting of Placer Lease Titles in the future.

The provisions of the proposed legislation may be summarized as follows:

In respect of leases now in arrear for more than one year's rental the lessee may apply before the 1st of January, 1921, for the consolidation of the annual rentals in arrear and arrange for their payment by annual instalments extended over a period not exceeding ten years. Where the arrears are consolidated, the failure to pay the annual instalment or the current annual rental when due will automatically result in a forfeiture of the lease. Where the lessee so in arrear fails to apply for consolidation and fails to pay the arrears before the first of January 1921, his lease is forfeited.

Provision is made for the issuance of leases, beginning 1st of July, 1920, at a reduced annual rental and reduced annual expenditure for development work. Leases in this new form will contain a provision for automatic forfeiture, if the lessee fails to pay the annual rental or to do and record the annual development work. Reinstatement is permitted within thirty days where the fault consisted only of failure to record the work. Excess development work done in any one year may be recorded so as to count on future development work requirements for the following three years only. Cash may be paid to the Crown in lieu of expenditure on development.

In the case of leases in good standing it is provided that the lessees have the option of applying at any time while the regular charges are paid up to have the annual rental and annual expenditure reduced to the rates under which new leases are to be issued after the 1st of July. If they apply and obtain this reduc-

tion the conditions of automatic forfeiture for default, and the privileges of recording excess work and paying cash in lieu of work, which are applicable to new leases, will also attach to these old leases. If they decide not to apply for a reduction of rental and annual expenditure their leases will continue subject to the same provisions to which they now are subject.

Leases which become in good standing through consolidation of arrears, may also be brought under the reduced rates of rental and other provisions applicable to new leases issued after the 1st of July.

Although the foregoing are the chief alterations there is yet another innovation of importance. Heretofore Placer Mining Leases have been issued by the Gold Commissioners, who have their headquarters at different central points throughout the Province, with the sanction of the Lieut.-Governor-in-Council, the authority to issue the same being invariably based on the Gold Commissioner's report accompanying the application. It is now proposed that Gold Commissioners, having full knowledge of all local conditions, shall be empowered to issue such leases without reference to the Lieut.-Governor-in-Council, while, as has been indicated, automatic forfeiture is provided for in cases where the lessee fails to observe the covenants and conditions of his lease.

These changes in the provincial law, it is pointed out, are proposed by Mr. Sloan, and supported by other members of the government, not through any lack of confidence in the Placer Mining Fields but because it is recognized that, at least in-so-far as the long exploited placer sections are concerned, the methods of the individual miner has given place, for the most part, to those of the hydraulic or dredge operator. And as the latter has contributed materially to the arrears of rental indicated, it is felt that a reduction in both rental and expenditure rates will have the effect of stimulating and stabilizing the placer mining industry of British Columbia.

The alterations in connection with the taking up and the maintaining of placer leases in the Province are as follows:

Hydraulic lease, \$25 in place of \$50 per annum and development \$250 instead of \$1,000 per annum.

Creek lease, \$37.50 in place of \$75 per annum and development \$250. instead of \$1,000 per annum.

Dredging lease, \$25 in place of \$50 per mile and development \$250 instead of \$1,000 per mile per annum, the value of any new plant or machinery employed to count as money expended on development; and 20 cents royalty to be charged against every ounce of gold recovered.

Stewart, B. C.

Definite information is available regarding development plans on the Big Missouri Group of Mineral Claims, Salmon River Section of Portland Canal Mining Division. There will be started a diamond drilling contract of 12,500 feet. This, together with work to be carried on simultaneously, will cost about \$40,000. Two camps will be maintained throughout the season. The erection of a concentrator and of all other necessary equipment is proposed providing the exploration and development for which plans have been laid gives satisfactory results.

Dale L. Pitt, who is known in Pacific Coast mining circles as the ore buyer for the Tacoma Smelter and later a manager for a copper producer at Index, B. C., has been appointed General Manager of the Premier Mine, Salmon River. R. K. Neill, of Spokane, Wn. and Vancouver, B. C. whose place he is taking, retains his

interest in the mine. Mr. Pitt has stated that development will be carried on vigorously, that a concentrator will be installed, water power developed, and a saw mill erected.

Alice Arm, B. C.

The Molybdenum Mining and Reduction Co., of Seattle, Wn., which is interested in one of the best showings of molybdenum in British Columbia, situated in the Alice Arm section, states that a bona fide effort is being made by all concerned to dispose of this property. It has been tied up by litigation for several years, the complications as to title making it impossible to place the property on a producing basis even during the war when prices were high and the Allies were crying out for the metal. The court has fixed the price at \$150,000.

Atlin, B. C.

