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Vol. XLI. Gardenvale, P. Q., November 5, 1920 No. 44.

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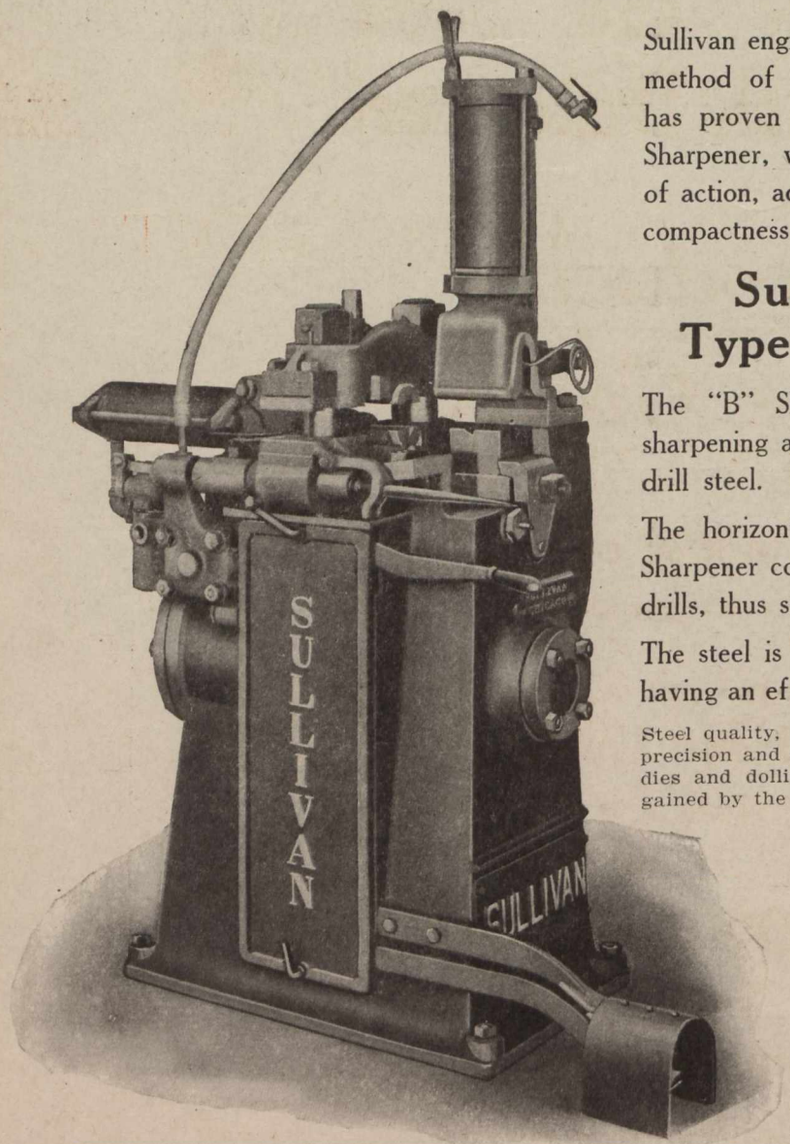

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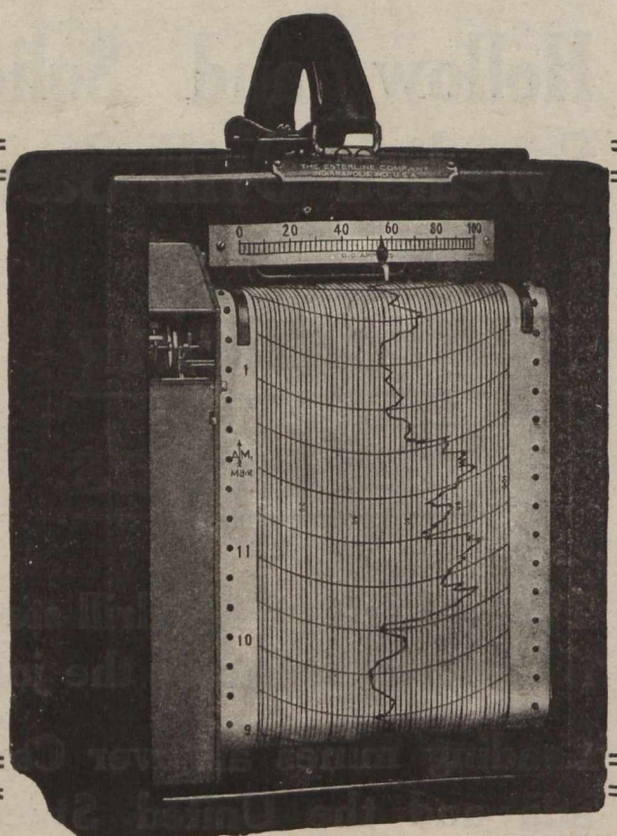

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Ontario in 1919 produced 38 per cent. of the total mineral output of Canada. Returns show the output of the mines and mineralogical works of the Province for the year 1919 to be worth $58,583,916, of which the metallic production was $41,590,759.

Dividends and bonuses paid to the end of 1919 amounted to $15,545,238 for gold mining companies, and $78,335,943 for silver mining companies, or a total of $93,881,181.

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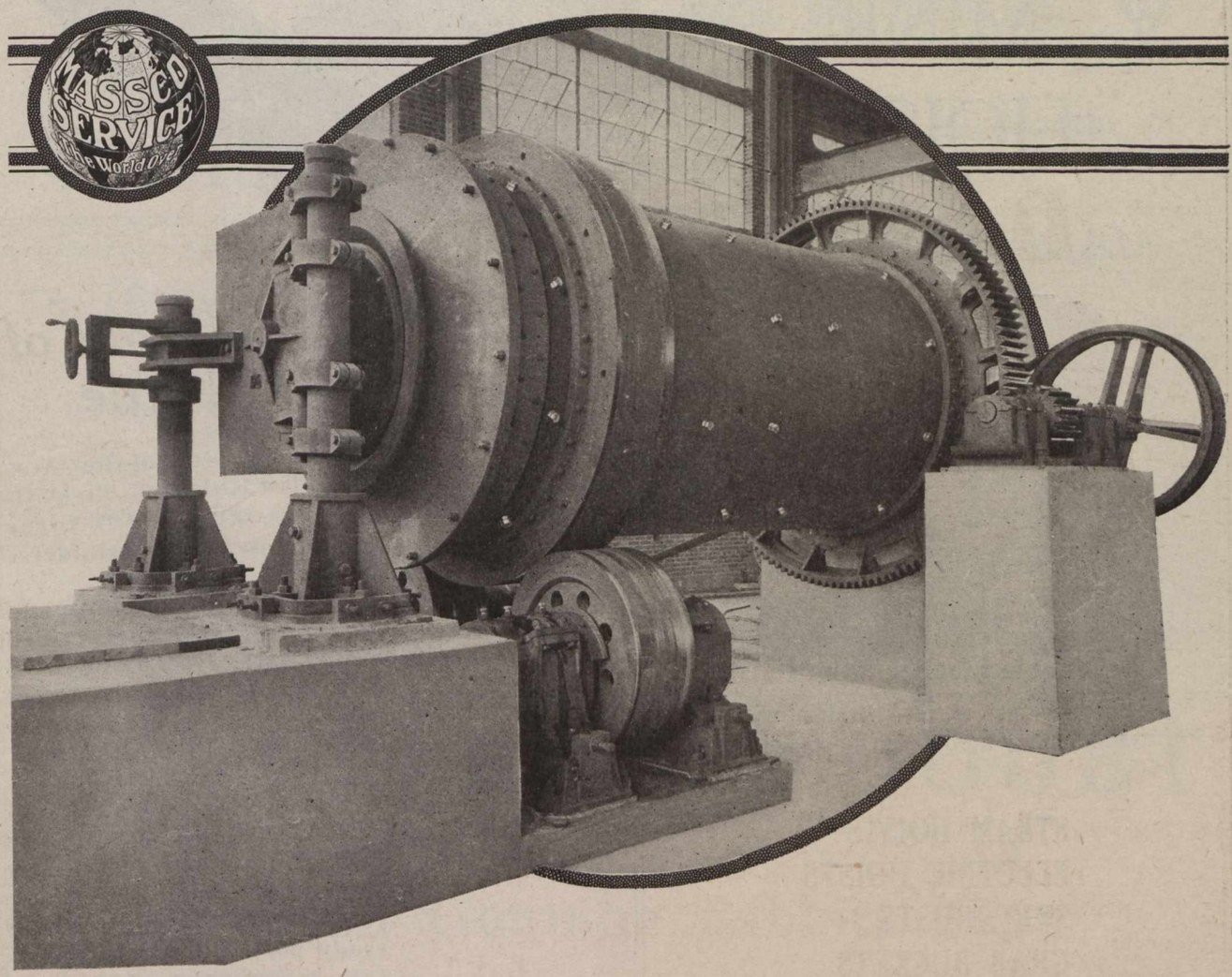

