



CANADIAN MINING JOURNAL

VOL. XL.

January 29th, 1919

No. 4

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The record progress by months was as follows:---

May,	208 ft. (27 working days)	June,	195 ft. (26 working days)
July,	202 ft. (25 " ")	August,	205 ft. (27 " ")
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Bulletin 670-F

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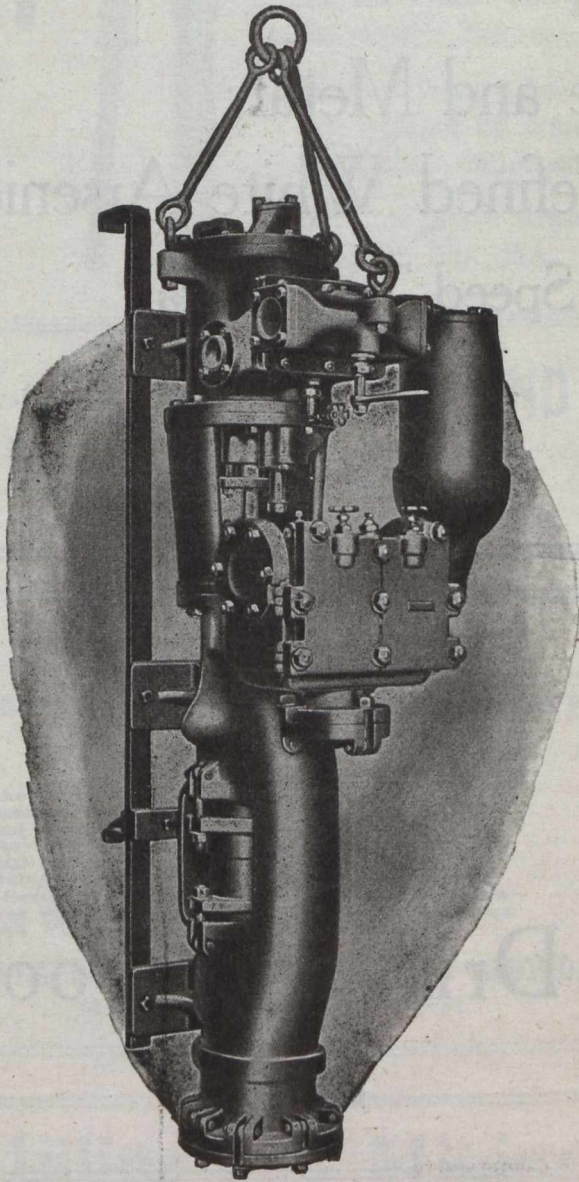
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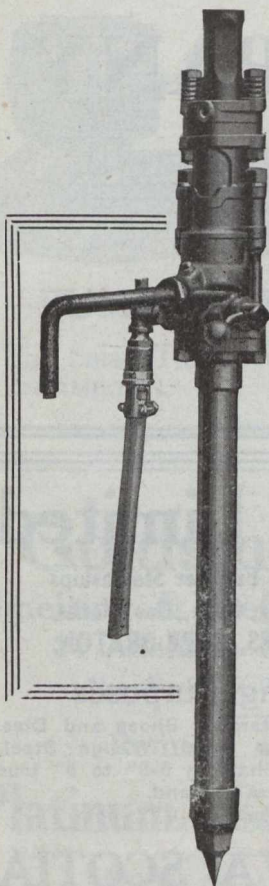
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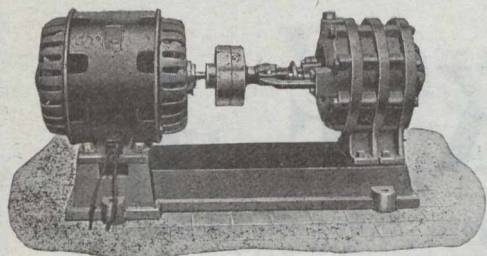


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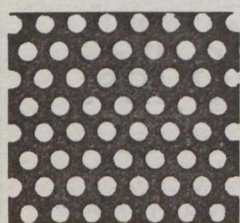
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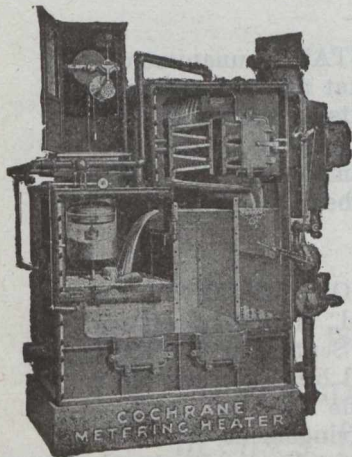
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One of the greatest factors in development of mineral areas is the provision of transportation facilities. Railways and the mining industry have together played a very important part in the development of several parts of Canada.

The Canadian Northern Railway, recently constructed across Northern and Western Ontario, has opened up for prospecting a large territory. Easy access to many promising areas is now available. Geological maps of some of these areas can be obtained from the Geological Survey, Ottawa.

The Canadian Northern Railway in Manitoba gives access to the Pas Mineral Area. In Alberta the Canadian Northern is serving important coal fields.

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THE FLOTATION PROCESS

MINERALS SEPARATION NORTH AMERICAN CORPORATION

Is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 129,819; 94,516; 96,182; 96,183; 99,743; 127,397; 129,320; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,603; 163,707; 163,936; 164,587; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603; 187,263.

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

On May 4, 1917, in the UNITED STATES DISTRICT COURT OF MONTANA, the opinion of Judge Bourquin was filed in the case of Minerals Separation Ltd., and others against Butte & Superior Mining Company, and was followed by a decree on September 17, 1917, wherein it was adjudicated that the three claims which had been limited by disclaimer were valid and infringed, and that the seven claims adjudged to be valid by the Supreme Court of the United States were infringed. The acts thereby adjudged to be infringement included the use of mixtures of petroleum oils and mineral-froth-forming oils in a total amount exceeding one per cent. on the ore, and also the use of Callow pneumatic cells.

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

On November 11, 1918, the SUPREME COURT OF THE UNITED STATES granted the petition of Minerals Separation, Ltd., and others for a Writ of Certiorari to review the decree of the United States Circuit Court of Appeals at San Francisco which had reversed so much of the decree of Judge Bourquin in the suit against Butte & Superior Mining Company as adjudged to be infringements those acts which employed oil of any kind or character used in excess of one-half of one per cent. on the ore.

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

Minerals Separation North American Corporation

Head Office:
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Engineering Office:
220 Battery Street,
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Canadian Attorneys.

Messrs. Eidout & Maybee, Patent Solicitors, 59 Yonge Street, Toronto, Canada.

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

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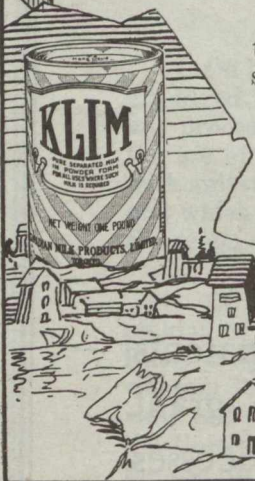
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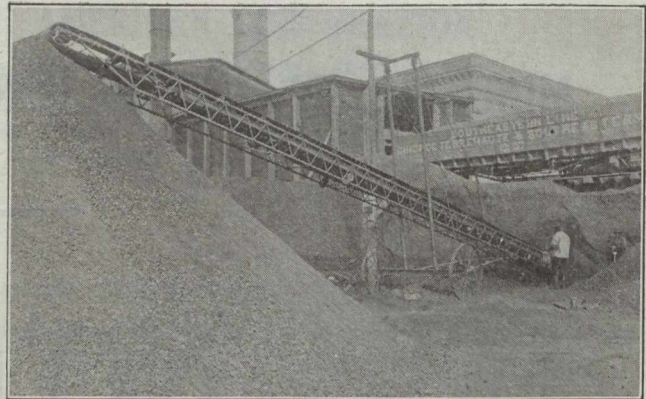
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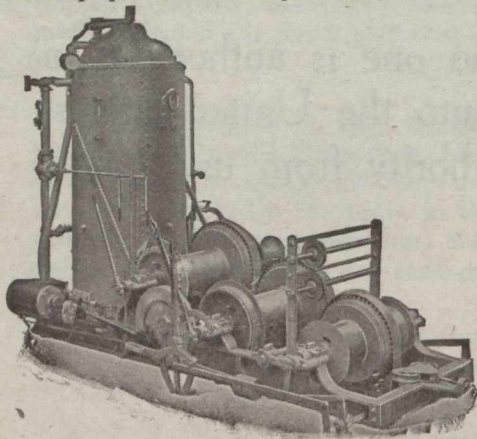
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Aggregate Value of \$595,571,107

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

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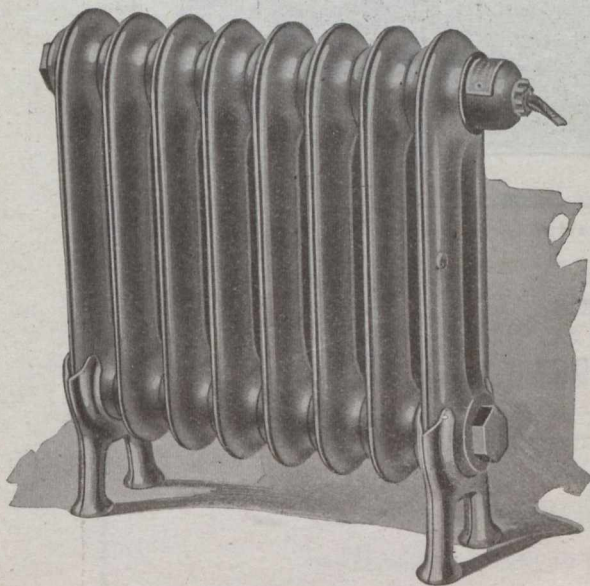
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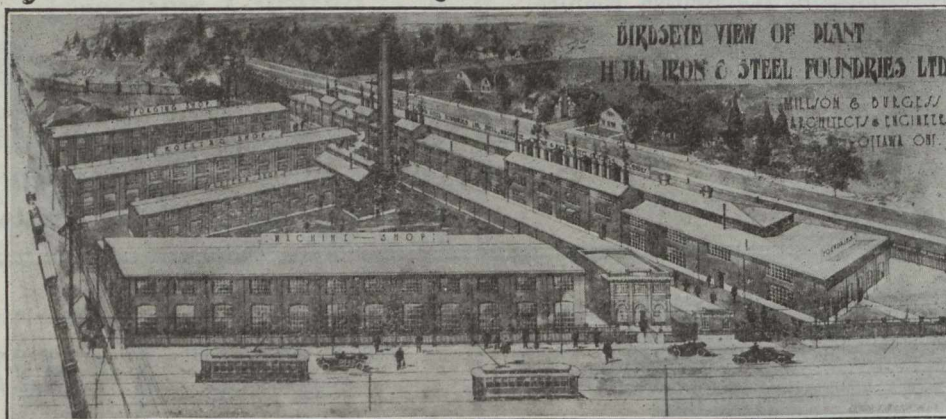
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The editor cordially invites readers to submit articles of practical interest which, on publication, will be paid for.

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VOL. XL.

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No. 4

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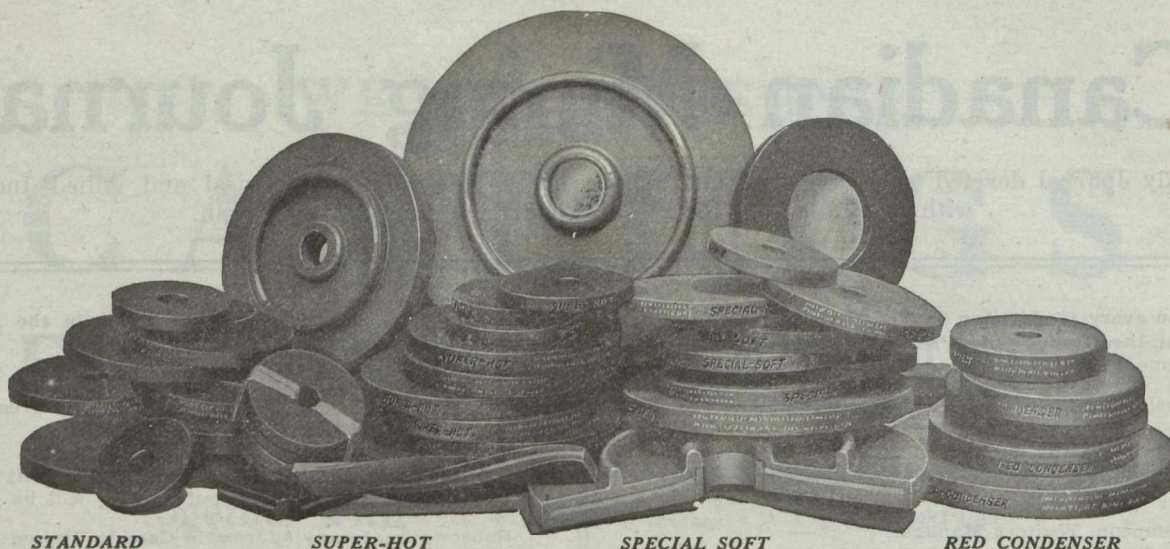
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:-: EDITORIAL :-:

THE ENGINEER AND THE CANADIAN MINING INSTITUTE.