A 50-ton shipment of the hydro-magnesite of the Atlin District, British Columbia has been shipped from Vancouver, B. C. to England. This was part of a 200-ton lot brought from the north in 1914 and which has been held at Vancouver at the command of Old Country parties throughout the period of hostilities. Nichol Thompson, who is handling the business, anticipates that this is but the beginning of regular shipments of magnesite from this province. There is another deposit situated in the Cariboo District and within a short distance from the line of the Pacific Great Eastern Ry., now under construction.

Princeton, B. C.

Construction operations at Allenby and Copper Mountain will be resumed by the Canada Paper Corporation about the 1st of April. It will be possible then to start tracklaying on the new railway from Allenby to the Mine, as the grading will be complete. The bridge timbers are being framed at Princeton and will be forwarded to Allenby for distribution. Both H. R. Van Wagenen, the General Manager of the Company, and Van H. Smith, of Butte, Mont., the Mill expert, have been wintering in the United States. They are expected to return shortly.

Trail, B. C.

Shippers to the Trail Smelter of the Consolidated Mining and Smelting Co. of Canada are being paid, commencing with 1920, everything over 5 per cent on exchange values.

Greenwood, B. C.

The Providence Mine, Greenwood District, continues to ship. Two cars have been dispatched this month, aggregating 75 tons, most of which was taken from the 400 feet level. The value of this is placed at \$14,000. Development now is in progress on the 500 foot level where there is considerable high grade ore in sight.

Grand Forks, B. C.

The Rock Candy Mine and Fluorite Plant of the Consolidated Mining and Smelting Co. has resumed operations with sufficient orders ahead to assure continuous activity for a year or more. The Mill has been closed down for the past few months, although development has continued. The shipments from the decrepitating plant probably will reach about 18 cars a week.

British Columbia Government Proposes Reservation of Iron-Ore Deposits.

The Bill now before the Legislative Assembly giving the Lieutenant Governor in Council power to place a reserve on iron ores deposits, the said power to extend over a period of three years, will be applied to a lim-

ited extent, and the authority so granted will be exercised, not to the detriment, nor in such a way as to inflict any hardship of interference with the prospector of any class of people interested in the mining industry. Rather it will be used for the advancement of the interests of those directly or indirectly concerned in the development of the mineral resources of the Province, as well as for the benefit of the public at large.

To the criticism that the bill will hamper the prospector it may be replied that he had not heretofore and cannot at present benefit materially by reason of the discovery and location of purely iron deposits. Without an Iron and Steel Industry in Western Canada there is not a sufficient market, if any, to make the product of such holdings saleable. That the force of this is recognized by the prospectors is confirmed by a statement voluntarily given to Hon. Wm. Sloan, Minister of Mines, who is responsible for the proposed legislation, by J. W. Mulholland, President of the Prospectors' Protective Association, who says in part:

"The iron deposits of British Columbia have in the past been of no value to the prospector. This class of ore is absolutely useless. By reserving districts which are idle and not covered by mineral claims there should be no reason or ground for opposition, for, if we have a Steel Plant in the Province, it would furnish a market for ores which are now being held by the prospectors of this Province and which would remain idle until such time as this market is created. Considering the benefits which this Province would derive from an industry of this kind I feel it my duty to give you (the Minister of Mines) my approval."

To the charge that present holders and operators will be adversely affected it is only necessary to direct attention to the fact that the authority asked for does not apply to iron ore locations already held until the Mineral or any other Act.

The object sought, briefly, is to prevent the further alienation of the iron ore resources to such an extent that their development is impeded. At present many such deposits are privately held and on none has much work been done. The only conclusion possible is that they were acquired, and are being held, for speculative purposes, a situation which, it must be clear, handicaps the efforts being made to interest capital in the development of an Iron and Steel Industry, an enterprise most important if British Columbia is to take the place her mineral riches warrant in the industrial world. An illustration in point is found on Texada Island where there are large iron ore deposits, of high grade, which have been out of the hands of the Crown for fifty years or more and on which there has been little expenditure in development.

While it is not intended to touch the unquestioned rights of these who have complied with all the laws heretofore, and have kept their properties in good standing, it is proposed that for a time such properties of this character, as may be deemed as of sufficient importance, shall be reserved by the Crown.

On the report of the discovery of iron ore, the resident engineer of the district in which such find has been made will be asked to inspect and report on the same. If it is considered on investigation that the ore is so situated, is in such quantity and of such quality as to warrant the belief that it might assist in the object in view, namely, the launching of an Iron and Steel Industry, the government power to apply the reserve probably would be exercised.

MANITOBA LETTER.

From Chas. A. Millican.
(Our Winnipeg Correspondent.)
Rice Lake District.

The Gold King Mines Ltd., with properties situated near the North East End of Hole River Lake in the Rice Lake District is the latest Company to place Development Shares on the market, offering 25,000 shares at 25c.

The prospectus and advertising matter are very conservatively worded; keeping clear of rash and extravagant statements.