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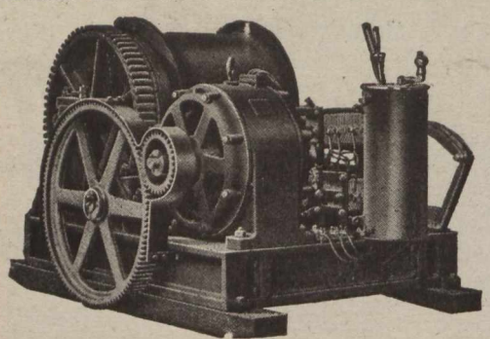

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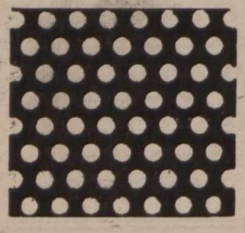

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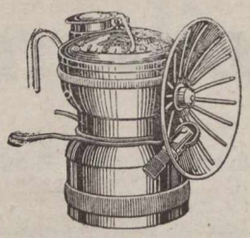

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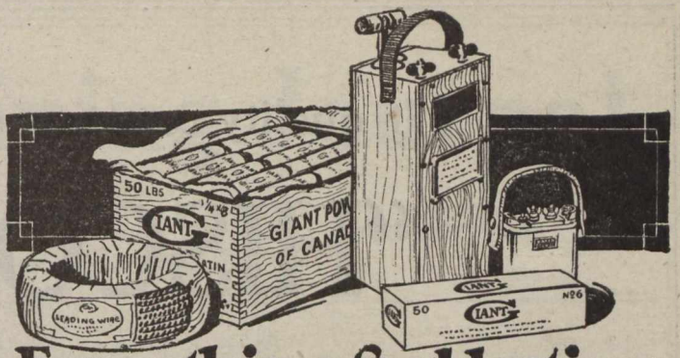

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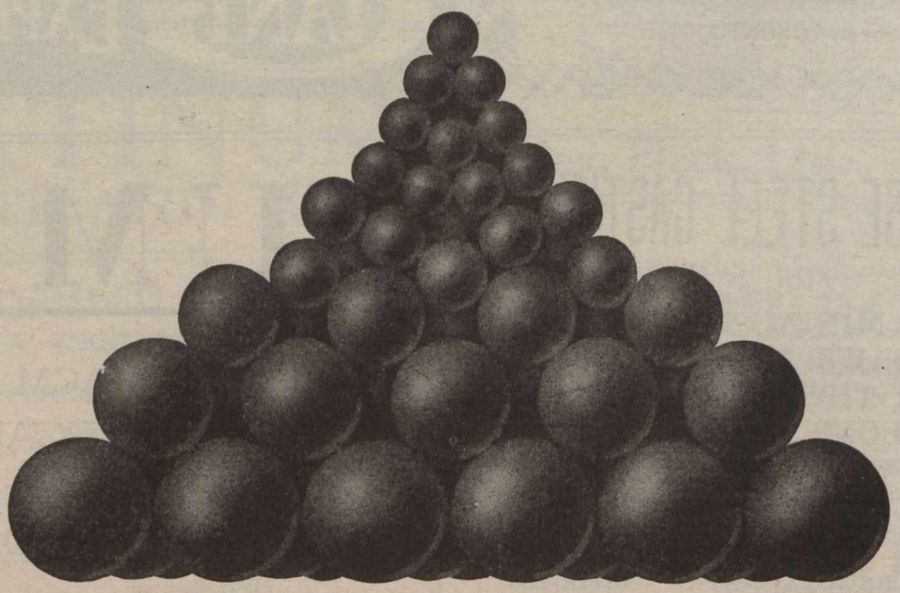

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CONTENTS

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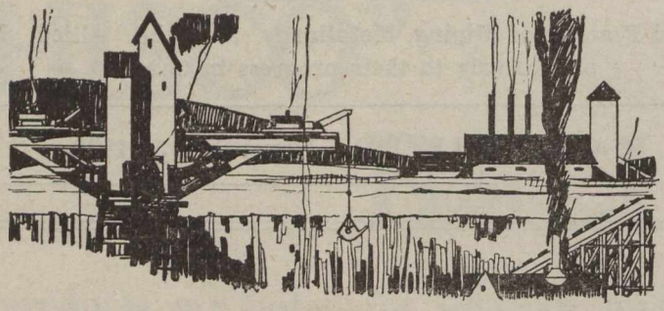

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Since the First Annual Western Meeting held at Vancouver in November 1919, the Institute has held general meetings at Toronto, at Glace Bay and at Winnipeg, thus gathering together under its leadership truly representative assemblies of the mining profession of Canada in the Far West, the Far East, the Middle East and the Middle West, and covering every activity of mining and metallurgy in Canada.

A series of meetings and deliberations so completely representative in attendance and subjects discussed, and so geographically comprehensive has probably not been recorded within any previous eleven months since the Institute was founded.

The Second Annual Western Meeting, just concluded, was the first general meeting of the Institute held in Winnipeg. The significance of the event was quickly apprehended by the citizens of Winnipeg and was expressed by the "Manitoba Free Press" which stated editorially that the selection of Winnipeg was: "a recognition of the fact that our province is on the "eve of very important developments in the establishing of a mining industry in copper and gold, "and that a convention of the mining men of Canada "to discuss the situation in Manitoba will do much "to direct those developments along the best channels."

The true function of the Institute, which is to be a centre of light and leading in every new field of mining endeavor in Canada, could not have been more accurately defined than by this quotation from the "Free Press", a newspaper that it is hardly necessary to state is an authoritative exponent of western sentiment.

Three things dominated the meeting, which in days not far gone would have seemed strangely alien to everyday life in Winnipeg; namely, the mining of coal, gold and copper, although, as will be seen from the list of minerals shown in the Fort Garry Hotel, these by no means exhaust the list of local mineral possibilites.

An encouraging feature of the proceedings—including the public gatherings—was the evidence that the West is alive to the serious consequences to Canada's national credit that must follow if the country continues to import more minerals than it mines at home, as it has hitherto done. This point was very lucidly exposed by representatives of the Government of Manitoba and leading industrialists at the concluding dinner.

Another western tendency of most hopeful augury is the manner in which the development of mineral resources is being entrusted to the universities and to trained technicians. It has most evidently been recognised by legislative leaders in the West that the minerals of the better known sedimentary areas along the main railways, and the little known pre-Cambrian and older sedimentaries of the North Country, present special problems in their utilisation which must be overcome by the gradual development of a special localised technique, necessarily based upon a broad-based foundation of scientific attainments.

The obvious regard in which the Commissioner of Northern Manitoba is held by the people of Winnipeg, and the importance attached to the scientific study of coal by the Government of Alberta, as expressed by its interest in the University of Alberta, are two indications, among many others, that the West is alive to the near approach of its predestined mineral predominance in Canada, and is in the act of seizing its opportunity.

In many respects the Winnipeg meeting was reminiscent of bygone Toronto meetings when Cobalt was young, and although the transportation question is a much more serious one in Northern Manitoba than was the case at Cobalt, the analogy of a metropolitan city with a hinterland of mineralized pre-Cambrian rocks to the North, naturally presents itself, and suggests that as Toronto experienced a vivifying influence when Northern Ontario disclosed its treasure house so will Winnipeg be stimulated when in Northern Manitoba, as the maps of the Geological Survey indicate to the prospector likely places for his pick and the diamond drill, more becomes known of the gold, copper, silver, zinc, and nickel of Northern Manitoba, already proved to be of first-class importance.

Proceedings of the Meeting, October 25th to 28th 1920

Monday Morning, 25th Oct., 1920.

The meeting opened in the Fort Garry Hotel, in the morning of the 25th October. Approximately one hundred persons were registered or in attendance throughout the three days during which the sessions were extended. A list of the registrants is published elsewhere in this issue. An important and illuminating feature of the meeting was the collection of mineral specimens displayed in the rotunda of the Hotel, assembled and arranged by Mr. L. G. Thompson of the University of Manitoba, a list of which will also be found in this issue.

The Institute was officially welcomed by Hon. Thomas H. Johnson, the Attorney General of Manitoba, who spoke on behalf of the Provincial Government and as representing the Premier who was absent from Winnipeg and prevented from welcoming the Institute in person.

The Attorney-General's Address.

Mr. Johnson said that those who lived in Manitoba were perfectly conscious of the advantages possessed by the City of Winnipeg, but he was disposed to attribute the selection of Winnipeg for the holding of the meeting not to its geographical position, but to the fact that the Institute has recognized the growing importance of Manitoba's mineral development. Especially in view of this did he welcome the Institute. There is, said Mr. Johnson, no organization which was regarded as of more importance in Manitoba at this particular time than the Institute.

Proceeding, Mr. Johnson said:

We are glad to be associated with Canadians, and Manitobans would prefer that our mining development, to as great an extent as possible, be in the hands of Canadians.

It is our privilege to have been associated with the national development, which has been so rapid that I have not heard of its like in history.

Within the limits of our short lives, Canada has changed her position absolutely and has emerged as one of the ambitious energetic nations of the world.

There devolves upon you a heavy responsibility by the fact that you are associated together to take a national view of our mineral resources, so comparatively undeveloped. There is a great deal of work to be done.