In this issue we publish another letter on the character of the Canadian Mining Institute and the Engineering Institute of Canada. In this letter, Mr. J. A. Reid agrees with us that the former represents the mining industry while the latter represents merely a profession. He quite rightly complains of the inadequate salaries paid to engineers. He seems to be of the opinion that a purely professional society might look after the interests of its members better than does a society which represents an industry.

One of the reasons that the Engineering Institute is devoting so much attention to the status of its members is because of belated recognition of the fact that its members need to take united action in order to secure their proper position in the community. Mr. Reid evidently sees the activities of the Engineering Institute grounds for hope of securing for engineers such privileges as are enjoyed by members of the legal and medical professions.

This striving after improvement in the status of engineers by class legislation is, we believe, doomed to failure. The general interests of the country do not permit the granting of special privileges to engineers or to any other group of workers. Mining engineers who look on the Canadian Mining Institute as an instrument for obtaining privileges have, in our opinion, entirely mistaken the purpose of existence of the Institute.

While we would not like to see the Mining Institute attempt to obtain by legislation special privileges for its members, we do think that it might endeavor to look after its members in other ways. It might, for instance take an active part in looking after the welfare of its members by assuming more responsibility for their employment. A special opportunity for service to members is now before us. Men are returning from overseas and should be helped in their efforts to secure positions. If managers' willing to take on engineers would advise the secretary of their needs and all returned men would communicate with the secretary, very important assistance could be given to members who have been on war service.

Mr. Reid sees in legislation the remedy for low salaries. We cannot agree with him that the desired end is to be reached in this way. Some of the worst offenders in the paying of small salaries are those who like to be considered leaders in the profession. The remedy for unfair salaries lies with those directly

concerned. There should be more frank discussions between managers and the engineers on their staffs. There should also be more open discussion in the Mining Institute, where other leaders in the industry as well as engineers could take part. Is it not important that engineers should bring this matter to the attention of managers and directors of mining and metallurgical works and to others interested in the industry, whether such men happen to be engineers or not? Is it not actually an advantage to the engineer that one-fifth of his audience in the Canadian Mining Institute represents other sides of the industry and can be expected to come to the assistance of the engineers, if the latter present a strong case.

The advancement of the status of the mining engineer is not the chief purpose of existence of the Canadian Mining Institute. Since, however, four-fifths of the members are technically trained men and the other fifth is composed of men whose sympathies as well as interests are with the technical men, it is obvious that the Institute is able to advance the interests of mining engineers.

As expressed in our editorial of November 15th, which started the discussion, the chief purpose of the Canadian Mining Institute is to assist in the development of Canada's mineral resources. The purposes, according to the charter, are: "First, to promote the arts and sciences connected with the economical production of valuable minerals and metals, by means of meetings for the reading and discussion of technical papers, and the subsequent distribution of such information as may be gained through the medium of publications. Second, the establishment of a central reference library and a headquarters for the purpose of this organization. Third, to take concerted action upon such matters as affect the mining and metallurgical industries of the Dominion of Canada. Fourth, to encourage and promote these industries by all lawful and honorable means." The improvement of the status of mining engineers will come with more general recognition of the value of the services of engineers. They must lend their abilities to the service of the community and they must also let the public know that they are doing so. By greater service and by more publicity there will be attained better recognition. Mining engineers have in the Canadian Mining Institute a splendid medium for making themselves useful to their fellow engineers and to others in the industry. By helping one another they will make the Institute stronger. The Institute representing the in-

dustry can help mold public opinion with regard to the industry and the men in it. We do not claim that the Institute has done all it might do; but we do claim that it occupies a place in the industry, that it has important work to do, that it fills the need for a professional society without being merely a professional society, that it is aiding in securing the much desired application of science to industry, and that it provides a means for social intercourse that is of advantage to both members and the industry.

Even those who look on membership in societies as a means of advancing their own interests should see in the inclusion of non-professional members many advantages. If the engineer wishes to advise those who are directing or managing mining and metallurgical companies of needed reforms and of necessary safeguards for the good standing of the profession, the Institute offers an excellent medium for discussion. Non-professional members who put up money for mining ventures are just as keenly interested as engineers are in the status of the engineering profession. They may be counted upon to assist in the exposure of fakirs and to approve and support proposals for educating the public against spending money on properties that have not been examined and favorably reported on by competent men. We would not like to think that many men belong to the Canadian Mining Institute simply because they expect it to improve their professional status, but even these will find some value in such membership.

In our opinion mining engineers should join the Canadian Mining Institute with the object of encouraging and promoting the mining and metallurgical industries by all lawful and honorable means, as set forth in the application for the charter. By serving the industry in this way they will undoubtedly serve their own interests also, for they will profit by the work of their fellow members. Those who give much from their own experience receive much in return.

THE HAILEYBURY SCHOOL OF MINES.

In this issue we present some account of the Haileybury School of Mines. Our readers will be especially interested in this for several reasons. The provision of facilities for study, in a mining district, of mining and metallurgy is itself much to be desired. Even more important is the evidence of interest taken by mining men and by manufacturers of mining and milling machinery in the establishment of the school. These men are deserving of more credit for what they have done for the coming generation than they are likely to get. It is not an easy matter to obtain such practical interest in educational matters, as many educators well know.

With the guidance of the men who have played a large part in establishing the Haileybury School of Mines, we may confidently expect that institution to

turn out men who will be fitted not only for technical work in the mining industry, but also trained in good citizenship. These young men will soon be playing a large part in developing Northern Ontario. They will do well to remember what is now being done for them and endeavor to uphold on every occasion the honor of their school and in later years to do their part for those who follow them. The school will be known by its graduates. Those who have assisted in fitting these students for their work in the industry will measure their success by the character and ability of the graduates, and by the interest which the latter take in the school after they leave.

THE FUNCTION OF OUR SCHOOLS AND COLLEGES.

One of the leaders in the campaign for education better fitted to the needs of our citizens is Mr. C. V. Corless, of Coniston. In an address to the College and High School Department of the Ontario Educational Association last April, Mr. Corless said in part:

"It is not the main business of our schools and colleges to impart that knowledge which is mere information; nor even to cultivate, to stimulate the power of research, discovery and independent thinking—of vastly greater importance though this may be; but it is their main business, as I conceive it, to lay the foundation of, and as far as opportunity offers to build in each student who passes through them, that sound and sterling character which is manifested in all social relationships by standing foursquare to every temptation, economic or other. So far, we are probably all agreed. Where we may differ is in coming to a conclusion as to the most sane and efficient way of doing this. * * * We must regard it as the chief intellectual aim of school and college education to assist the student to acquire that vitalizing contact with, that intelligent rooting of experience in, those real things and activities of the world in which he lives, which alone stimulate and sustain real mental growth, and an intelligent inductive study of which secures best the material progress, and strengthens most the moral purposes of mankind. This alone will form a secure foundation for civilization based on justice, good-will and the acceptance of responsibility.

"Among the gravest defects of our entire general educational system at present are the paucity of actual material things brought into use as an educational medium; the assumption that real education can be acquired chiefly through a carefully graded manipulation of the symbols of knowledge; the too ready acceptance of facility in the use of these symbols as a substitute for real education and the failure to discern clearly the undemocratic evils which necessarily result from a programme and methods based on this false conception. This has resulted in inefficiency in many directions. For we must conceive the intel-

lectual aims of real education to be the acquirement of that power and eager desire which grapple quickly and intelligently with the difficulties of such original practical situations as arise in life outside the school-room; the attainment of that readiness and adaptability which quickly bring to bear on the solution of such difficulties, every available resource or experience, whether obtained personally, or through consultation with others, or from accumulated stores of recorded experience. It must develop: that originality which quickly discerns a new problem and seizes on its essential conditions; that concentration which leads to its clear statement and the rejection of irrelevant conditions; that judgment which selects with reasonable sureness the problem worth tackling and rejects the problem incapable of solution or the one likely to cause the frittering away of any unreasonable amount of time, energy or capital in effecting its solution.

"The effective cure for social ills in a democracy—inclusive of the antagonism between Capital and Labor—can be found only through an educational system that takes clear account of them; that adapts its training to meet them; that has ample resources and authority committed to it for this purpose; that accepts full responsibility for doing so; and that definitely concentrates its full resources and the best ability procurable on the problems of society. This may, and, I believe, does, mean a greatly increased scope and outlook for the work of education. This can never be accomplished by schools and colleges that work in semi-isolation from the practical affairs of the world around them. It can only arise from educational institutions having the most vital relationship to their surroundings, physical, industrial and social. Our schools should shed tradition and rise to democracy's great needs."

Mr. Corless speaks with the authority of experience as teacher and as manager of an important industrial concern. Long and earnestly he has given his attention to the problem of providing better education for the communities in which he lives. He has recently come out into a wider field, and we believe that he will draw many to his standard in the fight for educational reform.

Mine managers frequently find themselves in the position of leader of a community. They must give much attention to the housing, recreation and education of the families of their employes. They could assist Mr. Corless and his co-workers by drawing on their experience. Others can assist by making themselves familiar with the literature on the subject and by giving publicity to the suggestions which appeal to them as specially helpful. The cause is a good one and worthy of the support of the industry which claims the sage of Coniston.

MINING SOCIETY OF NOVA SCOTIA.

The annual meeting of the Mining Society of Nova Scotia will be held in New Glasgow on the 23rd and 24th of April. Arrangements will be made to visit the collieries of the Acadia Coal Company and the works of the Steel Company at Trenton, and to have a number of papers which will deal with such diversified mining matters as new methods in limestone quarrying, new discoveries in the Pietou coalfield, local manufacture of refractories and bricks by the steel companies here, oil-shale development, electricity applied to mining coal, local salt mining development, etc. A full meeting is expected, as New Glasgow is centrally located.

THE PAS BOARD OF TRADE ON LEASEHOLD SYSTEM.

At a meeting at the Pas some weeks ago the following resolution was passed:

"The Pas Board of Trade hereby resolves that the regulations now in force whereby a lease is granted for mineral properties staked under the Quartz Mining regulations should be cancelled, as being inimical to the progress of the mining industry in Manitoba, and that the freehold system formerly in force be re-established; and that a copy of this resolution be presented to the Manitoba Branch of the Canadian Mining Institute at its first meeting for further consideration."

B. C. Mine Owners Will Not Recognize Committee

That the Mine Owners Association of British Columbia will not recognize the Committee which has been authorized by the Dominion Government to investigate the question of the rates charged for ore treatment by the Consolidated Mining & Smelting Company at its Trail Smelter is the effect of a statement issued by C. F. Caldwell, president of that Association. He says:

"I am in receipt of a notice of a meeting of the Committee appointed by the Associated Boards of Trade of Eastern British Columbia, and approved by the Dominion Government to make the investigation into the smelter rates at the Trail Smelter to be held at Nelson, B.C., on January 21st.

"I, as president of the Mine Owners' Association, cannot recognize this Committee as meeting the conditions of the petition of the mine owners, circulated and signed by a majority of the mine owners, mine workers and business men of the entire Sloean District, and presented to the Dominion Government by myself in person.

"Should the mine owners appear before this committee, they would be giving their approval of this mode of investigation. When we publicly protested to both the Dominion and Provincial Governments against the committee form of investigation, believing it was brought about for the express purpose of defeating the resolution of the mine owners, which asked for the appointment of a Royal Commission, one member to be chosen by the mine owners, one by the smelter, and by the government. This would have been an investigating commission which would have brought results."

Correspondence

MANITOBANS WANT FREEHOLD SYSTEM.

To the Editor of the Canadian Mining Journal:

Sir,—In connection with the question of freehold versus leasing system for acquiring rights on mining lands, recently raised by the resolutions of The Pas Board of Trade and the Manitoba Branch of the Canadian Mining Institute, several points of view as held by those representing the mineral industry in Manitoba must be presented.

It appears that the Canadian Mining Institute placed itself on record recently as being in favor of the principle of leasehold tenure of mining claims and the case was so presented to the Dominion Government. Probably this move on the part of the parent Institute had a good deal to do with influencing the framers of the order-in-council which inaugurated the leasehold system for Dominion mining lands in the Prairie Provinces. It should be pointed out in this connection that at the time this change was considered, there was little development and few indications of immediate development of mineral wealth on these Dominion lands, and the Western Provinces, in which the scheme has been applied, had little or no representation of those interested in metal-mining, in the Canadian Mining Institute.