On the Gold Pan Extension the Manager is rushing to completion the camp buildings and installation of Machinery. It is expected that mining operations will begin by 1st April and sinking carried on from the present 50 feet shaft down to the 300 feet level before much drifting is undertaken.

Mr. G. H. Porter, Managing Director of the Commonwealth Mine left on the 20th with supplies and a small crew of men to erect camp buildings preparatory to starting mining operations.

Major Pelletier has returned from the Gabrielle Mines, having completed the erection of new Camp building and putting the old buildings into serviceable condition for present use.

This Company will not instal any heavy machinery this season. It is the intention to do considerable stripping together with some sinking on present shafts. A large block of this Company's Treasury Stock has been purchased by an English Syndicate.

It is not expected that any work will be carried on at the Brooklyn Mine during the summer season.

On the 22nd inst., one of the Winnipeg evening papers made the announcement of a strike of \$200,000 ore at the Gold Pan Mine, which caused considerable excitement in the City.

Later news relates the finding of a small pocket in the 200 ft. drift 83 ft. south of the shaft, but in extent it was exceedingly small, and the value not anything like as high as reported. A single shot blew out all there was of high grade ore. Work on the drift is still proceeding.

Golden Vein Mine.

The shaft on this property is now down 30 feet. Cross samples taken every five feet run as high as \$34.00 per ton, with a general average assay value of close on \$9.00. A sample was taken from the bottom of the shaft shows an assay of \$62.50 per ton. The vein is 15 feet wide at the bottom of the shaft and values appear to increase with depth.

Work on the Marigold Claim is being pushed. The shaft is now down 25 feet. The vein has widened to 5½ feet, and is carrying visible Gold.

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CHANGES IN THE CANADIAN MINING INSTITUTE

To the Editor "Canadian Mining Journal."

The plea of Mr. E. P. Mathewson in his address at the annual dinner of the Canadian Mining Institute for the adoption of the modern methods of business in the affairs of the Institute is warmly supported by many members. That there are obligations to the proposed plan, while not to be overlooked, should not be allowed to prevent a big step forward being taken now.

The purpose of the Canadian Mining Institute, according to its charter, is to encourage the development of the mineral resources of Canada. Its membership is predominantly made up of men of the engineering professions; but it includes many interested in other phases of mining. At times there as appeared a desire to degenerate to the status of a technical society; but the purpose of the Institute's existence has continued always to be the furthering of the mining and allied industries. The presentation and discussion of technical papers has always been a prominent feature of the meetings of the Institute; but never allowed to become the only feature. In this the Canadian Mining Institute has been a step in advance of the sister organization in the United States. It is interesting to note that the American Institute has recently made changes in its constitution which make it more nearly like the Canadian organization.

The Canadian Mining Institute occupies the position of representative of the Canadian Mining Industry.

It seems to me that Mr. Mathewson and his supporters are on firm ground when they urge that steps be taken to insure that Institute should capably fill the position which it occupies. There is room for discussion however, as to whether the increased activity proposed should be made dependent on the securing of the financial support of the larger operating companies. The large companies have big interests to protect and it is quite proper and very necessary that they should unite to protect themselves. It is a proper function of the Canadian Mining Institute to support the big companies in many of their claims, for in the main the interests of the operating companies and of the whole industry are the same.

There can be little doubt that if the mine owners would give the affairs of the Canadian Mining Institute the attention that they give their own affairs they could soon make the voice of the Institute heard more insistently in places where it is highly desirable that it should be heard. With a business organization on modern lines the Institute would take on a new lease of life and become of vastly more importance to the industry and more fully function as the representative of the industry. There will nevertheless be members who will not look kindly on any proposal which will tend to make something of the nature of a mine owners' association out of the Canadian Mining Institute.

In recognizing the Institute's business office staff so as to make possible greater activity in matters that affect the industry, it may be found possible to get the desired results without seriously changing the present nature of the Institute. My own inclination would be to adopt Mr. Mathewson's plan and insure greater activity on the part of the Institute even if there is danger that the objections to the scheme may prove well founded. Possibly means can be found to avoid the danger without greatly altering the main feature of the plan, which is essentially to place the Institute in a position where it can be of greater service to the industry.