We are on the eve of a great development. Canada is just becoming known to the world. Canada's sacrifices in the war are going to influence her future for good. It is today a great privilege to be a Canadian. I have no doubt our development will be great, and sensible and intelligent, and that it is not going to be submerged by the disasters that have submerged other nations in our times, but is about to take her rightful place among the nations of the world.

The Question of Ownership of Natural Resources.

There is one Manitoban question in which we bespeak your interest in, because it directly concerns your own activities, that is the ownership of our natural resources.

I am not going to ask you to pass resolutions or memorials, but I want to point out that this is a question of very long standing. Many attempts have been made to settle it, but it will never be settled until it is settled right. The people of Manitoba are preparing now to renew their urging of the settlement of the question. Unfortunately there has been a disposition on the part of the Federal Government to temporise on this question by bringing in the other provinces of Canada, which has resulted in confusion, and has made a settlement more difficult than it otherwise would have been.

We seek to take nothing from any other province, but hold that the resources of Manitoba belong to Manitoba, and we make our claims solely upon the historical basis."

The President, Mr. O. E. S. Whiteside, delivered the Presidential Address, as follows; which took for subject the extension of the Institute's scope of usefulness.

The Presidential Address.

The Extension of the Institute's Scope of Usefulness.

In 1898 when the Canadian Mining Institute came into being it is quite certain that its founders would have scoffed at the idea of Manitoba ever being a field in which it might exercise its functions to useful effect. Indeed it is only within the last few years that any of us have regarded this Province as anything more than the great wheat growing area of the Dominion — the region whose wheat has made Canada famous the world over, but as if to prove her impartiality, and to insure that every Province of our country shall be possessed of mineral wealth, however richly endowed it may be with other natural resources, Nature has established wiithin your borders an area of PreCambrian rocks, which already have been proved to contain mineral deposits of great actual and potential value. Hence you have now in Manitoba the beginning of what we all trust will become an important and flourishing mining industry, and your faith in the future of that industry has justified you in founding here a Branch of the Canadian Institute of Mining and Metallurgy, which thanks to the energy and zeal of its officers and members has become one of the most active of all the local organizations of our Institute.

The aims and objects, the functions, and the past record and traditions of the Institute were doubtless now as fully realized and appreciated here as in those Provinces in which mining had been the premier industry for many years past. I may therefore be permitted to take advantage of this first Regular Meeting of the Institute in the Province of Manitoba to address you briefly on the possible extension of our scope of usefulness.

What are our aims, and objects and functions ? In a word, "Service". Service through co-operation. And I do not hesitate to say that apart altogether from the practical ends we attain and the material good we accomplish, the Institute, in common with other associations of a like nature, exerts a far reaching and eminently beneficient influence in the community in general by reason of the spirit by which it is animated — by which it moves and has its being; a spirit that is essentially altruistic and fraternalistic. With most of our members it is not a question. "What can the Institute do for me, but what can I do for the Institute?" That at any rate has been the spirit that has animated us during the past, and I trust that it will continue to do so in the future. We have had in mind not so much the good of the individual member, as the good of all the members and the industry we represent.

To insist nowadays on the value of co-operation would surely seem superfluous. The power of it, and the value and importance of it was emphasised especially in the Great War; and was indeed the great lesson of the war. But though our Institute exemplifies the co-operative spirit, and could not exist but for the fact that this spirit animates its membership, yet when it comes to everyday business or commercial relationship I am inclined to question whether the majority of our members put into practice the principle of co-operation to any great degree than do any other class of the community. While I should be the last to decry the stimulating effect of competition in any relation of life, I am firmly of the opinion that there are limits to which competition should be allowed to go; for when it exceeds these limits it ceases to be salutory and becomes harmful. It becomes harmful when, in a word, it makes of a man a less desirable, a less useful citizen, or of a community a less worthy unit of the State. Is it too much to say that if in the past less of the spirit of competition between individuals, of rivalry between Provinces, and cities, and communities, had been in evidence, and if instead of sectionalism everywhere we had had displayed more of the communal spirit, the desire to co-operate, more tolerance, a greater disposition to "boost" for others as well as for ourselves and our own backyard, Canada, today would be in a stronger and better position than she is ? To my mind then the chief functions of a national organization such as ours,

representing as we do one of the great basic industries of the country, is to teach both by example and precept the value of co-operation. We should begin of course in our own organization, following along the lines already established and steadily extending and amplifying in those directions. We have now, for example, branches or divisions in all the Provinces of the Dominion in which mining is carried on. The establishment of these Branches has done much to increase the usefulness of the Institute to the members locally, but as yet it has not contributed very notably towards the greater consolidation of the Institute. We should aim to make the Branches serve the dual purpose by encouraging them to co-operate among themselves. This would be entirely practicable in a number of ways. There could be not only a frequent interchange of papers on professional subjects of common interests but also an interchange of ideas on matters affecting the general welfare of the Institute, or of the Profession, or of the industry, and so far as possible joint action should be taken to achieve a given purpose.

Mr. O. E. S. WHITESIDE,
Coleman, Alberta.

President of the Institute 1920.

The Institute moreover should persistently offer its services to the Government. This we have not failed to do in the past but our opportunities now, in consequence of our gain in numbers and status, are greater in this respect than ever before. It will perhaps interest you to learn that at least one Provincial Minister of Mines has undertaken to submit all contemplated legislation affecting mining to the Provincial Division of the Institute in his Province for comment and criticism in advance of its introduction in the local legislature. While naturally the Minister is not bound to accept the views that may be presented to him by the Institute, the arrangement referred to will at least bring him into closer touch with the men best qualified to pass judgment on legislation affecting the mining industry; and it is safe to assert that any opinion or advice that is offered will be sincere and disinterested. If co-operation on similar lines between the Department of Mines in Canada (Provincial and Federal) and the Institute can be brought into effect it will undoubtedly enable us to extend our scope of usefulness to a very marked degree.

But there are boundless other opportunities for usefulness and effective co-operation on our part. The Institute represents both the industry of mining and the profession of mining. We are therefore in a position to establish relations for joint service with organizations of two distinct types, namely those primarily concerning themselves with matters of trade and commerce, and those whose objects are essentially the promotion of technical and engineering knowledge.

In the past we have been too inclined to allow Boards of Trade to speak for the mining industry on trade matters; and also we have displayed scant disposition to interest ourselves in the activities of sister societies representing other branches of engineering. These tendencies to stand aloof should be overcome. It should be the duty of the Branches in each Province to educate public opinion concerning conditions affecting mining, and to seek the co-operation of, as well as to co-operate with, such bodies as the Boards of Trade, the Canadian Manufacturers Association, and Mine Operators' Associations, in voicing the requirements of the industry from the trade or commercial viewpoint. In like manner, the establishment of more friendly relations with sister engineering institutions is greatly to be desired; and in the West especially it is conceivable that much benefit would result from joint meetings in such cities as Winnipeg, Edmonton, Calgary, and Vancouver of the different engineering bodies. Engineers of all branches have much in common. The mining engineer of to-day must necessarily know something of practically every branch of engineering. It would therefore be possible to ar-

range a programme of papers at joint meetings that would appeal to all. Discussion on rock work would be of interest alike to the railways, the municipal, and the mining engineer; electricity and mechanics would likewise afford a common meeting ground. And above all, such meetings would serve to promote good fellowship among the engineering fraternity.

A second important function of the Institute, capable of expansion, is educative. Our Charter states that one of our aims is the dissemination of information. No one will assert, I believe, that we have failed to carry out this part of our work well. We have reason to be proud of our publications. Our Bulletin is in a class by itself, and a monument to the untiring zeal and ability of our late secretary, Mr. H. Mortimer Lamb. But still I think we can even go a step further in our educational work. Heretofore we have been content to publish information for the benefit of our members only. This information for the most part has been of a highly technical character, and as such has been undoubtedly valuable. But outside of our membership thre is a class, a very big class indeed, sadly in need of education in respect of the mining industry and its importance to the community. That class is the Canadian public as a whole. Because of this general ignorance we are failing to realize the greatness of our own heritage; and we are allowing it to pass out of our hands into the control of others. The biggest and best mines in Canada are not owned by Canadians. It is almost hopeless to attempt to raise capital in Canada for home mining ventures, however worthy. Why? Because the Canadian public has been led to believe that mining is a gamble, a gamble in which the chances of a satisfactory issue are infinitely remote. The majority indeed are unable to realize that to invest money in the development of a promising prospect is an entirely different thing to speculating on margin or otherwise in mining stocks. It is the commonest thing in the world to hear the remark, from otherwise quite sane men in business, "Oh, I've no use for mining. I got badly bitten once, and once bitten twice shy", and if you ask for particulars, you will presently learn that this now discrete and sage person once plunged and lost heavily during the Rossland boom in some wildcat or prospect without even enquiring concerning its antecedents. Rickard, with his distinguished talent for accurate definition, has told us that capital sunk in mining must be regarded as a speculation rather than as an investment; but approached with due prudence and precaution there is no form of speculation that offers more prizes or yields richer returns. Obviously I refer to legitimate mining enterprise and not to the stock market. While we frankly welcome and sorely need more foreign capital to help us in developing our natural resources, it is nevertheless in the interest not only of the individual, not only of the community, but also of the nation that Canadian Mining should be undertaken by Canadians, and that the title of Canadian mineral resources should be retained as far as possible by Canadians. Hence the urgent need of education, of propaganda along these lines. The task is not an easy one, but that should not deter us from undertaking it. Time does not on this occasion permit me to detail a plant of campaign for the carrying on of this important work, but I may be allowed to suggest one or two preliminary means of attack. The first of these might well take the form of a series of public lectures, under Institute auspices in all the principal commercial centres of the country, followed by a wide distribution of literature of an educative character dealing with the question. We could doubtless enlist the public press of the country as our allies in this enterprise by an understanding that material supplied by the Institute would be directed towards impressing the public with the fact that mining is a business that may be engaged in with a reasonable certitude of profit by exercising ordinary common sense and foresight, and acting under competent technical guidance and advice. That would be our appeal to the individual and his self-interests. But we should go beyond this and show that to sell our birth-right for a mess of pottage is not good business either from the national or any other standpoint; and we should risk being trite by indicating that if it profits foreign capital to develope Canadian mines it would no less profit Canadian capital. Then thinking of the morrow, we should also aim to educate the rising generation in the national importance of a Canadian controlled mining industry; thus in most of the Provinces in which mining is a major industry the educational authorities would no doubt raise no objection to addresses on this theme to school children by members of the Institute who could be deputed to undertake this duty. Also it should not be impossible to provide for the introduction of simple text books in the schools treating of the natural resources and basic industries of Canada, in which of course due attention would be given the subject of mines and mining. Work of this sort, in short, could most fittingly be undertaken by the Institute.