Since the time of the passing of the order-in-council, there has been considerable development of metal-bearing claims, particularly in Manitoba, and the many new and promising discoveries of the past few months in this Province indicate that there will be a considerable production in the near future from Dominion mining lands, providing that conditions be made favorable. At the same time there has been a growing body of mining opinion, and the Province for the first time is represented by a strong Branch of the Canadian Mining Institute.

In the older mining Provinces of British Columbia and Ontario and in most of the Eastern Provinces, there has been no strong tendency shown to follow the advice of the Canadian Mining Institute, by introducing the leasehold system of tenure, and the mining interests in Manitoba feel that they are in a disadvantageous position, having the leasehold system adopted for them while on either side the old freehold system still attains.

The question is intimately bound up with the demand of the Western Provinces for their natural resources. Had Manitobans felt sure that their resources would soon be handed over to them, the question of the system of tenure would not have been raised. If the resources are not handed over to the Province and the leasing system is retained, we have the mining industry of Manitoba placed in a ridiculous position as pointed out recently by Professor Wallace, Commissioner of Northern Manitoba:—So far the Dominion Government has not undertaken the onus of directly aiding mineral development on Dominion Lands; at the same time the Provincial Government can not be approached for aid for the simple reason that they have no interest in and no prospect of acquiring interest in and revenue from mineral production. If the old freehold system were still in force, the Provincial Government would see some prospect of getting control of the producing mineral lands, and could legitimately take a direct interest in fostering mineral production.

If the other mineral-producing Provinces were working under the leasing system, the case for Manitoba would not be so strong; but as it is, Manitobans seem to have legitimate ground for their belief that the present arrangement results in a discrimination against them, particularly in connection with the attraction of the large amounts of capital so necessary for the development of mineral resources in the present inaccessible portions of their Province.

It is the intention of the Manitoba Branch to present their case to the Canadian Mining Institute before taking any other action; and it is to be hoped that the order-in-council, to which they object, will be the object of some attention during the next session of the Dominion Parliament, unless it is intended that the Western Provinces shall assume control of their resources in the near future.

The writer, as Secretary of the Manitoba Branch, feels that it is his duty to present at least part of the Manitoba case, and to introduce a discussion, into which it is hoped some others from Manitoba and the other Prairie Provinces will enter, and from which those of other Provinces who are interested in the question, will grasp our point of view.

Yours, etc.

J. S. DeLURY,

Sec., Manitoba Branch, C.M.I.

University of Manitoba, Winnipeg,

Jan. 20th, 1919.

THE ENGINEER AND THE INSTITUTE.

To the Editor of the Canadian Mining Journal:—

Sir,—Two editorials, one of the Canadian Mining Journal (Nov. 1st 1918) and the other of the Canadian Engineer (Nov. 7, 1918), discussing the respective professional standings of the Canadian Mining Institute and the Engineering Institute of Canada have been subjected to considerable criticism in the letters of several members of the former society published in the December Bulletin of that Institute. These correspondents take the ground, that the Mining Institute as a professional body is quite on a par with the other, and moreover better fitted to represent the profession of mining engineering than the Engineering Institute, and that therefore the conclusions arrived at in the two editorials were entirely unjustified. I may say however, that I found the arguments advanced by these gentlemen quite unconvincing, and that from the standpoint of a professional mining engineer I find myself in accord with the views expressed by the two editors.

In my estimations a technical society is a body composed purely of technical men, who are banded together for their mutual interest, and the advancement of that particular branch of technology to which they belong; such an organization is comparable to the Medical Society, Bar Association, or other such purely professional body. An Industrial society on the other hand, while it may have many points of resemblance to a technical society proper, differs in being devoted to the interests of the industry as a whole instead of to those of any particular growth within it, for which reason it has a mixed membership representing different phases of the industry in question.

The Canadian Mining Institute certainly belongs to the latter class. I fail to see how, with a non-technical membership variously estimated at from 20% to 25%, to whom are open all the privileges, including election to the highest offices, it can claim to be anything else

than an industrial organization. [Associate members, of the Canadian Mining Institute are entitled to vote but not to hold office—Ed.]

The Engineering Institute of Canada, on the contrary, is a purely professional institution. Only engineers compose its active membership and direct its activities. Until recently it was mainly a civil engineering society, but of late it has broadened its charter and endeavored to enlarge the scope of its functions, so it would be well for mining engineers to consider what advantages they might derive from its membership.

It is an unfortunate fact that the technical professions, including the various branches of engineering, are very poorly paid. The graduate of a school of applied science of several years experience, receives a salary hardly on a par with the wage of a mechanic, or the stipend of a clerk. Of this then is abundant proof. I need only refer to the statements of Mr. A. A. Cole, past president of the Canadian Mining Institute, relative to the salaries offered to applicants for legal and technical positions in the Civil Service of Canada. In the first case, the salary was \$3,300 per annum and the requirements such that they could easily be fulfilled by any mediocre lawyer, while in the second, the salary was \$1,600 per annum, and the applicants had to show qualifications practically equivalent to a Ph.D. degree in science. Recently a still more flagrant example has come to my attention. I was shown a circular letter from the Civil Service commission dated Nov. 21st 1918 in which three positions are advertised.

(1) A secretarial clerk at an initial salary of \$1,800 per annum.

(2) A female clerk for the Department of Labor at an initial salary of \$1,600 per annum.

(3) An assistant engineer for the B.C. Hydrometric survey who must be a university graduate with two years field and office experience at an initial salary of \$1,500 per annum.

These facts speak louder than words of the esteem in which the engineering and technical professions are held in Canada.

As to the profession of mining engineering in particular, what do we find? Not only are the salaries paid to the bulk of its members on a par with that above set forth, but in addition, it is infested with charlatans and impostors who practice their knaveries without let or hindrance on the part of the law, to the great detriment of the fair name of the profession.

In my mind there is only one remedy for this state of affairs, and that is, the formation of a strong professional organization which will take the needed legal steps to secure the interests of its members, and which will give them a professional standing equal to that of the legal and medical professions. The Engineering Institute of Canada does in great measure fulfill the requirements as above set forth; it is purely a professional body and it has made efforts to obtain the legal protection of its members, with some degree of success, as witness the Quebec and Manitoba acts relating to civil engineers. As mentioned above, this society has now broadened the scope of its activities and is attempting to secure the affiliation of allied branches of engineering. If it is successful in this endeavor there is no doubt that an effort will be made to revise the status of the engineering profession in Canada and likewise to give a much needed legal protection to its members.

In the Canadian Mining Institute I believe that an

effort is being made to make a distinction between the technical and non-technical members. Personally however I am doubtful of the success of this measure, as it will probably provoke the opposition of the influential non-technical section, who will likely regard it as an attempt to bar them from full participation in the privileges of the Institute. Even if successful, it still remains doubtful whether the professional members will gain much prestige thereby. The institution as a whole will still retain its original character in the public mind, so that differentiation between technical and non-technical members will be difficult for outsiders; considering the matter therefore, from the standpoint of the professional mining engineer, let us consider the relative advantages offered by the two societies.

The Engineering Institute is a clear cut professional organization, devoted primarily to the interests of its members and not connected with any particular trade or industry.

The Canadian Mining Institute on the other hand is somewhat different in its aims, being essentially devoted to the development of the mining industry, and hence not concerned with the interests of its members except in so far as they affect the status of the industry.

In view of these facts it is obvious that the claims of the former society deserve a prior consideration over those of the latter, so much so, in fact, that it is difficult to conceive how anyone, regarding the matter from a professional view point, can think otherwise.

Finally, I think that there is abundant room for the two societies to flourish without interfering with each other's development; the mining engineer, undoubtedly, will find it to his advantage to belong to both organizations, to the Engineering Institute, to protect and improve his professional standing, and to the Canadian Mining Institute to keep in touch with the development of his calling.

Your, etc.,

J. A. REID.

Cobalt, Jan. 17th, 1919.

Canadian Collieries Planning to Open More Mines.

Considerable interest is taken by coal mine operators of British Columbia in the announcement attributed to local officials of the Canadian Collieries (D) Ltd. that plans are being prepared by the company for the opening of new mines on the Island and generally extending operations. On January 6th a meeting of the Directors was held at Montreal when the resignations of Sir William Mackenzie as president and Sir Donald Mann, as a director, were received, their places being taken, respectively, by Mr. H. S. Fleming, of No. 1, Broadway, New York, and Mr. F. Perry, of Montreal.

Regulation of Coal Mining in Alberta.

At a meeting of the Federation of Labor of the Province of Alberta held at Medicine Hat, Alberta, on January 10th, several suggestions affecting the regulation of coal mining in that Province were endorsed which, if put in the form of legislation and enforced, will radically alter the present conditions. One provides for the compulsory use of electric safety lamps; another, that mine inspectors shall be elected and be subject to recall; and a third that a 6-hour day shall be granted to all underground workers.

Dr. Stansfield's Report on Electric Smelting of B. C. Iron Ores

"The Commercial Feasibility of the Electric Smelting of Iron Ores in British Columbia" is the subject of a report recently completed by Dr. Alfred Stansfield, Professor of Metallurgy at McGill University, and Consulting Metallurgist, Montreal, who is acknowledged to be one of the foremost of America's authorities in this line of industrial endeavor.

The report is lengthy, dealing with the matter from all angles in a very exhaustive and detailed manner. Its conclusions, summarized, are that the problem is perfectly feasible from a metallurgical point of view, that British Columbia has a sufficient supply of ores of a quality well suited to the process and capable of being converted into a high quality of iron or steel, and that there also are available all requisite fluxes, etc., wherewith to carry out the process completely. But two difficulties are made clear. That which is most emphasized is the question of the cost of electric power under existing conditions. Dr. Stansfield finds that, with power at the rates which he was quoted by the largest companies of the Province, the profitable production of pig iron by means of electric smelting would not be feasible. He deals, too, at some length with the market and the impression given by his observations is that the immediate local, and the demand likely to be evidenced from outside within a measurable period, are not sufficient to justify the establishment of a large plant of the character under discussion.

In this connection a few remarks by Dr. Stansfield in introducing his report are apropos. He says:

"Early in the investigation it appeared that electric power might be obtained at such a price that electric smelting by the methods now in use would be commercially possible. I, therefore, investigated and discussed carefully the type of furnace and design of plant that would best suit the local requirements, and prepared estimates for the cost of such a plant and of making pig iron on a scale determined by the present requirements of the Province. It now appears that electric power cannot, at present, be obtained at prices that will permit of the use of the usual electric smelting methods; but I am presenting the results of my investigation along these lines because they are needed to show that the process described would be too costly at this higher price, and because it is possible that, in the future, power may be available at a lower price, which would then permit of operations being undertaken. In view of the very high price asked for electric power I have paid special attention to a new process for producing electric furnace iron which offers possibilities of a decided economy as compared with standard methods."

After dealing generally with electric smelting, Dr. Stansfield, having pointed out that it is a process which has passed the experimental stage being in operation commercially on a large scale in Sweden and elsewhere, explains that the pig iron normally produced by the standard electric furnace is unusually pure and unsuitable for use in the iron foundry. He adds: "The officials of the Swedish Company con-

sider that a foundry iron can be made by these furnaces, though at somewhat higher cost, but I have no evidence that this has been accomplished in regular commercial practice, and the Noble Electric Steel company, which smelted iron ores electrically for several years at Heroult in California, was obliged to adopt a different type of furnace for the production of foundry iron. I consider, however, that the Electro-Metals furnace could be used for this purpose because any low silicon iron could be made suitable for foundry use by additions of ferro silicon —."

The essential conditions for the electric smelting of iron ores on a commercial scale are said to be—a supply of high grade ores at a reasonable price, an ample supply of cheap electric power, a supply of charcoal or other fuel at a moderate price, a supply of labor at a moderate price, a suitable location for the smelting plant and a suitable market for the resulting iron at a rather high price.

Dealing with his subject under these headings the writer says of the iron ores of British Columbia that they have not been opened to any extent, but that it may be safely assumed that there are "adequate supplies of ore of reasonable richness and purity at easily accessible points. These ores are chiefly magnetites, and on this account, are undesirable for use in the blast furnace, except in admixture with other ores. Magnetites are, however, quite suitable for treatment in the electric furnace. It appears that the ores are not of very high grade, but that a supply may be expected to contain from 50 to 55 per cent of iron. The ores are practically free from phosphorus and titanium, and the proportion of sulphur can probably be kept as low as 0.1 per cent. The ores under consideration are also practically free from copper. Your officials estimate that a supply of 50,000 tons per annum of ore of this grade can be delivered at a suitable smelter site, at a cost, under present conditions, of about \$4.00 per net ton, which would be made up as follows:

Mining	\$1.50 to \$2.00
Loading or tramping	0.15 to 0.25
Freight (by water)	1.00 to 1.50
Unloading	25 cents
Royalty to owner	50 cents

Total cost at smelter \$3.96 to \$4.10

"From the information at my disposal I am satisfied that these ores can be smelted electrically for the production of a high grade pig iron. For the production of one long ton of pig iron about 2.0 net tons of 55 per cent ore would be needed, so that the ore would cost \$8.00 per long ton of pig iron. In view of the somewhat low grade of the ore, the cost of smelting per ton of product, will be somewhat higher than is usual with the Swedish ores, but this may perhaps be remedied by the use of magnetic concentration."