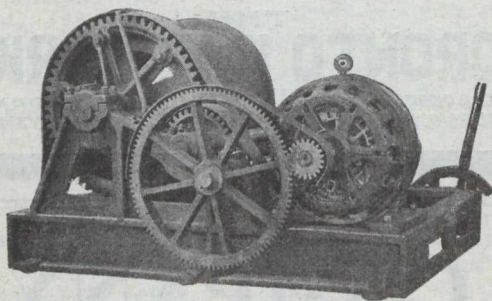
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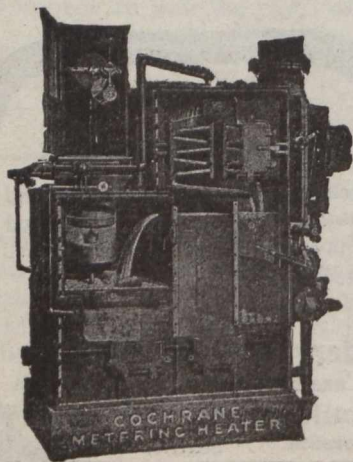
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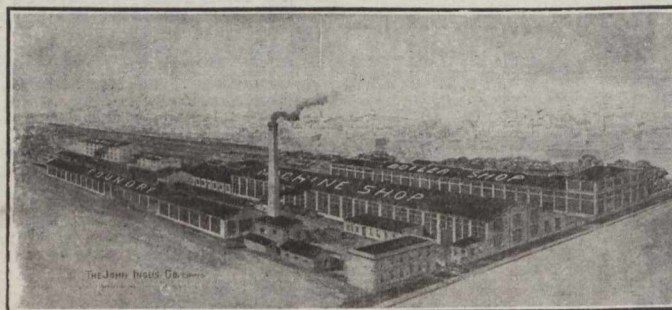
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R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
The Mine & Smelter Supply Co.
- Concrete Mixers:**
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
Mussens, Limited
R. T. Gilman & Co.
- Condensers:**
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.
- Concentrating Tables:**
The Mine & Smelter Supply Co.
Deister Concentrator Co.
The Wabi Iron Works
- Converters:**
Northern Canada Supply Co.
MacGovern & Co., Inc.
- Conveyors—McCaslin Gravity Bucket:**
Canadian Mead-Morrison Co., Limited.
- Contractors' Supplies:**
Canadian Fairbanks-Morse Co., Ltd.
- Consulters and Engineers:**
Hersey Milton Co., Ltd.
- Conveyors:**
The Mine & Smelter Supply Co.
- Conveyor Flights:**
Hendrick Mfg. Co., Ltd.
- Conveyor—Trough—Belt:**
Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.
The Wabi Iron Works
- Conical Mills:**
Hardinge Conical Mill Co.
- Copper:**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Cranes:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Link-Belt Co.
R. T. Gilman & Co.
Smart-Turner Machine Co.
- Crane Ropes:**
Allan Whyte & Co.
Greening, B., Wire Co., Ltd.
- Crucibles:**
Canadian Fairbanks-Morse Co., Ltd.
The Mine & Smelter Supply Co.
- Crusher Balls:**
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull, Que.
Osborn, Sam'l (Canada) Limited.
- Crude Oil Engines:**
Swedish Steel & Importing Co., Ltd.
- Crushers:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited
The Mine & Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Surplus Machinery and Equipment Property of U.S. Government

FOR SALE AIR COMPRESSORS

Can. Ingersoll Rand, Class P.L.B.-2, power driven, two stage, cross compound, low-pressure cylinder 16", high pressure cylinder 10", stroke 12", displacement 624 cu. ft. per min., 225 R.P.M., H.P. recommended to drive 110. Fly wheel 5' x 18", weight 1900 lbs., with vertical air receiver 42" x 10'. Capacity, 700 cu. ft. at 110 lbs. Location, Montreal, Que.

No. 8301.

Can. Ingersoll Rand, Class R.L.-3, Duplex type, steam driven, with cross-compound steam and cross-compound air cylinders. Cylinder sizes, H.P. steam 13", L.P. steam 22", H.P. air 12", L.P. air 20", stroke 16", displacement 1160. R.P.M. 200. Indicated H.P. in steam cylinders, 200 Boiler H.P. recommended. non-condensing 162-146 condensing 132-116. Fly wheel 8' dia., weight 4500 lbs. No. 6 Ingersoll Rand Air receiver, 48" x 12", and No. 1706 Ingersoll Rand aftercooler. Location, Leaside, Ont.

No. 2171

Sullivan Machinery Co., Class W.G.-3 horizontal single stage, power driven. Cylinder 12" dia., 12" stroke, displacement 345 ft., R.P.M. 220. H.P. recommended, 75; terminal air pres-

sure, 120 lbs.. Fly wheel, 60" x 14½'. With unloader. Location, Leaside, Ont.

No. 17897.

Can. Ingersoll Rand, Class B-3, cross compound steam driven, steam cylinders 14" x 24", air cylinders 14" x 22", high pressure 22" x 22", low pressure, displacement 1160 cu. ft., at 120 R.P.M., indicated H.P. in steam cylinders 200, steam pressure recommended 125, with water-tube inter-cooler. Location, Montreal, Que.

Two machines numbered as follows:

No. 4040.

No. 4041.