In conclusion, may I be permitted to dwell briefly on the past record and achievement of the Institute, and the service it has rendered to the profession and industry of mining in this country, and to the country itself. It is true that this service has been criticised. We have been told that we might have done more. But such criticism, in the minds of many is unfair. Yet we may benefit from even unfair criticism if it be constructive, and our friend probably reasoned that way at the time, and I agree with him that the Institute's activities must not be allowed to lag. We must continue to justify our existence; and if we mean even to maintain the position we have won, to equal the record of past service well done, it is imperative that we should develop new fields of usefulness. At the same time the established activities, so ably initiated and performed in the past, will continue to occupy our attention. Of new work, apart from that I have just outlined, certain suggestions were made at the Annual Meeting in Toronto last March. These suggestions were that we might undertake to do in Canada what is done by the American Mining Congress in the United States. In a measure we have already done some work along these lines to good effect, that is to say in the matter of influencing legislation, and it should not be forgotten that the establishment of the Dominion Department of Mines was due almost entirely to the Institute's persistent efforts; which only serves to prove the wisdom of further strengthening our organization so as to enable us to do more and more of that class of work.

The opportunities for expansion along the lines suggested seem almost without limit. Have we the ability and initiative necessary to make it a success? Is it a good and proper work to undertake? As a society we can only advance or recede. There is no standing still. Let us all then, individually and collectively, be up and doing. If our Institute is worth maintaining at all if it means anything to us, it is surely the duty as well as the privilege of every member to do his utmost to contribute to its success. Fault finding may of course help in that direction, but I am inclined to think that there are other and more effectual ways of rendering assistance. The Institute may commit mistakes in policy. These, if not too flagrant, may be condoned. Inaction on our part, or an attitude of mere complacency with the position and reputation for good work we have won, with no desire to improve it, would be fatal and uncondonable. I need scarcely say that there is little likelihood of the Institute falling into that grave error.

Dominion Mineral Royalties.

The question of Federal royalties on minerals and particularly on copper and oil was discussed and it was pointed out that in connection with the Flin-Flon deposit the formulation of some definite policy by the Dominion Government was so necessary as to be almost tantamount to deciding whether this new industry should proceed to develop or not. Capitalists required some definite idea of royalty costs and title rights before making large expenditures. It was stated that Institute Committees had been appointed to deal with the royalties question at the last Annual Meeting in Toronto but that final reports had not yet been received by the Council. The attendance of several of the vice-presidents from the East had been confidently anticipated but at the last moment the vice-presidents were unable to be present. The names of Dr. Allan of the University of Alberta and Mr. C. R. Bancroft of the Mandy Mine were added to the Committee on Dominion Royalties.

Leasing of Bituminous Sands.

Attention of the meeting was drawn to the fact that the leasing of the bituminous sands in Alberta had been withdrawn by Ottawa but that before this was done a considerable lease had been granted to a private company of which Colonel Lindsay was the head. It was further understood in Alberta that, in the event of any old lease falling out of date, such lease would revert exclusively to the interests controlled by Col. Lindsay. The Provincial Government of Albert had made many enquiries as to the definite status of the tar sands in regard to leasing and mining, but no definite information could be obtained from Ottawa. The reply of the Superintendent of the Department of Mining Lands and Yukon Branch (Dept. of the Interior) to enquiries as to the terms upon which tar-sand rights

had been granted to General Lindsay states that "as the agreement is not final, and compliance with the terms thereof is dependent on whether or not the preliminary experimental work proves successful, it is not considered advisable, for the present to disclose the terms of the agreement." Similar answer had been given to enquiries sent from Alberta and also from eastern points, and there was a general agreement of the members present that the information vouchsafed was insufficient and that definite information was improperly withheld.

MONDAY AFTERNOON. 25th OCTOBER 1920.

With Dr. Allan of the University of Alberta in the Chair the afternoon's proceedings were largely devoted to consideration of questions concerned with coal and coal mining.

A paper on "Coal" by Mr. Louis Stockett, was taken as read in the absence of the author.

Mine Rescue and First-Aid Work.

Mr. Duncan McDonald, who is Inspector of Mines and General Superintendent of Mine Rescue Work in Alberta, read a paper with the foregoing title, and gave a demonstration of the salient points of the latest type of "Proto" apparatus.

Mr. McDonald said that the use of oxygen breathing apparatus was now recognised by legislation requiring its use in many countries, and that it was noteworthy that governments were paying attention to the safeguarding of the construction and use of breathing devices. The careful selection and training of men for rescue work was emphasised, and the speaker noted that no shortage of volunteers for training was found where the mine officials and the management took a personal interest in the work. Where the management was indifferent, poor results were probable.

The necessity for standardization of apparatus was dwelt upon, and the selection of one type for a province or state was considered desirable.

An annual Dominion contest in mine rescue and first-aid work was suggested by Mr. McDonald, in which there could compete teams that had been successful in local contests from every mining district of Canada.

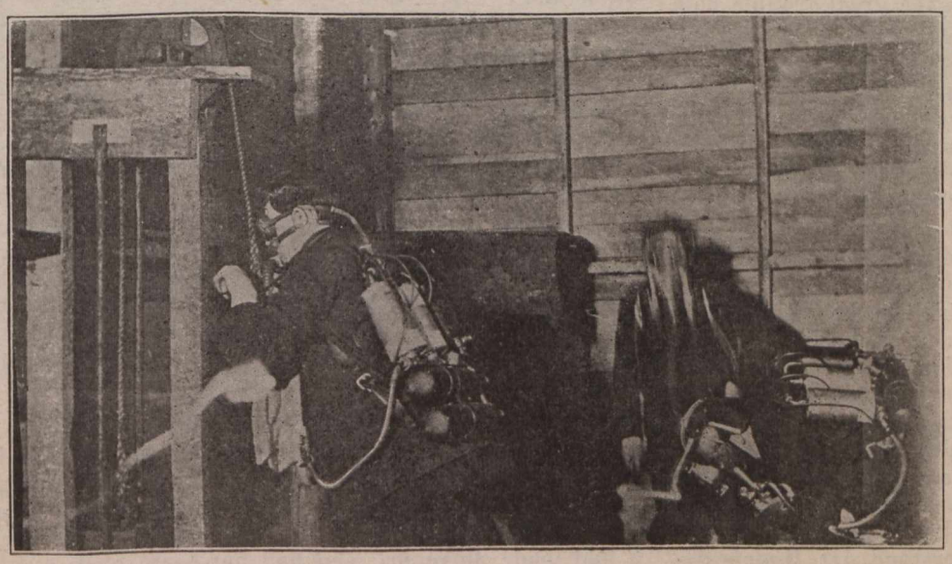
The Province of Alberta has taken a leading part in the provision of mine breathing apparatus, and in the training of men in rescue and first-aid work. Three rescue-cars and six stations are now located at different points in Alberta under the direction of the provincial government, each car and station in charge of a fully qualified superintendent. Ninety sets of "Proto" apparatus are provided in these cars and stations, and 1,388 men have received training. The work was put under the supervision of the Workmen's Compensation Board in 1919.

Mr. F. W. Gray stated that when in the service of the Dominion Coal Company in 1907 he had brought to Canada the first Draeger apparatus, which, with the single exception of a Giersberg apparatus imported at an earlier date by the Nova Scotia Steel & Coal Co., but never used, was the first modern self-contained breathing apparatus used in North America. The Dominion Coal Company's station had antedated that of the United States Bureau of Mines by some months. Mr. Gray supported the suggestion recently made by Hon. Wm. Sloan, the Minister of Mines for British Columbia (see page 794, our issue of 1st October 1920) that joint action should be taken in Canada and the United States to design a standardized self contained oxygen breathing apparatus that would combine the acknowledged excellences of the main types now on the market and avoid their special defects.