Referring to the question of power, Dr. Stansfield says: "British Columbia is well supplied with water powers, and many of these can be developed cheaply for the use of electric smelting and similar industries. Competent engineers have assured me that some of these

powers in accessible locations can be developed at such a cost as to yield a continuous electrical horse-power for smelting at a cost of \$10 per annum. This figure is not much higher than obtains in Sweden and if a dependable supply of power can be secured at this rate it seems almost certain that an electric smelting industry can be undertaken profitably. The consumption of power, under conditions obtaining in British Columbia, would be between 0.4 and 0.5 of a horse-power-year per ton of iron produced; so that the cost for power should be between \$4.00 and \$5.00 per long ton of pig iron. Some 8,000 or 9,000 horse-power would be needed for a daily production of 50 tons of pig iron. In view of the desirability of producing pig iron at the earliest possible time, and of the difficulty and expense attending the development of water powers under present conditions, it is highly desirable, if not imperative, that an electric smelting industry shall be supplied, in the first place, from powers that are already developed."

The writer then explains that the B.C. Electric Ry. Co. has surplus power, that when in the Province its management stated that it possibly could be delivered at \$15.00 per horse-power-year, but since he had been informed that the charge would have to be \$27.80 per horse-power-year, which would represent a charge of from \$11.00 to \$14.00 per ton of iron. The latter would be the rate on the British Columbia Mainland, but on the Island 2,000 k.w. of power would be available for a short period, and subject to peak load restriction, at \$15.00 per horse-power-year. The increase, it is maintained, makes it altogether too high to allow of commercial production of pig iron by present methods at or near Vancouver City. As to Vancouver Island it is stated that its supply, "besides its uncertainty, is too small to permit of profitable operation."

In discussing the necessity of having supplies of charcoal and coke for reduction, Dr. Stansfield states that "the consumption of charcoal varies with the grade of iron required, and the type of furnace employed, from about 0.4 to 0.5 net tons of charcoal per long ton of pig iron, so that 20 to 25 tons of charcoal would be needed daily for an output of 50 tons of pig." He adds that, while there is no considerable charcoal industry at present, there is in the coast districts of British Columbia an abundant supply of timber from which charcoal can be made suitable for use in electric smelting. In view of the large amount of wood waste produced at some of the large mills it is thought reasonable that a well designed charring plant could be erected "that would utilize this waste material and deliver charcoal to the smelter at a cost of from \$6.00 to \$8.00 per net ton; estimated on the following basis:

2½ cords of Douglas Fir mill waste.....	\$2.50
Cost of charring, less returns for by-products..	2.50
Carriage of charcoal to smelter	1.00
	\$6.00

The charge per ton of iron would thus be between \$2.40 and \$4.00.

It is pointed out that Douglas Fir, which would probably constitute the staple supply for charcoal making, "does not furnish by-products of suitable quality and quantity to warrant the use of elaborate methods for their recovery," but the opinion is expressed that by making the charcoal "in large kilns, or in some appliance which might be devised to char the wood waste with the minimum amount of hand labour" a partial recovery of by-products could be made at moderate expense. It also is asserted in this connection that as coke

cannot be produced from British Columbia coals as cheap as charcoal can be made, it would be more economical to use the latter.

Dr. Stansfield's investigations have led him to the conclusion that the cost of labor might be from \$4 to \$5 per ton of iron, although in the initial stages of the industry it might run as high as \$7 per ton of iron. As to the location of a smelter plant he says that it should be conveniently situated with respect to the supplies of ore, charcoal and other requirements and should also permit of the cheap delivery of the iron and other products to the market. He also emphasizes the importance of having it located close to the source of electric power, so as to lessen the cost of transmission. With reference to the market it is stated that the consumption of pig iron in British Columbia now is only about 10 tons daily. It is suggested that with more moderate prices this consumption might be raised to 20 or 30 tons daily. As this would be too small to permit of economical commercial operation it is recommended that, if a suitable supply of electric power can be obtained, a plant be constructed to produce say 25 tons daily of foundry iron for sale and a further 25 to 30 tons of low silicon iron for conversion into steel.

Under the heading "Foreign Competition" reference is made to the possibility of an iron blast furnace being established on the Pacific Coast of the United States. It is estimated that pig iron could be made in such a plant under present conditions at a cost of about \$25 per long ton. On this point it is added that "the duty on pig iron entering Canada from the States is \$2.80 per ton plus 7½ per cent ad valorem which, at the sale price of \$30.00 per ton, would amount to \$2.25 per long ton, or a total charge of about \$5.00. This duty, together with the freight charge and the Canadian bounty, would place the electric furnace iron, if made with \$15 power, on an equality with the imported blast furnace iron. "The report continues: "In this connection it may be added that a large iron and steel plant can scarcely be built until some years after the war, so that an electric furnace plant, if constructed promptly, would command the market for a number of years. Ultimately, blast furnace iron may be expected to take a part at least of the market for common grades of iron, but the electric furnace should always be able to command a small market for its higher grade of iron."

Mention is made to the action taken by the Dominion Government recently for the encouragement of the industry in the Canadian West, which consists of the guarantee for a period of three years of the purchase of any surplus production "at the market price at the time." Dr. Stansfield's observations on this point are interesting. He says: "This agreement will no doubt apply equally to electric furnace iron, but it does not appear to me that it is likely to help matters materially, for the following reasons: 1. The offer is obviously of no use if the price referred to is that obtaining in Eastern Canada, as iron could not be made at that price. 2. If the price intended is the local price in British Columbia we are met with the difficulty that the Government's ability to carry out the undertaking would be limited to the local demand for iron, as it would be impossible for it to buy expensive iron in British Columbia and ship it to lower priced markets elsewhere. We are thus limited to the natural market for iron and steel in British Columbia and to possibilities for exportation on a small scale. Commenting on the action of the Provincial Government in respect of placing a bounty on the production of pig iron within the Province the wri-

ter states: "The Provincial Government has offered a bounty of \$3 per net ton of pig iron made in British Columbia from local ores and on the other hand imposes a tax of 37½ cents per net ton of ore mined. The combined effect of these measures will be a payment of about \$2.60 per gross ton of pig iron; a source of income which will be of some importance, and may sometimes make the difference between working at a loss and at a profit."

Touching on the type of furnace which should be adopted the following conclusions are reached:

"(1) If a permanent smelting plant were being erected, the Swedish type of furnace would be selected, because it is more economical than any other at present in use, and is the only one that has been employed commercially.

"(2) If a temporary plant is contemplated it may be better to install the open pit furnace, on account of its smaller first cost, and the ease with which it could be converted to other uses.

"(3) Information should be obtained with regard to the iron ore reduction process of Trood and Darrah, as this may prove superior to any direct smelting process. If this process is likely to be available, it will be best in the meantime to use a simple pit furnace, rather than to install the more elaborate Swedish furnace."

As to cost of production it is stated that a simple plant, assumed for purposes of calculation only, would consist of three electric furnaces of 3,000 K.W. each, producing altogether about 80 tons of pig iron daily, and would cost from \$350,000 to \$400,000 to erect in British Columbia.

The cost of making a long ton of foundry pig iron in such a plant would be estimated as follows, assuming that power can be obtained at \$15.00 per horse-power-year:

Iron ore, 2.0 net tons at \$4.00	\$8.00
Electric power, 0.45 h.p. year at \$15.00	6.75
Charcoal, 0.4 net tons at \$8.00	3.20
Electrodes, 15 lbs. at 8 cents	1.20
Repairs and maintenance	1.00
Labour	4.50
Management	2.00
Interest, 6 per cent on total capital, and depreciation, 10 per cent on cost of plant	2.60
Royalty to Electric-Metals Company	0.50
	\$29.75

A further table is given showing that, with 0.5 cent power the cost per ton of pig iron would be \$40.50.

Dr. Stansfield refers to a new process by which granulated oxidised ores mixed with carbon are roasted in a fuel-fired furnace and thus reduced to the metallic state. This reduced metallic sand is then melted in an electric furnace at an expenditure of 1-3 of the electric power required to both reduce and melt the ore in the electric furnace. This process, it is pointed out, seems to offer possibilities to electric smelting that are now lacking. The process, however, is only in the experimental stage, and is not available at present, but may in the future bring electric smelting of British Columbia iron ores within commercial reach.

In his general conclusions Dr. Stansfield again outlines the general requirements for a successful industry; dwells on the importance of the price of power which is higher, as quoted by the company having the largest supply of unused power than the industry could bear; and asserts that "in view of the small demand for pig iron in British Columbia it would be almost essential, if a

smelting plant is to be established on an economic basis, that additional products should be turned out. Steel for castings and small rolled sections, and ferro alloys such as ferro manganese, ferro chrome and ferro silicon, could be made suitably in such a plant. These additional products would permit of more economical operation, would enable larger profits to be made, and would allow the plant to continue in profitable operation if, at any time, the price of pig iron were to fall below the cost of production.

Finally the following recommendations are submitted:

(a) To develop one or more of the best iron ore deposits and to make complete tests of the ore.

(b) To reserve a suitable water power for future development.

(c) To establish a plant for the economic production of charcoal from mill waste.

(d) To investigate the new process for the production of electric pig iron, and if this is found satisfactory to begin immediately to produce the pig iron; purchasing power for this purpose until the water power can be developed.

Prof. Stansfield was commissioned by the Hon. Wm. Sloan, Minister of Mines in the British Columbia Government, to investigate the conditions in this Province with respect to the electric smelting of its iron ores and to make the report thereon of which the foregoing is a brief summary. It is accepted as a clear exposition of the problem facing those ambitions to see the natural magnetite resources of the Canadian West exploited and, besides furnishing the Provincial Administration with valuable information for its guidance in the consideration of its policy towards this phase of industrial development, is expected to be of material help to private interests which have been considering the possibilities of an Iron and Steel Industry in the Northwest.

COAL MINE OPERATIONS IN WESTERN BRITISH COLUMBIA.

Discussing the coal mine operations in the western section of British Columbia, which includes Vancouver Island, during the year 1918, Mr. W. M. Brewer, Resident Government Engineer, states that there has been no abnormal progress, but that the advance has been steady despite the difficulty of obtaining capital and labor as well as the set-back sustained by the influenza plague. "Wages", he says "paid to all classes of miners have advanced steadily during the year and to such an extent that many coal miners are receiving as much as \$10.00 per day and upwards, and the minimum wage, since the last increase made on November 1, is about \$5.00 a day." He observes that there have been no labor troubles resulting in strikes in his district, although such were threatened, "but the questions in dispute were settled by conferences in which the employers, employees and Government officials participated." Continuing he states that "prospecting for coal has been carried out at the following localities: Near Chase River (Vancouver Island) by the Canadian Western Fuel Co., Ltd., on the Company's farm, Five Acres District, West Nanaimo, where the Wakesiah Mine is opened; near Craig's station on the Alberni extension of the E. & N. Ry. Co. by the Canadian Collieries (D) Ltd.; also at Wellington by the same Company, as well as by Mr. H. Shepherd and associates, of Nanaimo. The last mentioned drilling was done in the expectation of locating the old Well-

ington seam at a point where it had not previously been worked, and as the operations were suspended by both outfits, it is presumed that the results were not satisfactory. Near the mouth of Chemainus River some foreshore leases were acquired by Messrs. H. W. Treat and associates, of Seattle Wn., and drilling was commenced at this point in December, 1918. A new discovery of coal outcroppings was made last Summer on the land of the Canadian Collieries (D) Ltd., on the Tsa-Abl River (sometimes called the Baynes Sound River) at a point about five miles up the river from its mouth. The company is opening up a road into the district in order to haul in and instal a diamond drilling plant to prospect the field this year." In the course of an enumeration of new mines which have been opened in the past twelve months and outlining new work done on old properties Mr. Brewer states that the Canadian Western Fuel Co. on the Wakesiah Mine has sunk an air shaft to coal on the Wellington Seam and connection has been made with the main shaft which reached coal at a depth of about 325 feet. The development of the property is proceeding and it is expected that an output of 500 tons of coal per day will be reached by about the middle of 1919. The estimated cost of the plant, railway connecting the mine with wharves and bunkers on the water front at Nanaimo, as well as initial development, is approximately \$200,000. The new Mine of the Granby Consolidated Mining & Smelting Company at Cassidy's, Vancouver Island, which now has been opened by three slopes and is producing is not expected to be fully equipped with the plant proposed for about one and one half years. The estimated cost of the completed plant, including railway connection with the E. & N. Ry., coal washer, houses for staff, miners and workmen is approximately \$1,000,000, when the capacity of the plant will reach about a quarter of a million tons of coal per annum. The maximum thickness of the seam is 12 ft.