Bury Compressor Co., Class L., horizontal single stage power driven, cylinder 12" dia. by 12" stroke, displacement 310 cu. ft., R.P.M. 200, terminal air pressure 100 lbs., belt wheel 12" x 54", H.P. recommended 75. Location, Brantford, Ont.

Two machines numbered as follows:

No. 2594.

No. 2595.

(With standard Air Receivers, 42" x 10'.)

No. 2596.

No. 2597.

We issue a weekly Bulletin, which shows the materials available for sale at date of issue. If you are not on our Mailing List, we request your name and address.

Toronto District Salvage Board, Ordnance Dept., U.S. Army

39 Adelaide St., E.,

TORONTO, Ontario

Canadian Miners' Buying Directory.—(Continued)

Cyanide:

American Cyanamid Company.

Cyanide Plant Equipment:The Dorr Co.
The Mine & Smelter Supply Co.**D. C. Units:**

MacGovern Co.

Derricks:Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Mussens, Limited**Diamond Drill Contractors:**Diamond Drill Contracting Co.
E. J. Longyear Company
Smith & Travers
Sullivan Machinery Co.**Diamond Tools:**

Diamond Drill Carbon Co.

Diamond Importers:

Diamond Drill Carbon Co.

Digesters:

Canadian Chicago Bridge and Iron Works

Dies:Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.**Dredger Pins:**Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited**Dredging Machinery:**Canadian Steel Foundries, Ltd.
Canadian Mead-Morrison Co., Limited.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.**Dredging Ropes:**Allan, Whyte & Co.
Greening, B., Wire Co., Ltd.
R. T. Gilman & Co.**Drills, Air and Hammer:**Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
The Mine & Smelter Supply Co.
Mussens, Limited**Drills—Core:**Canadian Ingersoll-Rand Co., Ltd.
E. J. Longyear Company
Standard Diamond Drill Co.
Sullivan Machinery Co.**Drills—Diamond:**Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company**Drill Steel—Mining:**H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.**Drill Steel Sharpeners:**Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Osborn, Sam'l (Canada) Limited.
The Wabi Iron Works**Drills—Electric:**Canadian Fairbanks-Morse Co., Ltd.
Sullivan Machinery Co.
Northern Electric Co., Ltd.**Drills—High Speed and Carbon:**Canadian Fairbanks-Morse Co., Ltd.
Osborn, Sam'l (Canada) Limited.
H. A. Drury Co., Ltd.
Hadfields, Limited**Dynamite:**Canadian Explosives
Northern Canada Supply Co.**Dynamos:**Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Company**Ejectors:**Canadian Fairbanks-Morse Co. Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.**Elevators:**Canadian Mead-Morrison Co., Limited.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
The Wabi Iron Works**Engineering Instruments:**

C. L. Berger & Sons

Engines—Automatic:Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Fraser & Chalmers of Canada, Ltd.**Engines—Gas and Gasoline:**Canadian Fairbanks-Morse Co., Ltd.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd.
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
The Mine & Smelter Supply Co.**Engines—Haulage:**Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.**Engines—Marine:**Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Swedish Steel & Importing Co., Ltd.**Engines—Steam:**Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.**Engines—Stationery:**

Swedish Steel & Importing Co., Ltd.

Engineers:

The Dorr Co.

Ferro-Alloys (all Classes):

Everitt & Co.

Feed Water Heaters:

MacGovern & Co.

Flashlights—Electric:

Spielman Agencies, Regd.

Flood Lamps:

Northern Electric Co., Ltd.

Flourspar:The Consolidated Mining & Smelting Co.
Everitt & Co.**Forges:**Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.**Forging:**Canadian Mead-Morrison Co., Limited.
Canadian Foundries and Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
Smart-Turner Machine Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.**Frogs:**Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore**Frequency Changers:**

MacGovern & Co., Inc.

Furnaces—Assay:Canadian Fairbanks-Morse Co., Ltd.
Lymans, Limited
Mine & Smelter Supply Co.**Fuse:**Canadian Explosives
Northern Canada Supply Co.**Gears (Cast):**Hull Iron & Steel Foundries, Ltd.
The Link-Belt Co.**Gears, Machine Cut:**Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Granulators:**

Hardinge Conical Mill Co.

Grinding Wheels:

Canadian Fairbanks-Morse Co., Ltd.