Mr. Gray also urged that the word "rescue apparatus" should be no longer used, and that the oxygen breathing apparatus should be regarded as primarily a fire-fighting device with possibilities for rescue work under certain conditions following mine fires and explosions. Mr. Robert Strachan of Fernie considered the use of the "Pulmotor" should be discontinued, and thought that life could more probably be saved by ordinary methods of artificial respiration. Mr. Strachan pointed out that where accidents had occurred from the use of oxygen apparatus, these had occurred not from failure of the device, but from improper use or lack of training. He thought it would be advisable, and would lead to good results, if the mines departments of the various provinces could get together on this matter of training and standardization of apparatus.

The Part that the Coalfield of the West should play in Canadian National Development.

Mr. F. W. Gray read a paper with the foregoing title, which was presented as a follow-up of the paper on "Canada's Coal Supply" presented at the Toronto



Training with Oxygen Breathing Apparatus in the Smoke-Chamber of the Station of the Dominion Coal Co. at Glace Bay, in 1907.

Meeting of the Institute in March last (see C. M. Journal, page 228, issue 19th March 1920.) The speaker urged that his previous contention, namely, that Canada could be made completely self-supplying in bituminous coal had been borne out by the intervening events. The text of the paper will be given in a later issue of the "Journal".

Mr. W. J. Dick, General Manager of the Coal Sellers, Ltd., said that to those actually engaged in mining and selling coal in the West, the annual enlargement of the radius of western coal was encouraging. In past years the coal imports into the Fort William port of entry had run up to 500,000 tons of anthracite and 2,700,000 tons of bituminous coal, so that Western Canada had been importing annually 3¼ million tons of coal that could have been supplied from Canadian mines. Why was this so? In the first place, the railways themselves were the largest users of bituminous coal, and although Pennsylvania was far away, the long stretch of water carriage through the Great Lakes helped the American coal. The railways that transported coal from the mining districts in the States were built as coal-carrying roads, and the cost per ton mile on the Lake Erie roads were much smaller than coal carrying costs on the Canadian roads. We have not the traffic on Canadian railways to enable us to compete with the coal-carrying lines in the States. Considering the low rail rate and the low lake freight rate on American coal coming to Fort William, it was a natural thing, and it suited the operations of the railways, which sent the grain cars westwards loaded with coal. The change in recent years had been very marked. At one time, the Winnipeg Board of Trade had stated that if Winnipeg had to use western coal the people would freeze to death, not realising that all the population to the west of Winnipeg were using nothing else but western coal. Now eight per cent of coal consumed in Winnipeg is mined in the Canadian West. Coal had been sent to Port Arthur, and even to Dryden, Ont., and found to be all right in use.

In regard to the enlargement of the western market, Mr. Dick said that both Alberta and British Columbia would show much larger exports to the adjoining States of the Union in 1920 than ever before.

Mr. R. C. W. Lett, Colonization Agent of the Grand Trunk Pacific said that while the heat values in western coal were much higher than in the American coal, such as was now being received, the great trouble had been disintegration, and he asked what progress had been made in briquetting lignites.

Commissioner R. C. Wallace said that while adverse action towards western coal had been taken in the past by the Board of Trade, no such body in Winnipeg would take similar action in regard to western coal now. Dr. Wallace's statement met with sympathetic general applause.

Mr. George B. Saunders spoke with reference to Dr. Bone's new boiler designed to consume lignite. He had blueprints of this boiler, which he believed would quite revolutionize lignite consumption for power-raising purposes. The installation would be quite expensive, and suited for large power-plants. The principle of this boiler is the prior subjection of the lignite to the heat of waste gases, resulting in sufficient evolution of moisture to reduce the lignite practically to a bituminous coal content before it passes to the chain-grate on which combustion takes place. While the exact process is not as yet understood, Dr. Bone's device is stated to be thoroughly practicable and will shortly be placed on the Canadian market.

The Use of Powdered Coal in the Selkirk Rolling Mills.

Mr. H. A. Mackay, Chief Engineer of the Manitoba Bridge and Iron Works, read a carefully prepared paper on the experiences of the Manitoba Rolling Mills in developing the use of powdered western coal for the heating furnaces and the open-hearth plant of his Company at Selkirk. Mr. Mackay's paper was one of those rare occasions at technical meetings when the development of a new utilisation of raw material is outlined from its beginnings to a successful consummation, and the President of the Manitoba Bridge & Iron Company — who was present — and Mr. Mackay are to be congratulated on proving the entire suitability of a local coal for a local metallurgical industry — one of the first, and also one of the most important in the West.

The initial troubles with western coal in powdered form were apparently associated with the low fusibility of the ash, and this was of course more in evidence in the use of powdered fuel for open-hearth use than in the case of heating furnaces, because of the necessity to pass the waste gases, and their suspended ash, through the checkers.

The distinctive feature of the Selkirk pulverizing plant is the long rotary dryer. The length of this dryer, as was explained by Mr. Mackay, was largely accidental and resulting from the fact that the necessary part was in stock, but it has proved most satisfactory in use, and it had been found possible to dry and pulverize coal that was quite saturated with moisture.

Mr. Deacon said they had discovered only one or two coals that would give good results when powdered, and use in metallurgical processes introduced problems very different from those associated with the raising of steam. The question of ash deposition was not so important where it was not necessary to pass the flame and gases through checkers and flues. Mr. Deacon thought from his experience that the use of powdered fuel for central heating plants would develop in western cities.

President Whiteside referred to an incident in his experience fourteen years ago when it had been found possible to utilise washer refuse running 50 to 60 per cent in ash. The fusibility of the ash was often very important.

Mr. W. J. Dick referred to the growing use of pulverised coal in the State of Washington, and its use by the Pacific Coast Collieries. Nut coal from the Lethbridge district, running 34 per cent ash — due to mixture with a draw-slate that could not be separated from the nut — had been burned successfully without any change in boiler setting giving 80 per cent efficiency. The utilisation of high ash coal turned largely on the question of fusibility. With regard to central heating plants, the speaker mentioned the central heating plant of the University of Edmonton and that of the City of Brandon. At the present time the price of pipe was a deterrent to extension of the central heating idea.

Progress of the Lignite Utilization Board.

Mr. Lemy, representative of the Province of Manitoba on the Lignite Utilization Board, was asked by the Chairman to address the meeting. Mr. Lemy said that although the Board had been working for three years it had made no report, and had not been asked to.

The Board got out weekly reports of progress, and in that way kept each other in touch with all developments. The Board was constituted by Order-in-Council and instructed to investigate the suitability of lignite for domestic fuel and its preparation.

The Research Council seemed to have been under the impression that everything had been learned about lignite that could be learned, and handed over to the Board a mass of literature. The Board started its work, but with the exception of one or two articles, could find nothing of value and had to start from the ground up. They made up their minds that anything that was to be found out would have to be discovered by the Board's own exertions. The engineers went on a tour and visited every plant, and although great hopes were entertained that the problem had been solved elsewhere, the investigations disclosed that this was not so. Carbonizing was the essential part of the problem. The first thing was to devise a carbonizer. Lots of devices were seen, but none proved of value. The Board's engineers had now under erection a device that Mr. Lemy said would do the work required.

A long series of experiments were made with binders. Every possible substance was investigated. About sixteen formulaes for binders had been produced that gave satisfactory results. The waste of flour mills and sulphite pitch were promising materials. A briquette had been finally secured that would stand the most trying conditions, including the necessary ones of ability to stand transport, weathering, storage, strength of briquette, and behavior under the process of burning. The Board had not the slightest doubt as to the practicability of manufacturing satisfactory briquettes equal in quality to good anthracite. The Board had planned to have briquettes on the market this Summer, but deliveries of machinery had disappointed them. The plant is about half finished and is expected to be in operation about the end of February. Housing was one of the problems to be overcome, for which no provision had been made in the original estimates. Fifty or sixty employees will be required. Original estimates made in 1916 have proved too small for obvious reasons. Instead of $400,000, the sum of $600,000 will be required to finish the plant. For the same reasons, it is not unlikely the cost of the briquettes will be increased from the original estimate of $10 per ton to $13 per ton. Plant will have an initial capacity of one hundred tons daily. The plant is of an entirely experimental nature, and not intended to demonstrate manufacturing costs. No private property is involved in the process. Certain features could be patented, and the Board has patented the carbonnizer only. The cost has been that of developing a process, and not a plant, and plants which may later be erected will thereby be made possible.

The Smoker.

The Smoker was — for the Canadian Institute — a decorous affair, but extremely enjoyable. Messrs. Lett and Atwood showed moving pictures of water-powers of the West, and in particular of Manitoba. No person ventured to sing the Anthem — which is perhaps just as well — for Winnipeg that is.

TUESDAY MORNING. 26th OCTOBER 1920.

With Mr. W. J. Dick, a vice-president of the Insitute, in the Chair, the proceedings of the second day of the meeting were opened by a paper read by Mr. J. F. McColl of Calgary, on "Results of Recently Conducted Steaming Tests on Western Coals."