The Granby Company, which has laid plans for a community at Cassidy's which in their provision for the housing of the workers will be the last word, has taken over direct supervision of the building from the new defunct Taylor Engineering Company. Many houses have been completed and in a few weeks twenty-five more will be finished, all of which are being modernly fitted. It is understood that about sixty others are to be constructed during the coming season as well as providing reading and recreation and pool rooms for the diversion of the employees. Dealing with development work on old properties Mr. Brewer states that the Canadian Western Fuel Company installed a new power engine (1,300 Killowatt D.C. generator) at the No. I. Esplanada Mine to replace the generator formerly in use. At the Harewood Mine the same company installed the following additions to the former plant: 1,200 Killowatt generator, two 150 h.p. boilers, and a new screening plant. The total estimated cost of these improvements is about \$42,000. The Canadian Collieries (D) Ltd. carried on the following improvements at the No. 4 Mine, Cumberland, in the Comox District: Driven a new tunnel, the mouth of which is 15 feet higher than the entrance to the old slopes. The new tunnel is being driven directly over the old slopes and when completed will cut out the use of tail ropes to haul empties back from long flat from top of those slopes. A new tippie is being built at the same mine, with a Marcus screen installed in the tippie. The capacity of the plant is about 1,000 tons a day.

PRODUCTION OF COAL IN CANADA 1918.

The Department of Mines estimates the production of coal in Canada during 1918 upon the basis of monthly reports as approximately 15,180,000 short tons which was not only greater than production in 1917 by 1,133,000 tons, but was the largest production that has been obtained in Canada in any one year. The increased output of coal, however, has been derived almost entirely from the increased production in the Western Provinces, particularly Alberta. In Eastern Canada the production in the Province of Nova Scotia in 1918 was less than that of the previous year by about 337,000 tons and was the smallest production obtained in this Province since 1909. New Brunswick reached a higher production than in any previous year with an increase of 76,000 tons over a production in 1917. In Western Canada the Province of Saskatchewan appears to have produced about 30,000 tons less than in 1917, while the increased production in Alberta was about 1,263,000 tons and in British Columbia 166,000 tons.

The production of 1917 and the estimated production in 1918 representing the actual amount of coal marketed or used and not including waste, slack, or unmarketable coal, are shown by Provinces herewith:

Coal Production in Canada.		
	1917.	1918.
	Short tons	Short tons.
Nova Scotia	6,327,091	5,990,000
New Brunswick	189,095	265,000
Saskatchewan	355,445	325,000
Alberta	4,736,368	6,000,000
British Columbia	2,433,888	2,600,000
Yukon	4,872
	<hr/>	<hr/>
	14,046,759	15,180,000

DEVELOPMENTS IN THE RICE LAKE DISTRICT, MANITOBA.

Since the discovery a few years ago of the Rice Lake gold-bearing area to the eastward of the southern part of Lake Winnipeg, the area has been considerably widened by the finding of gold in promising quantities in several adjacent areas. For a time the centre of chief interest, and still receiving a good deal of attention, is the area lying between Gold Lake and Clearwater Lake. The gold-bearing belt was found to extend still further to the east by the discoveries made in the Long Lake field. The latest discoveries meriting prominent attention lie in a northerly direction from the original Rice Lake area, to the north of the Hole River and in the vicinity of Hay Lake.

It will be well to follow custom and designate the whole gold-bearing field in this vicinity as the Rice Lake District and to indicate the particular fields in the order of their discovery and development:—(1) The Rice Lake Area; (2) The Gold Lake Area; (3) The Long Lake Area and (4) The Hay Lake Area.

During the past year, beyond some prospecting and assessment work, little has been done in the Rice Lake and Long Lake portions of the district.

On the Gold Pan claim, lying between Clearwater and Gold Lakes, development work on a small scale has been going on almost continuously. A shaft has been sunk to a depth of over 220 feet, and several short drifts have been run. It may be recalled that in an early stage of development some extraordinarily rich ore was encountered in the Gold Pan shaft. High-grade ore has been met in other parts of the shaft, and

in some of the drifts, while from the lowest part of the shaft as recently developed, come some very rich specimens.

The Provincial Government has an engineer engaged with a force of men in joining up the terminus of a winter road, constructed last year, between Fort Alexander and Gold Lake, with the Long Lake District.

Great interest has been shown recently in the developments on the Lulea Group of claims in the Hay Lake area, north of Hole River. The discovery was made by C. Andrews and for some time the claims were held by him and E. W. Jackson, of Winnipeg. Messrs. E. McDonald and C. M. Clark secured a controlling interest in the properties, which are held and operated by the Bellevue Mining Company.

The vein on the Lulea group is a quartz vein occupying a shear zone and carrying values in free gold and sulphides. Its width and length (from a few feet to twelve or more feet, and traceable across two or more claims) taken into consideration with the results of milling tests on sampled small-lots of ore, indicate that there is a sufficient quantity of good quality ore to warrant the considerable expenditure which the Bellevue Mining Company is making on the property.

Last winter an attempt was made by the operators to have some machinery taken into the district before the spring thaw; in this they were unsuccessful as the roads softened very early in the season. This machinery, consisting of a ten-stamp battery, an air-compressor and boiler, together with some supplies which were also stalled at Manigotagan last season, have been moved already to their claims.

As reported in the Winnipeg Free Press: "Forty-seven thousand feet of lumber has reached Manigotagan, as well as 25 tons of mining machinery purchased in the East. Another ten-stamp battery complete, together with some 150 tons of other machinery and fittings are now on the cars bound for Riverton, and will be rushed to the property.

"Everything will be run by electricity taken from the Winnipeg City Power Plant at Point du Bois." The Free Press also gives the information that there is a force of twenty-nine men working on the property and that the main shaft is down to a depth of 60 feet.

LIMESTONE FROM WINNIPEGOSIS.

Below is an average of three analyses of the high-grade limestone now being quarried near Winnipegosis by the Manitoba Gypsum Company for use in their manufacturing plant in Winnipeg:

	per cent.
Silica	0.41
Ferrie Oxide	0.11
Alumina	0.20
Magnesium carbonate	0.66
Calcium carbonate	98.25
<hr/>	
Total	99.63

SODIUM SULPHATE IN SOUTHWESTERN SASKATCHEWAN.

Winnipeg manufacturers are turning their attention to deposits of sodium sulphate occurring in Southwestern Saskatchewan. During the past year considerable interest has been taken in the search for potash deposits throughout the Prairie Provinces. Potash, as would be expected, has been found in many places but

the low grade and relatively small quantity of these deposits make them at the present time look very doubtful as possible producers of potash salts. More abundant appears to be sodium sulphate and your correspondent is advised that important deposits of this salt with quality and quantity reasonably assured have been located in Southwestern Saskatchewan. There is a demand for this product in the pulpwood and glass industries. The former industry has been well established in Central and Western Canada and the latter may yet be an established industry in Manitoba when it is recalled that there are large deposits of glass sand available in the vicinity of Lake Winnipeg.

PRODUCING GYPSUM IN MANITOBA.

The Manitoba Gypsum Company, operating at Gypsumville and Winnipeg, has secured a considerable acreage on the shore of Lake Winnipegosis about six miles from the town of that name. The area is underlain by a high-grade limestone carrying 98.2 per cent. of calcium carbonate together with small quantities of magnesium carbonate and argillaceous materials. It is the intention of the company to ship 1,000 tons of this material to Winnipeg during the coming year to be used in the manufacture of plaster, the Manitoba Gypsum Company being a large producer of a considerable variety of lime and gypsum plasters. The use of this raw material from a Manitoba locality is of special interest as hitherto the material which this production will replace, was imported.

Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Company for the first week of 1919 aggregated 7,736.

Sales of Crown Granted Mineral Claims, which are in respect of taxes, are being advertised in different sections of British Columbia. Since the outbreak of the War the regulations in regard to Provincial dues have not been very rigorously applied, but from now on the authorities are likely to demand strict compliance with the laws. This, of course, does not mean that the terms of the Allied Forces Exemption Act, which protects soldiers, sailors and their relatives while the former are on active service, are to be cancelled or in any way disregarded.

Kiteltas Mountain Copper Co.

A. J. Thompson, manager of the Kiteltas Mountain Copper Co., of Usk, B. C., is visiting Portland, Ore., to spend the holidays and to take up with members of the company plans for further development work in the opening up of the property. Discussing the results of the season's operations and the indications, Mr. Thompson stated that there was a splendid surface showing and that, as far as work has been carried, the outlook was promising. The ore is bornite containing copper, silver and gold and the veins, of which there were six, carried some free gold. To handle the latter it would be necessary to instal a mill and it was likely that this would be done before long. Four of the veins referred to were clearly shown on the surface. On driving a tunnel two others were cut which looked just as good. Five hundred feet of tunnelling has been done, including drifts. The original No. 1 vein had been cut, but did not show any great results. Drifting is being continued. A small shipment of ore had been made to the Tacoma Smelter and the results of its treatment would be waited with interest.

Special Correspondence

3 Grand Forks Furnaces in Operation.

Three furnaces now are in operation at the Grand Forks Smelter of the Granby Consolidated Mining & Smelting Company, and Superintendent Campbell expects that the Granby mines at Phoenix, B.C., will be able to ship sufficient ore to keep this number in operation continuously. It is stated that the fourth furnace may be "blown in" if ore shipping prospects warrant it. There is a supply of coke on hand and en route to meet the needs for a couple of months at least. Mr. Wakely A. Williams, superintendent of smelters for the Granby Company, who is responsible for the foregoing, also said that there was no immediate need of apprehension that the Grand Forks plant would be forced to close down. The price of copper, undoubtedly, would have an important bearing on the operation of Granby properties, and it might be necessary for production to be curtailed.

Queen Bess Mill Nearly Ready.

Mr. O. A. Thomas, manager of the Queen Bess Mining Company, reports that the concentrator being installed at that property is almost ready for operation. During the past eight months some \$50,000 worth of machinery has been purchased in order to provide adequate equipment for the mine. The Queen Bess is a silver-lead-zinc proposition which was located in 1895 and which until a short time ago lay dormant. The steady development which has proceeded for the past two years has given the company a considerable ore reserve. A shaft sunk to a depth of 300 ft., Mr. Thomas says, proves the permanence of the ore bodies of the district.

The total ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada for the week from November 15th to November 21st inclusive, were 5,373 tons, making the year's total up to the latter date 294,922 tons.

Potash From Cement Plants.

At the request of the War Trade Board an investigation into the possibility of recovery of potash salts from the waste flue gas of cement plants is being undertaken in Canada. In the past Canada has produced small quantities of materials containing potash, not in any way meeting her demand for this valuable fertilizer, and it is thought likely that the by-saving what is wasted in the operation of cement plants the country may make at least a step towards independence.

Rich Silver Ore from Mary Reynolds Mine.

Some rich silver ore has been taken from the Mary Reynolds Mine, situated in the Stump Lake District, 35 miles east of Merritt, B.C. It is steel galena, and runs high in values. Specimens shown by Robert R. Hedley were taken from a drift at the 45-ft. level, where stoping is now in progress. The property has a shaft 100 ft. in depth, but Mr. Reynolds thus far has done work only on the 45-ft. level drift from this shaft. The vein at this point varies in width from three to five feet, the entire vein content being considered good milling ore, while some exceptionally high grade pockets are found. Development lower down will start at an early date. The vein, apparently a true fissure, shows on the surface at point about 900

ft. distant from each other. Open cuts at various points along the cropping expose the vein and ore is found in every opening.

Inland Mining Company.

The Inland Mining Company, of Walla Walla, Wn., has been operating the Eureka Mine, a copper property at Granite, B.C., in the Nelson Mining Division, for almost four months, during which period \$15,000 has been spent on development. Production has been brought to 25 tons a day, the ore is being shipped to the Trail Smelter for treatment. Plans for further development include a long cross-cut tunnel and the construction of a tramway to the Canadian Pacific Railway. Mr. W. M. Meyers is superintendent at the mine.

Government Discontinues Prospecting for Platinum.

After the 31st of December no more platinum will be purchased at the Dominion Assay Office, Vancouver, B.C. This institution was opened during the latter part of the war for the purpose of encouraging the production of the metal in Western Canada, it being imperatively needed for war purposes. In this connection the placers of the Tulameen River were prospected by representative of the Imperial Munitions Board in Canada. The results of the latter work were satisfactory and indications were that, if development were continued as energetically as it started, a considerable quantity of platinum would be recovered. With the war over and the demand much lighter, operations by the Government on the Tulameen River have ceased. The Vancouver Assay Office was established to receive this platinum, as well as that recovered by companies or individual prospectors and operators throughout the Province, and also that of private individuals who cared to part with jewelry made wholly or in part of platinum. Payment was allowed, as soon as its value was confirmed, at the rate of \$105 an ounce. While the latter arrangement will be discontinued by the new order, it is not believed to be the intention of the Canadian Government to withdraw the assay office, it being the opinion that it will be maintained for the benefit of prospectors and miners.