Gold Refiners

Goldsmith Bros

Canadian Miners' Buying Directory.—(Continued)

- Gold Trays:**
Canada Chicago Bridge & Iron Works
- Hose (Air Drill):**
Goodyear Tire & Rubber Co.
- Hose (Fire):**
Goodyear Tire & Rubber Co.
- Hose (Packings)**
Goodyear Tire & Rubber Co.
- Hose (Suction):**
Goodyear Tire & Rubber Co.
- Hose (Steam):**
Goodyear Tire & Rubber Co.
- Hose (Water):**
Goodyear Tire & Rubber Co.
- Hammer Rock Drills:**
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
The Mine & Smelter Supply Co.
- Hangers and Cable:**
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel:**
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.
- High Speed Steel Twist Drills:**
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
- Hoists—Air, Electric and Steam:**
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Jones & Glassco
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Link-Belt Co.
- Hoisting Engines:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.
- Hoisting Towers:**
Canadian Mead-Morrison Co., Limited.
- Hose:**
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
- Hydraulic Machinery:**
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Industrial Chemists:**
Hersey, M. & Co., Ltd.
- Ingot Copper:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds:**
Standard Underground Cable Co. of Canada, Ltd.
- Inspection and Testing:**
Dominion Engineering & Inspection Co.
- Inspectors:**
Hersey, M. & Co., Ltd.
- Jacks:**
Canadian Fairbanks-Morse Co., Ltd.
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
R. T. Gilman & Co.
Mussens, Limited
- Jack Screws:**
Canadian Foundries and Forgings, Ltd.
- Laboratory Machinery:**
Mine & Smelter Supply Co.
- Lamps—Acetylene:**
Dewar Manufacturing Co., Inc.
- Lamps—Carbide:**
Dewar Manufacturing Co., Inc.
- Lamps—Miners:**
Canada Carbide Company, Limited
Canadian Fairbanks-Morse Co., Ltd.
Dewar Manufacturing Co., Inc.
Northern Electric Co., Ltd.
Mussens, Limited
- Lamps:**
Dewar Manufacturing Co., Inc.
- Lanterns—Electric:**
Spielman Agencies, Regd.
- Lead (Fig):**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Levels:**
C. L. Berger & Sons
- Locomotives (Steam, Compressed Air and Storage Steam):**
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
- Link Belt**
Canadian Fairbanks-Morse Co. Ltd.
Northern Canada Supply Co.
Jones & Glassco
- Machinists:**
Burnett & Crampton
- Machinery—Repair Shop:**
Canadian Fairbanks-Morse Co., Ltd.
- Machine Shop Supplies:**
Canadian Fairbanks-Morse Co., Ltd.
- Magnesium Metal:**
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Metal Marking Machinery:**
Canadian Fairbanks-Morse Co., Ltd.
- Metal Merchants:**
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canada
Canada Metal Co.
C. L. Constant Co.
Everitt & Co.
- Metallurgical Engineers:**
The Dorr Co.
- Metallurgical Machinery:**
The Dorr Co.
The Mine & Smelter Supply Co.
- Metal Work, Heavy Plates:**
Canada Chicago Bridge & Iron Works
- Mica:**
Everitt & Co.
Diamond Drill Carbon Co.
- Mining Engineers:**
Hersey, M. Co., Ltd.
- Mining Drill Steel:**
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
International High Speed Steel Co., Rockaway, N.J.
- Mining Requisites:**
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
- Mining Ropes:**
Dominion Wire Rope Co., Ltd.
- Mine Surveying Instruments:**
C. L. Berger & Sons
- Molybdenite:**
Everitt & Co.
- Monel Metal (Wire, Rod, Sheet and Foundry Metal):**
International Nickel Co.
- Motors:**
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
MacGovern & Co.
The Mine & Smelter Supply Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