Mr. McColl, who is the Chief Engineer of Calgary, and introduced himself as "Two Bit McColl", (a cognomen earned through his predilection for moderately priced fuel) described his experiences in successfully utilising for steam-raising purposes Drumheller slack coal — largely considered a waste product — averaging 15 per cent moisture and 12 per cent ash, through using a special setting of a chain-grate stoker under an ordinary B. & W. boiler. The special feature of Mr. McColl's setting is the introduction of a secondary arch. The deflection of the flame by the arch throws it back towards the front of the boiler sufficiently to evaporate the moisture as the coal comes on to the grate from the feed-hopper. Mr. McColl said he had proved indubitably the practicability of using a low-grade western slack, and believed he was saving his employers $300 per day by consuming this low-priced inferior fuel in place of round coal sold at higher prices. The alterations to the standard boiler setting had cost some $300 each boiler, and would now cost more because of increased labor and material costs, but in any case would more than pay for themselves.

The Drumheller coal used analysed, approximately, moisture 15 per cent, ash 12 per cent, volatile 30 per cent, carbon 42 per cent, with 11,540 b.t.u's.

The Ogilvie Flour Mills had used satisfactorily a coal containing 16½ per cent moisture, 6.3 per cent ash, 33.4 per cent volatile and 43.8 per cent carbon, estimated to yield 9,960 b.t.u's.

Mr. McColl said he had no difficulty in burning high moisture coal, even when thoroughly saturated by melting snow or rain. He had burned Souris lignite, containing 30 per cent moisture without difficulty.

Mr. McColl mentioned that some of the western coal received, and received for testing purposes, to assist the missionary work of the representatives of the Province of Alberta, was poor quality, no care having been used in its selection, and little interest taken by the shippers. In some instances valuable standing in the competitive tests had been lost by pure indifference in the preparation of the coal samples, some of which had been taken from old dumps in Winnipeg itself.

President Whiteside said "coal is coal" and it is a matter of getting a proper setting of the boiler, proper firing, and proper adaptation of conditions to the quality of the coal attempted to be consumed. Mr. Whiteside said the present time was a crucial one in the use of western coal, and there was need for consolidation of interests, and cooperation in the grading of coal and its preparation for market.

The Mineral Resources of Alberta.

Dr. J. A. Allan, of the University of Alberta, and the author of a comprehensive report to the Government of Alberta on its mineral resources (see Journal of 15th October, page 841) spoke regarding this subject. Dr. Allan referred to Mr. Stirling, the Chief Inspector of Mines, who had been quite ill, but was now recovering, and said he had done a great work for the Institute in Alberta.

Dr. Allan described the geology of Alberta, and stressed the fact that a large part of the province was composed of the central plain containing the sedimentary rocks which held coal and oil and distinguished Alberta from the other provinces of Canada. The occurrences of coal were distinguished by extent, by numerous horizons of varying age, and by marked

differences in the original material and the method of deposition of the coal, and by differences also in the structure of the coal that had been caused by pressure and heat. Any anthracite found in the Province was a result of metamorphism, and there was no large area of true anthracite present. Some areas in Alberta plainly represented limited areas of swamp deposition, which accounted for the disappearance of a well-marked seam within a short distance.

Dr. Allan intimated that the University og Alberta was undertaking a comprehensive investigation of the origin and nature of Alberta coal, in which microscopic examination would play a large part, and said that a necessary preliminary to the full development of the great western coalfield was a fundamental knowledge of these matters.

In regard to oil, a general survey of the provincial occurrences was given by the speaker, who stated, what it is both pleasing and important to know, that the Imperial Oil Company was withholding nothing that it had learned by its borings and geological searching from the officers of the Province and the Geological Survey at Ottawa.

The importance of the oil strike at Fort Norman was that it is believed to be located on the edge of a large basin extending northwards that in all probability contained oil. Oil had been struck at Great Slave Lake, where a drill-hole is down 500 ft. The work has been discontinued until Spring, but indications are good. The oil is heavy, about 16 Baume.

With regard to the bitumen sands of the Athabaska River, Dr. Allan said there was the equivalent of 189 cubic miles of bituminous sands, which if a method could be found to concentrate and extract the oil, would last the World at present rates of consumption for one thousand years.

With regard to iron, the Province was singularly deficient in this material, but some excellent samples had come down from the McKenzie Basin.

Professor N. C. Pitcher, of the University of Alberta, was to have read a paper on the more efficient utilization of coal in Alberta, but had been prevented from coming to the meeting. It is expected that Professor Pitcher's paper will be included in a forthcoming issue of the Institute's Bulletin.

Problems in Connection with the Marketing of Western Coal.

Mr. D. King, of the Hargraves Coal Company, read a thoughtful and extremely helpful paper on the problems of marketing western coal. It is understood that Mr. King has always been sympathetically disposed towards the use of Canadian coal wherever and whenever possible, and his address, which was largely conceived from the viewpoint of a coal distributor, was one that apparently received, and was worthy to receive, the careful attention of western operators, many of whom were present to hear Mr. King.

Mr. King, considered the problems of marketing western fuel were few in number and easy to remove. First, prejudices against Canadian coal must be removed. The consumer must be educated and proof given that our coals compare favorably with imported coals. The operator should prove to the dealer that he is with him, and that there is profit in handling western coal. The preparation of coal for the market required more study, and the speaker urged fewer and better standardized sizes. Mr. King said the Government of Alberta had made a start in educating the public to the use and advantages of western coal, but is was only a start, and he urged its intensive continuance. To stop now would be to stop at the crucial moment.

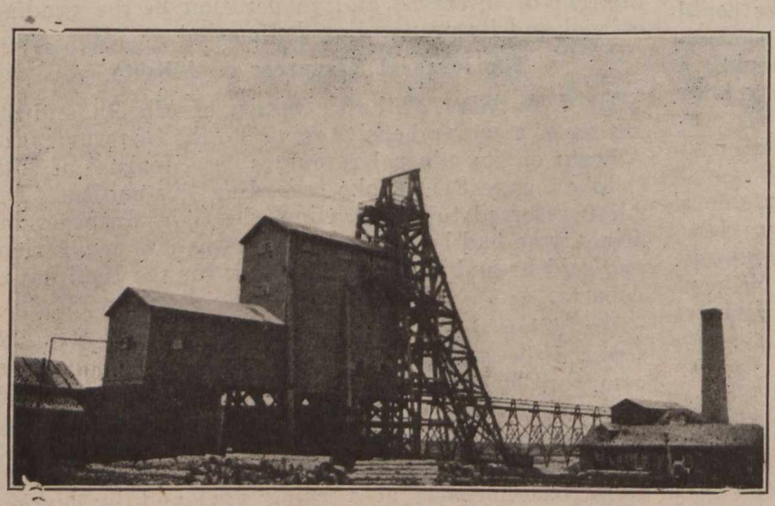
The opportunity of the western coal miner is today unlike that of a few years ago. It is not a forced opportunity. The market was now in the operators hands to keep or to lose, to make or to mar. When American coal comes back, as it will, it would have to be met on a dollar for dollar basis. "Do not, gentlemen" said Mr. King, "be content with a general statement that western coal is as good as eastern coal. Make sure."

Mr. King said there were too many steam-coal sizes, which he thought must be an unnecessary and heavy expense to the operators, as it was to the dealers. The speaker urged the importance of having a good sales agent, a man who knew what he was talking about, and could be relied upon to make exact statements, and no more.

The concensus of the general discussion that followed Mr. King's paper, was that the present time offered a unique opportunity to gain a solid footing for western coal in the home markets, if the operators and the dealers would work cooperatively to that end.

Mr. J. R. Shanks, of Nordegg, Alt., suggested that the Alberta Government should obtain copies of Mr. King's paper for distribution among the coal producers.

Mr. Stutchbury, of Edmonton, who is a local representative of the Alberta Government in the forwarding of the sale of Alberta coal, said the Alberta Go-



Tipple and Headframe.
WESTERN DOMINION COLLIERIES
Taylorton, Saskatchewan.

One of the Oldest and Best Equipped Mines in the Souris Lignite Field.