Coal Shortage on Pacific Coast.

The Alaska Bureau of the Seattle (Wn.) Chamber of Commerce and Commercial Club recently received an urgent appeal for a supply of fuel from the Territorial Council of Defence, Juneau, Alaska. W. A. Clark, chairman of the latter body, stated that there was only enough coal in Juneau at that time to last four days, and that none was to be found at Douglas City. As Juneau is in the Government Forest Reserve, no wood was available. Mr. Clark was told that the delay in despatching fuel to the North was owing to the fact that vessels of the Seattle-Alaska Fleet could obtain none in the Northwest. Since then, however, the freighter Latouche loaded 800 tons at the Pacific Coast Coal Mining Company's Bunkers, Seattle, and will discharge it at Wrangell and Juneau. It is feared that if shipments are not maintained more regularly there will be much suffering in the northern British Columbia and Alaska centres this winter.

Developing Gold Deposits on Proserpine, Mt., B.C.

The "Imperial" and "Independence" Group of Claims on Proserpine Mountain, a low rounded mountain situated just south of Barkerville in the Cariboo District, B.C., are showing up very satisfactorily as a result of recent development work. Present indications are that, properly handled, the properties will be made a productive gold mine. As far as the work has gone the veins are well defined and contain exceptionally good values. Whether, with further sinking, the condition will be found to continue is another question, but competent authorities are of the opinion that the chances are excellent. Williams Creek, which is adjacent, was one of the largest producers of the early placer mining days in the Cariboo and it is felt that, old story as it is, the owners of the claims in question are justified in believing that they have located one of the sources of the gold that was taken from the sands of the Creek bed.

Three years ago the first of the claims were located and called the "Independence." Shortly after eight claims were staked on the strike and named the "Imperial" Group. Since then prospecting has been carried on continuously on both, the work consisting of shaft sinking, cross-cutting and stripping, proving the continuity of the veins for a distance of 8,000 feet.

An account of the present situation from Barkerville, B.C., reads in part as follows:

"There apparently are too large main veins, about 300 feet apart, with a strike northwest and northeast. No. 1 vein appears to be about 28 feet wide and No. 2 about 14 feet. Nothing of a spectacular nature was discovered until August, 1918, when a number of openings were made on the "Independence" No. 2 vein. Here a remarkable body of ore was uncovered. Considerable free gold could be seen in the quartz and from the pan prospects it was evident that the veins which at this point was 14 feet wide would yield high values. Some of the holes were sunk 10 feet deep. Mr. J. D. Galloway, district government engineer, visited the property for inspection during the month of October securing sixteen samples and assay returns from the Department of Mines show an average value of \$61.50 in gold per ton.

"About three weeks after the "Independence" discovery the owners of the Imperial group succeeded in tracing the vein north-westerly by following the strike and float some 4,000 feet. Here, by a crosscut, the vein was picked up again, with an average width on the surface of 9 feet. It yielded good pan prospects while clusters of free gold could be seen through the quartz. Mr. Galloway also visited this property. At the time the owners had made two crosscuts in the vein about 8 feet in depth about 500 feet further north. From the double crosscut Mr. Galloway took eight samples which yielded as follows: From a sample taken on the south side of the first cut, \$6.10 from a 17-inch cross-vein, 15.25; from the north side of cross-channel, \$24.30; from a sample of the sulphide in the bottom, 8 feet deep, \$231.30; from adjoining cross-channel, south side, \$16.40; from north side, across 9 feet, \$28; grab sample, main dump, \$21; grab sample, main dump, fine material, \$11. From the single cut, Mr. Galloway took three samples, assaying as follows: Two cross-channel samples, \$19.40 and \$28; one of the sulphide, \$112.40 in gold and \$1.60 in silver per ton.

"Shortly before Mr. Galloway arrived a well-defined 20-inch cross-vein was discovered highly mineralized also carrying considerable galena. Assayed a sample yielded \$16 gold and \$8.30 silver. Since Mr. Galloway's

visit the owners have built a shaft house and a 4 x 6 shaft to a depth of 24 feet 6 inches.

"The free gold values seem to increase to a depth of about 11 feet, when the ore commenced to go into an arsenical sulphide and at 15 feet all signs of surface oxidization disappeared. The vein widened from 9 feet at the surface to 12 feet at the 24-ft level with the dip slightly expanding both ways. The quartz apparently stands in seams or partings—mostly dipped and running with the vein. These seams are from about half-an-inch to an inch wide and are highly impregnated with arsenical pyrites, while the silica itself carries a fair amount of the pyrites. The owners have crosscut the vein at 24 feet and have taken a cross-channel sample from each side of the tunnel, which they have forwarded to the Mines Department for assay. Slow progress has been made sinking on account of the water, and work has been suspended for a time to allow it to subside."

To Investigate Smelter Rates.

It is announced that the first session of the Committee appointed to investigate the rates charged British Columbia Mine Operators for the treatment of their ore by the Consolidated Mining & Smelting Company at Trail, B.C., will be held on the 21st of January at Nelson, B.C. The personnel of this Committee follows: Mr. S. S. Fowler, Riondel, B.C.; Mr. Ivan de Lashmutt, Silverton, B.C.; and Mr. James Anderson, Kaslo, B.C. The British Columbia Government will be represented by Mr. A. G. Langley, Resident Engineer with headquarters at Revelstoke, B.C.

Crow's Nest Coal Miners Do Not Want Representation on Commission.

For several months the coal miners of the Crow's Nest Field have been working on the Single Shift System, a concession which was granted following the strike of last September, when the understanding was that a Royal Commission should be appointed immediately to make inquiry into charges that the mines of the district were unsafe to life while operated on the basis of two shifts to the twenty-four hours.

It now appears that the men, satisfied with present conditions, do not propose appointing a representative to the Commission, a course which, it was understood, they were to take, the personnel to be completed by appointees of the Crow's Nest Pass Coal Company and of the Minister of Mines. What course will be adopted as a result of this announcement is difficult to say; but it seems assured that the company will not be content to allow the situation to remain, because its management feels that two shifts does not affect the safety of the workings and that the continuance of the single shift very seriously affects the output and the returns of the property.

The decision of the men is explained in the following resolution adopted at a recent meeting of Gladstone Local Union (Fernie, B.C.) No. 2314, U.M.W. of A.:

"Whereas the result of Order 26 decreed that the mines at Coal Creek and Michel resume work on single shift for an indefinite period pending the report of a Royal Commission;

"And whereas our position is actuated by the question of greater safety of the mines only, it is then we view with great concern the probabilities of such a Commission, composed as it will be of men of lesser efficiency or repute in the mining world;

"And now whereas we, as members of Gladstone Local Union, did not seek or request that such expert services as that of the highest reputed authority on the

American continent, viz., G. R. Rice, of the United States Bureau of Mines, nor were we asked collectively or individually to give evidence as to conditions existing in this coal field, but such evidence was supplied exclusively by the Crow's Nest Pass Coal Company, and by the Department of Mines, nor were we informed of the conditions which led to the disastrous explosion at No. 3 Mine notwithstanding the fact that the Department of Mines had G. R. Rice's report of conditions on file, which report of conditions clearly shows the flash point should be reduced from 5.5 to 2.5 in those mines;

"And whereas, since the above mentioned disaster the withdrawal point has been changed from that of $\frac{1}{2}$ inch cap to $\frac{1}{4}$ inch, which shows that the Department of Mines must have some faith in the Rice Report on which we based our argument;

"Now whereas all commissions that have been appointed to settle disputes between capital and labor have invariably been unsatisfactory to labor;

"Therefore be it resolved that we, the members of Gladstone Local Union, No. 2314 U.M.W. of A., absolutely refuse to take any part whatever in the aforementioned Commission."

Coal for Prince Rupert.

The securing of an adequate supply of coal at reasonable rates for the City of Prince Rupert, B.C., has been under investigation by the Council of that community. Mr. Nicol Thompson, Fuel Controller, was interrogated as to charges, and in his reply stated that it had been arranged when he visited Prince Rupert in October, 1917, that the price of coal should be made by the dealers at their wharf or shed, cost of delivery to be arranged with the purchaser. At that time it was figured that the price would be \$10.50 a ton, but since then there had been advances, making the cost at the mines as follows: All coal mines on Vancouver Island, except the Western Fuel Co., \$7.20 per gross ton; Canadian Western Fuel Company, \$6.45 per gross ton. Mr. Thompson further explained that under the new regulations while the price at which a dealer might sell was not fixed, his profit was limited to 50 cents per net ton over all reasonable overhead charges. Mayor Gale, of Vancouver, wrote Prince Rupert that the retail price of coal delivered in sacks over the greater part of his City was \$10.50 per ton of 2,00 lb. He added that Vancouver had the privilege under charter amendments secured two years ago to operate its own coal business, and it has actually supplied all civic and semi-civic buildings at actual cost, although the city has not gone into the coal business in the ordinary way. The Prince Rupert Council finally recommended the establishment of closed coal bunkers operating on a gravity system, in order to eliminate much of the labor now wasted in distribution; that coal be purchased by consumers in bulk as far as possible to avoid the extra 50 cents a ton cost for sacking; that a representative of the city be appointed to cooperate with the Provincial Fuel Controller for the regulation of supply and prices in the Northern District; and that Prince Rupert be given power under the Municipal Clauses Act to operate coal yards if it is found in the public interest that such a policy be adopted.

Will Develop Groundhog Anthracite.

The Groundhog Anthracite Coal Fields of British Columbia are to be developed according to responsible mining men. These deposits are situated north of the Hazelton District and contain eleven known commer-

cial seams, aggregating about 68 feet in thickness. Interest in these measures is held by Sir D. D. Mann and the Lord Rhondda Estate. While active work was suspended during the war it is asserted that it will be resumed without loss of time.

International Coal and Coke Co., Ltd.

Mr. A. C. Flumerfelt, President of the International Coal and Coke Company, Ltd., with collieries at Coleman, Alberta, has issued a notice to shareholders requesting proxies for a change in corporation from the State of Washington to a corporation to be chartered under the laws of the Dominion of Canada. While the operations of the company are in the Province of Alberta, the company, being a United States charter, has to pay taxes in the United States, which are now costing between \$1,200 and \$1,500 per month, and as well pay taxes under the Canadian laws. By operating under the Canadian law the United States taxes will be eliminated. In view of the high prices the company is receiving for its product and development at the mine, together with the installation of by-product coke ovens, the company is enjoying considerable prosperity and is rapidly increasing its financial strength. Two dividends amounting to three per cent have been paid to the shareholders during the year.

Vancouver Chamber of Mines.

At the annual meeting of the Vancouver Chamber of Mines, which was held recently, it was decided that an international mining convention would be held in the Province, under the auspices of the organization, sometime during the year. Nothing was done as to the fixing of a date, but the consensus of opinion was that it was important that the assembly should be made thoroughly representative of British Columbia, and of the Pacific Coast States. Officers were elected as follows: Hon. President, Hon. Wm. Sloan, Minister of Mines; Hon. Vice-Presidents, Senator Shatford and Mayor Gale; President, A. M. Whiteside; Vice-President, Lieut.-Col. E. G. Prior, Victoria, B.C., and C. E. Cartwright; Hon. Treasurer, J. M. Ley; Executive, Messrs. N. Thompson, G. T. Hodge, R. H. Stewart, J. M. Turnbull, S. J. Crocker, G. S. Pettipiece, I. Thomas, S. N. Miller, J. D. Kearns, H. P. McCraney, F. E. Woodside, B. G. Hawkins, W. E. Bland, A. B. Buckworth and G. S. Eldridge.

As a result of a recent inspection of the Cassiar Crown Copper Company's property, situated on Grouse Mountain near Telkwa, B.C., it has been decided to drive a new tunnel about 90 ft., with a view to tapping the vein at about 75-ft. depth, drifting from there on the ore. This vein shows up strongly on the surface, being fourteen feet wide and traceable for a considerable distance. Should the present indications be confirmed by further development, the owners propose installing a modern plant for the handling of the output. The copper contents of the ore constitute its chief value.

Mr. W. M. Sutherland, well-known in British Columbia as a prospector and mining operator, died recently at Revelstoke, B.C. He was interested with Mr. J. B. Tyrrell, of Toronto, Ont., in the development of the Golden Wonder Group of Claims on Rocher de Boule Mountain near Tramville. In the early days the late Mr. Sutherland was engaged in mining in the Yukon where he first became associated with Mr. Tyrrell.