- Motor Generator Sets—A.C. and D.C.**
MacGovern & Co.
- Nails:**
Canada Metal Co.
- Nickel:**
International Nickel Co.
Coniagas Reduction Co.
The Mond Nickel Co., Ltd.
- Nickel Anodes:**
The Mond Nickel Co., Ltd.
- Nickel Salts:**
The Mond Nickel Co., Ltd.
- Nickel Sheets:**
The International Nickel Co. of Canada
The Mond Nickel Co., Ltd.
- Nickel Wire:**
The Mond Nickel Co., Ltd.
The International Nickel Co. of Canada
- Oil Analysts:**
Constant, C. L. Co.
- Ore Handling Equipment:**
Canadian Mead-Morrison Co., Limited.
- Ore Sacks:**
Northern Canada Supply Co.
- Ore Testing Works:**
Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
Campbell & Deyell
Hoyt Metal Co.
- Ores and Metals—Buyers and Sellers of:**
C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.
- Packing:**
Canadian Fairbanks-Morse Co., Ltd.
- Paints—Special:**
Spielman Agencies, Regd.
- Perforated Metals:**
Northern Canada Supply Co.
Hendrick Mfg. Co.
Canada Wire and Iron Goods Company.
Greening, B., Wire Co.
- Pig Tin:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Pig Lead:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
Pennsylvania Manufacturing Co.
- Pipes:**
Canadian Fairbanks-Morse Co., Ltd.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
R. T. Gilman & Co.
- Pipe Fittings:**
Canadian Fairbanks-Morse Co., Ltd.
- Pipe—Wood Stave:**
Pacific Coast Pipe Co.
Mine & Smelter Supply Co.
- Piston Rock Drills:**
Mussens, Limited
Mine & Smelter Supply Co.
- Plate Works:**
John Inglis Co., Ltd.
Hendrick Mfg. Co.
The Wabi Iron Works
MacKinnon Steel Co., Ltd.
- Platinum Refiners:**
Goldsmith Bros.
- Pneumatic Tools:**
Canadian Ingersoll-Rand Co., Ltd.
Jones & Glasco
R. T. Gilman & Co.
- Prospecting Mills and Machinery:**
The Electric Steel & Metals Co.
E. J. Longyear Company
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Pumps—Pneumatic:**
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Sullivan Machinery Co.
- Pumps—Steam:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
The Mine & Smelter Supply Co.
Mussens, Limited
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Pumps—Turbine:**
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Pumps—Vacuum:**
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
The Wabi Iron Works
- Pumps—Valves:**
Canadian Fairbanks-Morse Co., Ltd.
- Pulleys, Shaftings and Hangings:**
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
The Wabi Iron Works
- Pulverizers—Laboratory:**
Mine & Smelter Supply Co.
The Wabi Iron Works
Hardinge Conical Mill Co.
- Pumps—Boiler Feed:**
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Mine & Smelter Supply Co.
- Pumps—Centrifugal:**
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Pumps—Diaphragm**
The Dorr Company
- Pumps—Electric**
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Smart-Turner Machine Co.
- Pumps—Sand and Slime:**
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mine & Smelter Supply Co.
The Electric Steel & Metals Co.
The Wabi Iron Works
Smart-Turner Machine Co.
- Quarrying Machinery:**
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields, Limited
Mussens, Limited
R. T. Gilman Co.
- Rails:**
Hadfields, Limited
John J. Gartshore
R. T. Gilman & Co.
Mussens, Limited
- Railway Supplies:**
Canadian Fairbanks-Morse Co., Ltd.
- Refiners:**
Goldsmith Bros.
- Riddles:**
Hendrick Mfg. Co.
- Roofing:**
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
- Rope—Manilla:**
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
- Rope—Manilla and Jute:**
Jones & Glasco
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Allan, Whyte & Co.

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:

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

Rolls—Crushing

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

Samplers:

Fraser & Chalmers of Canada, Ltd.
 C. L. Constant Co.
 Ledoux & Co.
 Milton Hersey Co.
 Thos. Hayes & Son
 Mine & Smelter Supply Co.
 Mussels, Limited

Scales—(all kinds):

Canadian Fairbanks-Morse Co., Ltd.

Screens:

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

Screens—Cross Patent Flanged Lip:

Hendrick Mfg. Co.

Screens—Perforated Metal:

Hendrick Mfg. Co.

Screens—Shaking:

Hendrick Mfg. Co.

Screens—Revolving:

Hendrick Mfg. Co.

Scheelite:

Everitt & Co.

Separators:

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

Shaft Contractors:

Hendrick Mfg. Co.

Sheet Metal Work:

Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:

Hendrick Mfg. Co.

Shoes and Dies:

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

Shovels—Steam:

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

Ship Bunkering Equipment:

Canadian Mead-Morrison Co., Limited.

Silene:

Coniagas Reduction Co.

Saline Refiners:

Goldsmith Bros.

Smelters:

Goldsmith Bros.

Sledges:

Canada Foundries & Forgings, Ltd.

Smoke Stacks:

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

Special Machinery:

John Inglis Co., Ltd.

Spelter:

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

Sprockets:

Link-Belt Co.

Spring Coil and Clips Electric:

Canadian Steel Foundries, Ltd.

Steel Barrels:

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

Stamp Forgings:

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

Steel Castings:

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

Steel Drills:

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

Steel Drums:

Smart-Turner Machine Co.

Steel—Tool:

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

Structural Steel Work (Light):

Hendrick Mfg. Co.

Stone Breakers:

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

Sulphate of Copper:

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

Sulphate of Nickel:

The Mond Nickel Co., Ltd.

Surveying Instruments:

C. L. Berger

Switches and Switch Stand:

Canadian Steel Foundries, Ltd.
 Mussels, Limited.

Switches and Turntables:

John J. Gartshore

Tables—Concentrating:

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

Tanks:

R. T. Gilman & Co.

Tanks—Acid:

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

Tanks (Wooden):

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

Tanks—Cyanide, Etc.:

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

Tanks—Steel:

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

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Canadian Steel Foundries, Ltd.
Hadfields, Limited

Transits:
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R. T. Gilman & Co.
Northern Electric Co., Ltd.

Transmission Apparatus:
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Canadian Fairbanks-Morse Co., Ltd.

Trucks—Hand:
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Tubs:
Hadfields, Limited

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

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

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

Turbines—Water Wheel:
MacGovern & Co.