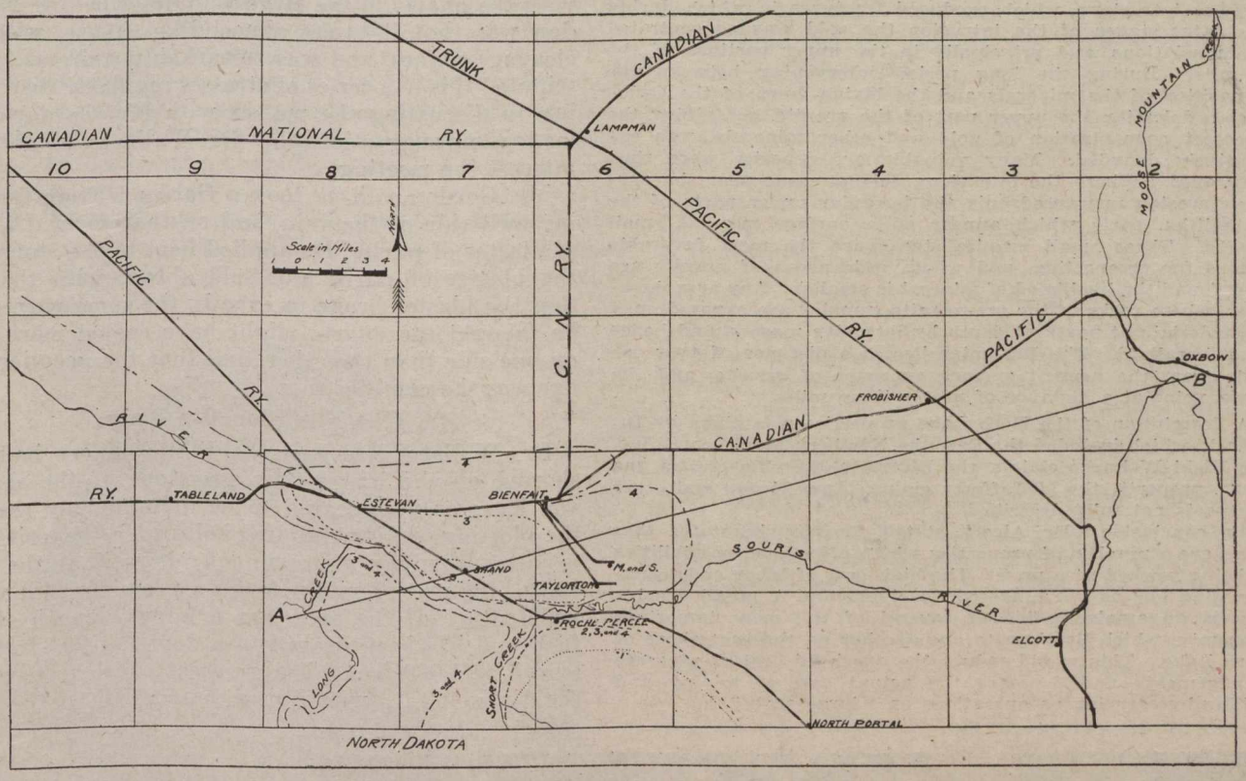
vernment was not discontinuing advertising, although they had temporarily discontinued the newspaper display advertisements through the grain-moving season. The Government was preparing for a four to five months campaign and demonstration in the burning of western coal for domestic purposes throughout the Winter. Mr. Stutchbury said it was the intention of the Alberta Government to lose no opportunity to press the sale of Alberta coal by advertising and educational work. The speaker said that Mr. King's remarks would be all the better received as he was well known as a "booster" for Canadian coal.

Mr. M. A. Daley, the Fuel Supervisor of the Northern Pacific Railway, was asked by the Chairman to address the meeting, as a gentlemen who had much experience both in the use and in the purchase of coal. Mr. Daley, who spoke as a citizen of the United States, congratulated the Institute on the importance of its work, and said that on such bodies rested the future of the British Empire. Mr. Daley said he supervised the purchase and use of some 2½ millions of tons of coal annually, and he realised the fundamental importance of coal, not only in transportation, but in everything else in civilized life. One of the greatest problems of the coal trade, the speaker suggested, was a better preparation of coal. He had known operators who actually did not know that it was in their own interest to sell a clean fuel.

Mr. Daley urged the opportunity for the utilisation of low-grade coal on railways. He instanced one locality in the United States where locomotives ran over an eight foot seam of coal, but actually went 600 to 1,000 miles to get a better grade of fuel. Pulverised coal on locomotives had yielded much better results than hand-firing. He had known of the use of lignite, containing 40 per cent of moisture, in powdered form, while slack, with 15 per cent moisture had been successfully used in the States. With regard to the difficulty occasioned by low fusibility of ash content in fuel, the difficulty referred to by previous speakers, namely the clogging of narrow flame passages and flues by honeycombs of ash, this had been overcome in a Milwaukee plant, where by the use of water-cooled tubes, interposed so as to meet the flame and fumes at the proper point, it had been found possible to precipitate the ash before it reached the flues.

TUESDAY AFTERNOON. OCTOBER 26th, 1920.

Tuesday afternoon's discussions and papers covered the metallic deposits of Northern Manitoba. The morning's session had been remarkable, for in listening to the papers descriptive of new methods of burning coal, and the obviously rapid development of a local technique, the impression could not be shaken off that those who were present were listening to the tale of the birth and infancy of what will some day be the greatest branch of the coal trade in Canada. In the afternoon, the meeting was no less remarkable, as one heard, as many did for the first time, of a new mineral area in the Middle West, only recently found, and indeed only recently suspected, which may very well compare some day with Northern Ontario and Northern British Columbia. There was a sense of being among pioneers of a new day in the West that gave the Winnipeg meeting a very distinctive tone, which was most in evidence in the juxtaposition of coal and metal papers in the sessions of Tuesday.



Map Showing Position of the Estevan Taylorton Field, Saskatchewan. The Commercial Value of the Saskatchewan Lignites is now Firmly Established.

—Reproduced by Permission from the "Bulletin".

Gold Deposits of Herb Lake District, Manitoba.

(Dr. F. J. ALCOCK, Geological Survey.)

Dr. Alcock illustrated his remarks by a new map of of the Herb Lake District, which he has prepared in the field, and has been very recently issued by the Geological Survey. A memoir by Dr. Alcock is in the press, dealing with this district and should be available for distribution very shortly. A summary of Dr. Alcock's remarks follows:

Gold-bearing quartz was first found in the Herb Lake region in 1914, and active prospecting has continued ever since. Much development work has been done, and on one property, the Rex Mine, a mill has been erected and active mining carried on.

The area is reached from Mile 82 on the Hudson Bay Railway by train from The Pas fortnightly.

Although Palaeozoic rocks occur in the southern part of the district, the pre-Cambrian rocks are alone of significance in mineral content. The pre-Cambrian rocks fall into two main divisions, first granite and its differentiates, and an older complex of sediments and igneous rocks, much folded, and intruded and metamorphosed by the granite. The gold bearing veins are high-temperature deposits genetically related to the granite intrusions, which produced fractures in which during the later stages of the intrusion the gold was concentrated from solutions, and principally in the upper portions of the granite. During the long period intervening between the deposition of the minerals and the laying-down of the Ordovician dolomite, the upper part of the granite, containing the greatest concentration of gold and other minerals, was extensively denuded. Many valuable ore deposits were thus destroyed. Where the intrusions did not come near the surface, erosion uncovered only the irregular upper parts of the batholiths, parts which appear on a surface map as small stocks. These small granite stocks are the most favorable places for prospecting, and where wide areas of granite are now found the likelihood of mineral is smaller. Any area, however, where rocks of the pre-granite complex are exposed, may be underlain at no great depth by intrusive masses, and hence be mineralized. The Rex mine lies at a distance of over one mile from the nearest surface exposure of granite, and the Kiski veins at a distance of nearly three miles.

A description of the Herb Lake properties was given by Dr. Alcock, which included the Rex, the Northern Manitoba Group, the Kiski-Wekusko claims, the Elizabeth-Dauphin claims, the Bingo property, the McCafferty claims, Apex Group and other prospects not fully described.

"In conclusion," Dr. Alcock stated, "It may be stated that there are a number of properties which offer good possibilities of being worked at a profit. The high cost of labor and transportation has as yet hindered development. A possible solution is an amalgamation of several of the more important properties which lie close to one another on the east shore of Herb Lake. This would reduce the overhead cost of separate managements and decrease the actual cost of mining and milling by carrying on operations on a large scale."

Dr. Alcock also mentioned his explorations in the Seal River country. No rock was exposed, and the topography consisted of long ridges of terminal morain deposits, and the typical glaciated features of kettle holes, undrained lakes, and similar well-known aspects. The debris was entirely unsorted glacial material, no stratified gravels being noticed. There was of course no possibility of gold deposits in this country.

Mineral Deposits of Copper Lake, Man.

J. P. Gordon, whose high-grade gold discovery in the Copper Lake district aroused considerable interest some 18 months ago, contributed an address on the mineral deposits of that section.

Mr. Gordon described the geological formation of the Copper Lake district and the mineral occurrences. He outlined the development work which had been done on his properties, and stated that with transportation facilities he was satisfied that the district could supply a large tonnage of low grade ore of commercial value.

Dr. Wallace said a remarkable feature in connection with the quartz in the large vein described by Mr. Gordon was that it broke almost like calcite, with three cleavage planes, and was remarkably uniform. He attributed this to a series of stresses regularly distributed, but in discussing the matter with Mr. Gordon he had made some suggestions that Dr. Wallace thought would interest the meeting.

Mr. Gordon said he took a flat rock from the hanging-wall side of the vein, and on that formed a mould of plaster of paris. He applied heat to the stone under the plaster of paris, and cold above, with the result that the plaster broke in exactly the same way, so that he thought the quartz might have cooled more slowly on one side than the other, and that the peculiar cleavage was the result of this.

The Flin-Flon Ore Body.