The Canadian Graphite Industry

(From Summary Report, Mines Branch, 1918.)

By HUGH S. SPENCE.

With the object of collecting data for a new edition of the Mines Branch report on graphite, published in 1907, and which has been out of print for several years, the writer visited the graphite mines and mills in the Provinces of Ontario and Quebec. The graphite occurrences in these Provinces constitute the source of supply of all the graphite that has been produced in Canada in recent years. All the properties lie within a radius of 150 miles of Ottawa.

An attempt to exploit graphitic shales near St. John, N.B., was made many years ago, and a production was reported from that locality by the Canada Paint Co., as late as 1896. These shales carry a very finely-divided, amorphous graphite: a grade which is only suitable for pencil making, paints, or foundry work. Similar graphitic shales are known, also, from various other places in New Brunswick, as well as from Nova Scotia.

In British Columbia, disseminated graphite is reported to occur at Alkow harbour, Dean channel, and near Harrison lake. A vein of amorphous graphite near Marysville, Cranbrook district, was examined by the writer in 1916, and was reported on in the Mines Branch Summary Report for that year. None of these graphite occurrences have been exploited to any extent, though a small trial shipment is reported to have been made from the Harrison lake property; and a shallow prospect pit has been put down on the Marysville vein. The latter is only 18 inches wide, and consists of a mixture of silicates and amorphous graphite, the carbon content being about 25 per cent.

The shortage of graphite experienced in the United States during the last three years has been caused by the greatly increased consumption in the crucible manufacturing industry; shipments of Ceylon graphite—which is the grade preferred for this work—being insufficient to supply the trade. The demand for flake graphite has resulted in a great increase in mining activity in the United States, and a brisk demand has been experienced for Canadian flake. In spite of this, however, the adverse conditions which have long hampered the graphite industry in this country still persist, and during 1917 only three companies operated at all steadily, there being nine mines, each equipped with a mill, that have been either completely idle or in only intermittent operation. Various causes have conduced to this state of affairs, among them being: (1) failure to devise a proper concentration process for the particular ore to be treated; (2) erection of mill without sufficient care being taken to establish the existence of an adequate ore-body, which sometimes resulted in ore having to be hauled to the mill from outlying pits, and (3) remote situation of the property, necessitating an expensive road-haul for fuel and supplies. In several instances, large expense was incurred in the erection of a mill out of all proportion to the size of the ore-body—as subsequently developed. The power-consumption alone, in such a mill, using as fuel, wood or coal, which has to be brought a considerable distance, is a factor that has conduced to the lack of success attending operations at certain of the properties. In this connection, it may be noted that of the two active mills running on disseminated flake graphite ore, one is using oil as fuel, and the other is operated by water-power.

The flake graphite occurs in disseminated form either in crystalline limestone (Haliburton and Hastings coun-

ties, Ontario) or in more or less calcareous bands intercalated in gneiss (Buckingham district, Quebec), the latter ore as a rule carrying more graphite (10-15 per cent) than the limestone, which averages 7-10 per cent. Both varieties of ore carry flake mica, pyrite, pyrrhotite, and lime silicates, as the principal accessory minerals; and both have been treated by essentially similar concentration methods. These are, briefly, drying in wood-fired kilns; reducing in gyratory crushers followed by two or more sets of heavy rolls; and subsequent alternate screening and crushing in rolls of the flour-mill type. Each set of rolls eliminates gangue by reducing the brittle calcite and silicates to powder, while the soft graphite tends to flatten out and is caught by the screens. The produce from the final set of rolls is sometimes polished between buhr-stones, or goes to an electrostatic machine, which removes any remaining impurities, particularly mica; the latter is one of the most difficult minerals to get rid of, owing to its softness, and consequent resistance to crushing. In the early days of the graphite industry, a wet process of concentration, employing buddles, was practised. This method is still in use at one mill, as the initial step in concentration, followed by drying; the dried product then proceeding to rolls, screens, and buhr-stones.

One of the most recently constructed mills practises wet concentration by means of tables and hydraulic classifiers, followed by drying in a vacuum filter and kiln, and polishing between rolls. Good results are obtained in some mills, also, by the use of dry tables.

Concentration by means of water flotation, such as is in general practice in the mills of Alabama, U.S.A., is not employed at any mill in Canada.

While certain of the mills achieve a fair recovery of the graphite contained in the ore treated, the majority lose an undue percentage in the tailings. The concentration methods in general use are far from being efficient. In addition to poor recovery, the carbon content of the best, or No. 1 product, is seldom brought over 90 per cent, and is generally lower; a great deal of the flake in the rock is broken up in the milling, and goes into the smaller mesh No. 2 product, and to the No. 3 or dust; while the large amount of dust produced in the mill in grinding the kiln-dried ore is very objectionable. Screen tests on samples of No. 1 flake from seven mills, showed the mean percentages of different size flake composing this grade to be as follows:—

+ 20 mesh.....	1.76 per cent.
+ 40 mesh.....	18.56 "
+ 60 mesh.....	67.00 "
+ 80 mesh.....	8.06 "
+ 100 mesh.....	1.10 "
— 100 mesh.....	2.96 "
	99.34 "

Most mills produce three grades of graphite, known as No. 1 flake; No. 2 flake; and dust. The No. 1 flake goes principally to the crucible trade; No. 2 is employed in lubricating products; and No. 3, or dust, is used in foundry work.

The graphite particles employed in crucible manufacture are required to be of a certain size, in order to bind efficiently with the clay. In this connection it may be noted, that one of the reasons for the preference for Ceylon graphite for use in the manufacture of crucibles is, that this variety does not occur in thin flakes like the American graphite, but is more massively crystalline, and breaks up on crushing into more angular fragments, hence requires less clay as a binder.

OBITUARY

M. W. SUTHERLAND.

On the 3rd of January last Murdoch W. Sutherland Miner and Prospector, passed away quietly in Dr. Winch's hospital at Hazelton, B. C.

Born in Western Canada of Scottish parents, his childhood was spent on a farm near Edmonton in Alberta and when but a young man he spent a year or two at Jasper House on the Athabasca river, trapping fur-bearing animals, and trading for furs with the Indians.

When gold was discovered in the Klondike he was one of the first to cross the mountains to the new Eldorado. After his arrival in the city of Dawson he spent some months prospecting for himself, and then engaged with Mr. J. B. Tyrrell on Hunker Creek first as miner and subsequently as foreman. Afterwards he took a lay on one of Mr. Tyrrell's claims and worked it carefully and economically with a fair measure of success.

About 1904 or 1905 many miners left the Klondike for the new diggings near Fairbanks in Alaska and Sutherland was one of the number. There he worked a lay on a claim on Cleary Creek, and through his force of character and ability in handling men, and with the experience in placer mining gained in the Klondike, he was so successful that he realized a small fortune. Then others recognized his efficiency as a manager, and made him flattering offers if he would



THE LATE M. W. SUTHERLAND,
In camp north-east of Hazelton, B. C.

undertake to manage their properties, but he loved independence and now that he had money at his command he decided to visit South America and examine some of its placers. Not finding anything attractive there he returned to Edmonton, his old home, where he engaged in the grain business for a short time.

From there he turned to Northern British Columbia where most of the remainder of his life was spent prospecting in the mountains and developing some of the prospects that seemed most attractive to him.

He belonged to that rare type of independent fearless men who love the forests and mountains and are at home anywhere in the wilderness, but who at the same time must always be engaged in active work of some kind, and whose chief joy is in discovering and developing the resources of the wilderness and making it contribute to the needs of civilization.

He was gifted with keen sight, and having a clear enquiring mind he was a careful and accurate observer. Self-reliant in the face of difficulties he had learned that by immediate attention and hard work he could overcome almost any obstacles that might present themselves, and being strong and tireless he did not know the meaning of rest, except as a preparation for more work.

Almost energetic either at work or play, he had no sympathy for men who were idling their time away, either in the wilderness under the name of prospectors, or in the mines under the name of miners. Nevertheless, he was one of the kindest of men, and if a man was doing his best, however poor that best might be, he was ready to assist him, and if a man was in distress he was anxious to help him. In fact, he would give his last dollar to anyone whom he knew to be really in need. From his own experience and observation he knew how much work a man should be able to do, and men working for him knew that he knew, so that he had no difficulty in obtaining willing and efficient labor.

Such men as Sutherland can ill be spared in Canada where honesty, intelligence, strength and fearlessness are the main elements of success.

Personals

Mr. R. J. Ennis, manager of the McIntyre-Porcupine mine went to Toronto on business, early in the week.

Mr. W. E. Simpson, consulting engineer for the Miller Independence is in Sherbrooke, Que., on business.

Mr. B. E. Neilly, of Cobalt, will be elected vice-president of the Canadian Mining Institute for the coming year.

Mr. A. Wende, manager of the Wright-Hargreaves mine, of Kirkland Lake has returned to Buffalo after a business visit to the mine.

Mr. Harry Stewart, manager of the Crown Reserve mine is in Montreal this week, where he attended the annual meeting of the company, held on Wednesday.

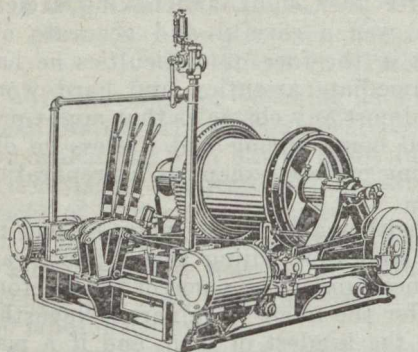
Mr. S. G. Blaylock, assistant general manager of the Consolidated Mining & Smelting Company of Canada, has returned to Trail after a business trip to the East.

Thomas Goard, a pioneer prospector and miner of the Revelstoke, Illecillewaet, Slocan and Lardeau Districts of British Columbia, died recently at Revelstoke.

Mr. Harry Oakes, president of the Lake Shore mine, went south early in the week to attend the annual meeting of the Tough-Oakes Gold Mines, held Wednesday in Toronto.

The following will be elected by acclamation councillors of the Canadian Mining Institute: Robert A. Bryce, Toronto; Geo. Gillespie, Madoc; E. T. Corkill, Copper Cliff; C. E. Smith, Ottawa.

Mr. George J. Miller, president of the Miller Independence mine at Boston Creek went south to Dayton, on Wednesday, and while there will attend the annual meeting of the company to be held early in February.



Made in 7 sizes, from 10 to 50 H.P.,
and with any diameter Drum
up to 48 ins.

MINE HOISTS

We make our Mine Hoists to suit you and your mine. We make them with one Drum, or with two Drums, and with any diameter Drum you require, up to 48" at bottom of the flanges. We make them for Steam Drive, as shown, or for Electric Drive, or for Belt Drive. We can give you a little 10 H.P. Hoist for prospecting, or for small mines, or a large 50 H.P. Machine for the deeper Mines. We can also give you a choice of 5 sizes between these two, so no matter what the size of your Mine, we can make you a Hoist to suit.

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U. S. MINERAL OUTPUT.

The value of the minerals produced in the United States in 1917, according to the United States Geological Survey, Department of the Interior, was \$5,010,948,000, an increase of \$1,496,976,000, or about 43 per cent, over the former record—\$3,513,972,000—established in 1916. The blast furnace products (pig iron and ferro-alloys), copper, coal, and petroleum contributed 74 per cent of the total value of minerals produced and 88 per cent of the increase in 1917.

The metals established a new record in 1917, being valued at nearly \$2,092,000,000 and representing 42 per cent of the total value of the mineral product. They showed an increase of about \$471,316,000, or 29 per cent, over the \$1,620,508,000 reported for 1916. The blast furnace products contributed nearly 90 per cent of the total increase. Increases were also made in the value of aluminum, copper, lead, and silver, but decreases were recorded in the value of gold and zinc.

The value of the non-metallic products in 1917 was 58 per cent of the value of all minerals produced, increasing \$1,010,459,000, or nearly 54 per cent, from the former record of \$1,878,464,000 in 1916 to \$2,888,923,000 in 1917. Of this total increase coal alone represented nearly 66 per cent, and coal and petroleum combined contributed about 85 per cent.

Dr. C. K. Leith, head of the Department of Geology in the University of Wisconsin, and well known in Northern Ontario, recently sailed for France to act as Mineral Adviser for the United States Peace Commission.

The Canadian Wire & Cable Co., Ltd., is installing machinery for the manufacture of a full line of wire rope in the plant at Leaside. It will be in operation March 15th. The company will then be in a position to supply all kinds and sizes of steel wire rope.

Mr. Elwyn G. Blacklock, assistant general manager of the Consolidated Mining and Smelting Company of Canada, and Miss Kathleen Riddle, of Danville, Quebec, were married on Tuesday, December 31st last at the Congregational Church, Calgary, Alta. Mr. and Mrs. Blaylock will reside at Trail, B.C.