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

Twincocks:
Canada Foundries & Forgings, Ltd.

Uranium:
Everitt & Co.

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

Welding—Rod and Flux:
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Imperial Brass Mfg. Co.

Welding and Cutting—Oxy-Acetylene:
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Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
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The Wabi Iron Works

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

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

Wire Rope Fittings:
Canada Wire and Iron Goods Company.

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Greening, B. Wire Co.

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Wolfram Ore:
Everitt & Co.

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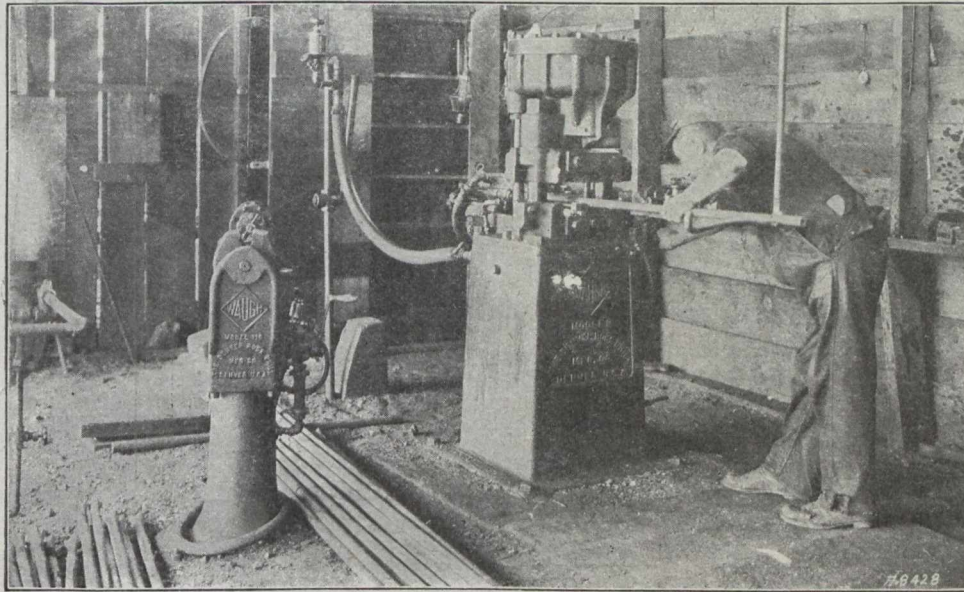
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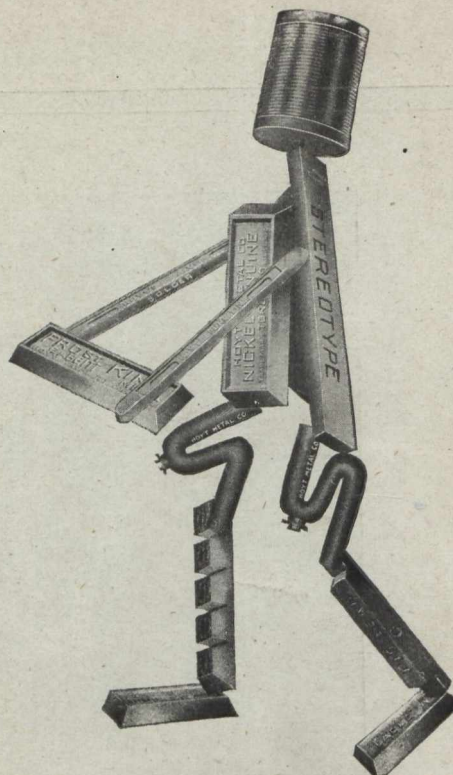
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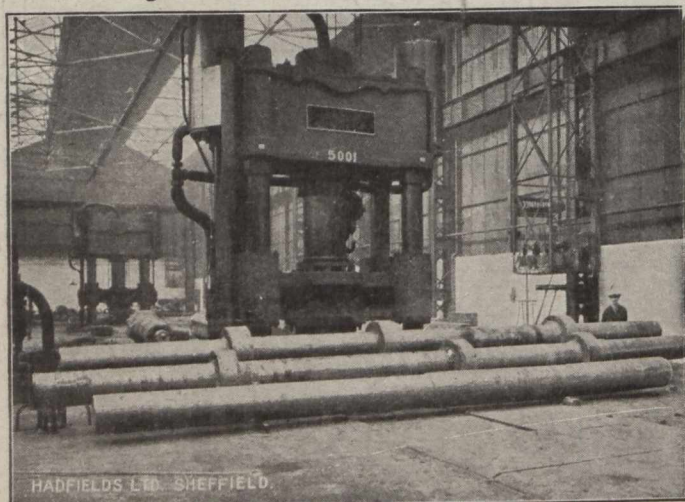
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