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Tanks, Air Receivers, Penstocks, Etc.
Dealers in Railway and Power Plant Machinery

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"ORTHACLASE" FELDSPAR—I have the finest grade of "Orthoclase" Feldspar and lots of it. Close to railway. Open for orders in any quantities. Car lots preferred.—P. J. DWYER, Wilberforce, Ont.

FOR SALE

- 1 4x8 Marathon Mill, with 7 tons of grinding rods from $\frac{5}{8}$ to $1\frac{1}{4}$ in. diameter, and 7 tons extra $1\frac{1}{4}$ in. rods. The delivery of this mill was too late for the purpose for which it was bought, so it has not been used.
- 1 12-in. x 15-in. two-drum Jenckes Tandem Hoist, with one 20-in. auxiliary drum and one nigger-head mounted on the shaft extension. Second-hand, but in good condition.
- 1 Steel Mast, 11 x 17 inches, 45 or 60 feet long, equipped with all sheaves, foot castings and swivel top piece for 12 guy wires.
- 1 1 cu. yard Mansfield back dump Excavator Bucket, second hand.

**McKinley-Darragh-Savage
Mines Limited**

COBALT, :: ONTARIO



PROVINCE OF QUEBEC MINES BRANCH

Department of Colonization, Mines and Fisheries

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

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

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

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

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

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

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

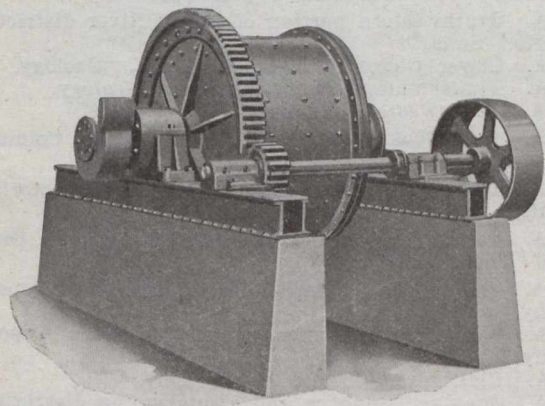
MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

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

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

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

**HONOURABLE HONORE MERCIER,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.**



BALL MILLS, TUBE MILLS,

Ball and Tube Mill Liners,
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Complete Mine Equipment,
Electric Hoists,
Skips, Cages, Cars,
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STEEL CASTINGS--any size

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CYCLONE BEATERS
BUCKET TIPS, STAMPS AND DIES,
DREDGER POINTS

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BALLS FOR BALL MILLS RE-
DUCE COST OF ORE PER TON
CRUSHED

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SHERBROOKE, QUEBEC

CANADA

DEPARTMENT OF MINES

HON. MARTIN BURRELL, *Minister*

R. G. McCONNELL, *Deputy Minister*

MINES BRANCH

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.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, 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, 1916.

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, 1917, Part D. Reports on field work in Manitoba.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argenteuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

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

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

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

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

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

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

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

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



PROVINCE OF ONTARIO



BUREAU OF MINES

Ontario's Mining Lands

Ontario, with its 407,262 square miles of area contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent. of the rocks being of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Helen, Magpie and Moose Mountain mines.

Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and talc.

Building materials, such as marble, limestone, sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured in quantity within the Province.

Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth \$72,093,832, of which the metallic production was \$56,831,857.

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Canadian Miners' Buying Directory.—(Continued from page 29.)

<p>Pipes— Canada Metal Co., Ltd. Consolidated M. & S. Co. Northern Canada Supply Co. Smart-Turner Machine Co.</p> <p>Pipe—Wood Stave— Pacific Coast Pipe Co., Ltd.</p> <p>Piston Rock Drills— Mussens, Limited.</p> <p>Pneumatic Tools— Can. Ingersoll-Rand Co., Ltd. Jones & Glasco.</p> <p>Prospecting Mills and Machinery— Standard Diamond Drill Co. Mine & Smelter Supply Co.</p> <p>Pulleys, Shafting and Hangings— Northern Canada Supply Co.</p> <p>Pulverizers—Laboratory— Mine & Smelter Supply Co.</p> <p>Pumps—Boiler Feed— Smart-Turner Machine Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd.</p> <p>Pumps—Centrifugal— Mussens, Limited. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Mine & Smelter Supply Co.</p> <p>Pumps—Electric— Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd.</p> <p>Pumps—Sand and Slime— Mine & Smelter Supply Co.</p>	<p>Pumps—Pneumatic— Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd. Sullivan Machinery Co.</p> <p>Pumps—Steam— Can. Ingersoll-Rand Co., Ltd. Mussens, Limited. Northern Canada Supply Co. Smart-Turner Machine Co.</p> <p>Pumps—Turbine— Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd.</p> <p>Pumps—Vacuum— Smart-Turner Machine Co.</p> <p>Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd. Hadfields Ltd.</p> <p>Rails— Hadfields Ltd.</p> <p>Roofing— Northern Canada Supply Co.</p> <p>Rope—Manilla and Jute— Jones & Glasco. Northern Canada Supply Co. Allan, Whyte & Co.</p> <p>Rope—Wire— Allan, Whyte & Co. Northern Canada Supply Co.</p> <p>Rolls—Crushing— Hadfields Ltd.</p> <p>Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son. Mine & Smelter Supply Co.</p> <p>Screens— Northern Canada Supply Co. Hendrick Mfg. Co. Hadfields Ltd.</p>	<p>Screens—Cross Patent Flanged Lip— Hendrick Mfg. Co.</p> <p>Separators— Smart-Turner Machine Co.</p> <p>Sheet Lead— Canada Metal Co., Ltd.</p> <p>Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.</p> <p>Shovels—Steam— M. Beatty & Sons.</p> <p>Smoke Stacks— Hendrick Mfg. Co. MacKinnon Steel Co., Ltd. Marsh Engineering Works.</p> <p>Steel Barrels— Smart-Turner Machine Co.</p> <p>Steel Castings— Can. Brakeshoe Co., Ltd. Hadfields Ltd.</p> <p>Steel Drills— Sullivan Machinery Co. Northern Canada Supply Co. Can. Ingersoll-Rand Co., Ltd.</p> <p>Steel Drums— Smart-Turner Machine Co.</p> <p>Steel—Tool— N. S. Steel & Coal Co. Hadfields Ltd.</p> <p>Stone Breakers— Hadfields Ltd.</p> <p>Surveying Instruments— C. L. Berger.</p> <p>Tables—Concentrating— Mine & Smelter Supply Co.</p> <p>Tanks (Wooden)— Gould, Shapley & Muir Co., Ltd. Pacific Coast Pipe Co., Ltd.</p> <p>Tanks—Steel— Marsh Engineering Works. MacKinnon Steel Co.</p>	<p>Tanks—Cyanide, Etc.— Hendrick Mfg. Co. Pacific Coast Pipe Co., Ltd. MacKinnon Steel Co.</p> <p>Tanks (water) and Steel Towers— Gould, Shapley & Muir Co., Ltd. MacKinnon Steel Co.</p> <p>Tramway Points and Crossings— Hadfields Ltd.</p> <p>Transits— C. L. Berger & Sons.</p> <p>Tubs— Hadfields Ltd.</p> <p>Steel Castings— Can. Brakeshoe Co., Ltd. Hadfields Ltd.</p> <p>Welding and Cutting, Oxy-Acetylene— Imperial Brass Mfg. Co.</p> <p>Wheels and Axles— Hadfields Ltd.</p> <p>Winding Engines—Steam and Electric— Can. Ingersoll-Rand Co., Ltd. Marsh Engineering Works.</p> <p>Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.</p> <p>Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.</p> <p>Zinc Spelter— Canada Metal Co., Ltd. Hoyt Metal Co.</p>
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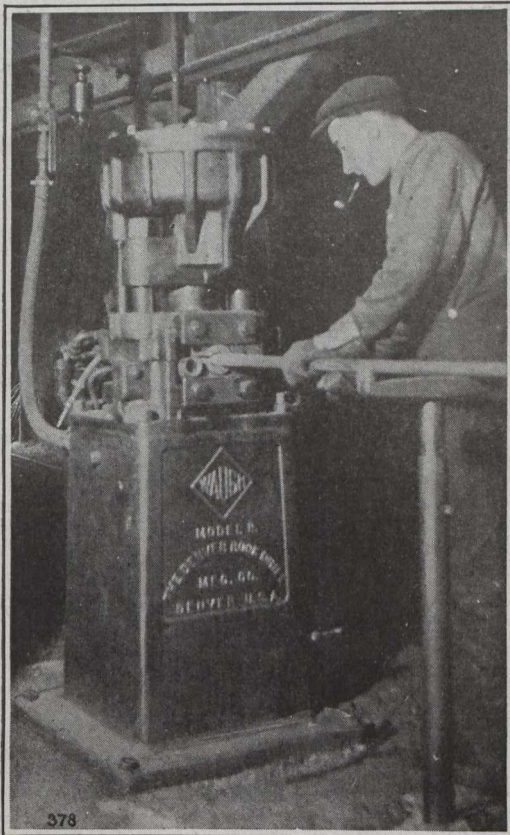
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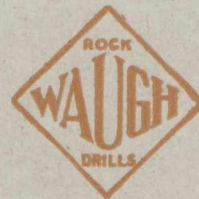
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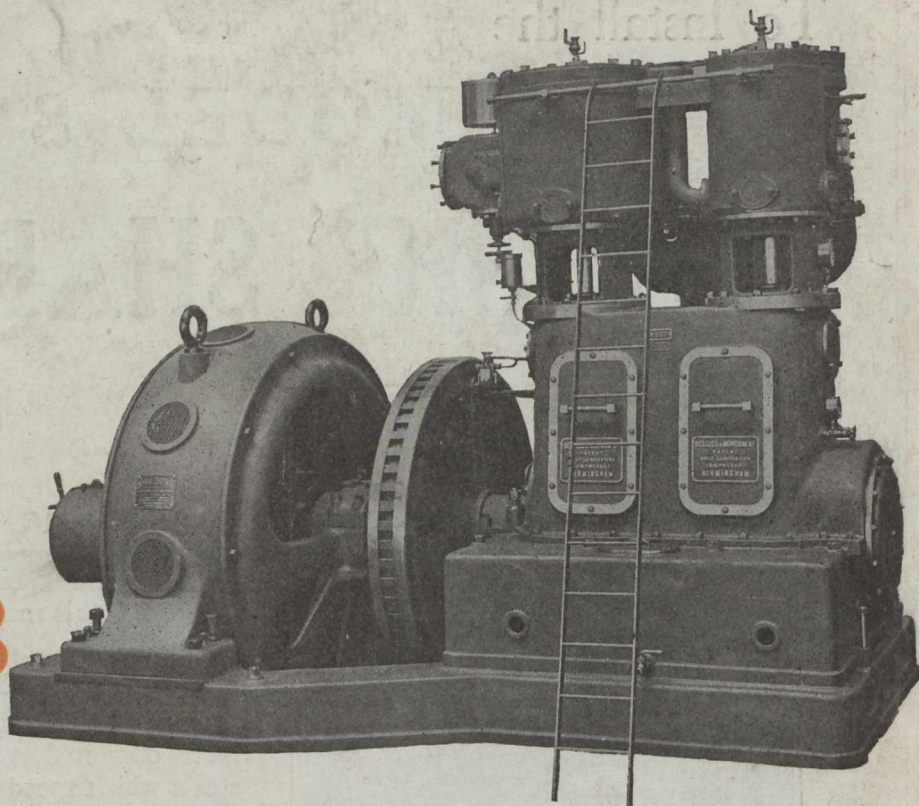
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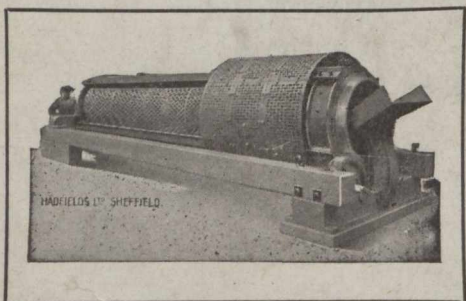
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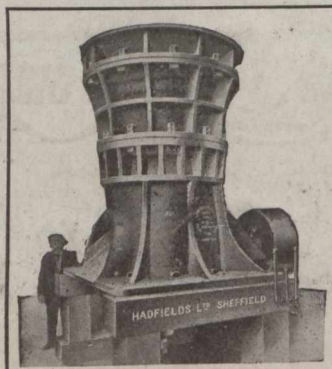
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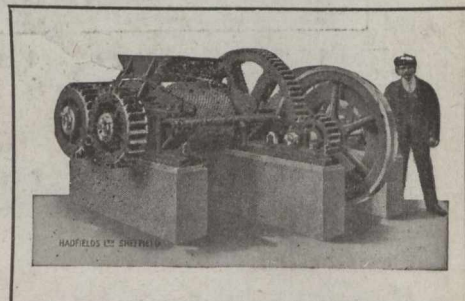
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