Dr. Wallace described the Flin-Flon ore body, and showed on the lantern cross-sections of the shape of the lense as it appeared to be delimited by results of the plotting of diamond-drill holes. The deposit, which is interrupted by a prominent "horse" at the south end of the property that forms a prominent topographical feature of the area, has a known length of 2,593 feet, and has been proved to a depth of 900 feet for a length of 1,000 feet. The greatest width transverse to the dip is 400 ft., with a maximum width at the 900 ft.

The Roofed-Over Pit sunk on the rich gold-shoot on the "Red Rose" at Copper Lake, Man., which first called attention to this district.

(From the "Journal" of Oct. 1st, 1919).

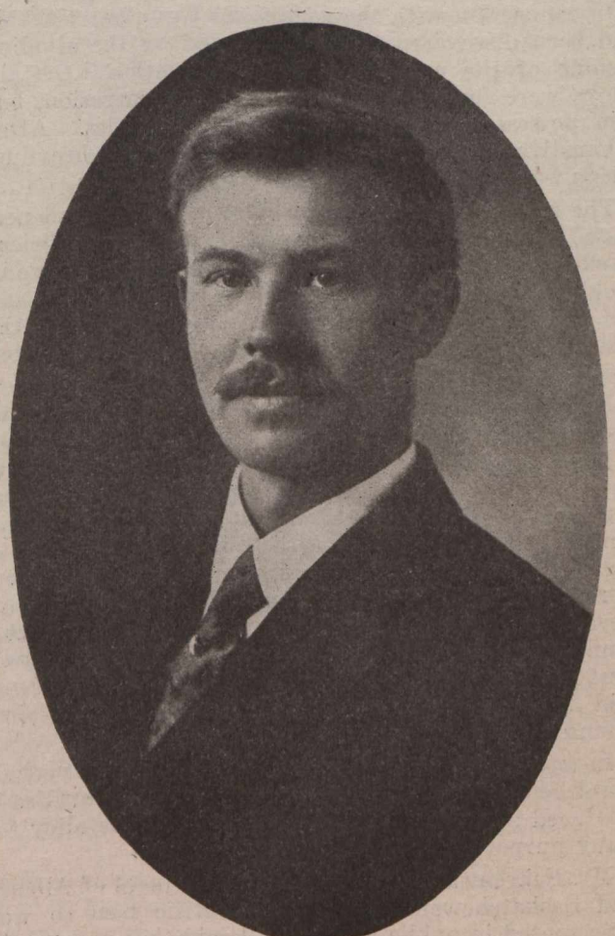
level of 35 feet. Exclusive of the greenstone horses contained within the ore body, the tonnage of ore is estimated as a result of diamond drilling at 16,000,000 tons, making no allowance for continuation of the ore below the 900 ft. level, or possible ore at depth in the line of pitch at the south end of the ore-body. On the whole, the ore-body is most compact at the north end, and shows a tendency to finger with inclusions of country rock toward's the south end at depth.

The ore-body consists of solid sulphides, which occur in the centre and towards the hanging-wall, and are in places in direct contact with the hanging-wall. Disseminated ore occurs in greater quantity towards the foot-wall.

The minerals of the ore-body are, in order of importance, pyrite, sphalerite and chalcopyrite. Gold and silver values occur associated mainly with pyrite. Galena has been found in vugs in the otherwise unmineralized rock, but does not occur in quantity in the ore-body. Native copper is found in leaf form in the upper sulphite zone, and has been precipitated as a result of secondary processes.

While it might be expected that values in gold would increase, and values in copper and zinc would decrease in depth, no indications of any such variation has been noted to the depth at which diamond drilling has explored the property.

Dr. Wallace's paper is so full, and so little susceptible to condensation, that further extracts cannot be made at this time, and publication of the paper in full must be awaited.



DR. R. C. WALLACE.
Commissioner of Northern Manitoba.

Particular stress was laid on the question of transportation, and mention was made of the visit of members of the Manitoba Legislature and Winnipeg business men to the mine—elsewhere described in this issue. A railway 85 miles long was required to make development of the ore-body a commercial possibility.

The Rice Lake District, Manitoba.

Professor J. S. DeLury, of the University of Manitoba, described the Rice Lake area. Dealing with the general economic aspect, Prof. DeLury said this remained much as it was when Mr. Dresser looked into it, with the normal advance that the district had made since its discovery. The knowledge of the area was still being extended, and that by a very small body of prospectors. A surprisingly small number of persons were working in the district, considering its size, but the known mineralized belt was being continuously extended. He would lay special emphasis on the fact that it was still a prospectors' district. It is an area with many possibilities that has not been scratched, not more than one per cent of the area having been intensively prospected.

Prof. DeLury referred to the discovery of nickel-copper ore in norite of Sudbury type in the Bear River District, of which large samples were shown in the mineral exhibit in the Hotel.

Some interesting slides showing glacial action, sheared zones, flow evidences, and quartz outcrops were shown by the speaker.

Bear River Area, Manitoba.

A detailed and fully illustrated paper on the Bear River area had been prepared by Mr. R. J. Colony, but was not read owing to pressure of time. The paper was an important one, inasmuch as it describes an occurrence of copper-nickel, and publication in the Bulletin will be looked for.

Evening Session, Tuesday, 26th October.

In the evening Dr. Wallace gave an illustrated lecture on Northern Manitoba, which included some new historical facts in connection with a country which, as Dr. Wallace put it, contained relics of what is almost a forgotten civilization, and of the earliest Canadian explorers. Among other interesting photographs were notable views of old Fort Prince of Wales, with its 42 ft. thick walls; and also of the church at York Factory, which contains a fine stained-glass window presented by Lady Franklin in memory of her husband. This church stands on the river bank, which in the course of 50 years has been eroded until the church is in danger of falling into the river. There is also a library at York Factory containing unique specimens of early Canadiana, that call for preservation.

View of the Hudson Bay Railway, which is complete except for 92 miles of steel rails, were in the nature of new knowledge to many who heard Dr. Wallace and the actual extent of construction work accomplished in a difficult and desolate region is certainly little realised by the Canadian public. One photograph shown by the speaker revealed the terrific intensity of the storms that visit Hudson's Bay.

Wednesday Morning, 27th October.

Captain H. E. Knobel, of Port Arthur, read a paper on "The Use of Ontario Iron Ores for Canadian Furnaces." It is hoped to reproduce Captain Knobel's paper in full in a forthcoming issue, but mention should be made of two definite suggestions put forward to assist what is undoubtedly a necessary development in

Canada, and to relieve what cannot by any stretch of the imagination be considered a satisfactory condition, namely, that only five per cent of our blast furnace iron-ore charges are mined in Canada.

These suggestions are:

(a) A suitable bounty on all Canadian iron-ores mined and marketed without restriction, payable to the mine-owner.

(b) The installation, at some suitable point, of a concentrating unit, on a sufficient scale to make economic determinations in the beneficiation of jaspilite ores — this class of ore being most representative of the large reserves of low-grade ores available.

Mr. F. W. Gray, speaking as the Secretary of the Iron & Steel Section of the Institute, said that the section had not been active, and suggested that possibly the policy of sectionalizing the Institute was mistakenly conceived. He thought that the best way for any particular technical interest comprised in the Institute's activities to make itself felt was to contribute to the Institute's papers and be in attendance at the discussions. The Institute had a wide field to cover, and its activities were sufficiently sectionalized by geographical exigencies to make it doubtful whether further dissection of its activities was desirable. The suggestion to make a coal-mining section had not been pressed, largely, the speaker thought, because this fact had been realized when the proposal was analysed in the endeavour to work it out in practice.

Dr. Allan said that unfortunately Alberta contained little or no iron, so far as known, but in the Crow's Nest District there was a deposit of magnetite. It contained a considerable percentage of titanium. Newly detected occurrences of iron ore in the Peace River district had been reported, both hematite and limonite, but were very far from transportation. There was also a hematite occurrence of undetermined extent in the Mackenzie Basin.

Mining and Ore Transportation at the Mandy Mine.

Mr. G. R. Bancroft described the now famous transportation achievement of the Mandy Mine, made possible by the extraordinarily rich ore concentration at that property.

Dr. Allen said the Mandy Mine was the only copper producer in the Province, and said that Mr. Bancroft had been modest in describing the transportation of the ore in not telling the members of his own leading part in that achievement.

Mr. F. W. Gray said that the tale of the Mandy Mine had, to most persons outside of Manitoba, been chiefly responsible in spreading the fame of the northern mineral belt of that province; and that if Mr. Bancroft was to be credited with the transportation work, he was also to be credited with putting Manitoba before the public in a way that had called very general attention to the province.

In answer to a question, Mr. Bancroft said the cost of transportation had varied during the four years in which it had been carried on. The hauling of the ore to the head of navigation amounted to about $14.50 per ton. The steamboat costs had varied with the well-known vagaries of the Saskatchewan River, in which stream the water level was apt to vary quickly and within wide limits of depth. Including loading and unloading the cost had been about $5.13 per ton, labor and material only, and not allowing for depreciation and interest on equipment.

Non-Metallic Mineral Deposits of Manitoba.

Mr. D. C. McArthur read a quite exhaustive paper, including an unexpectedly long list of the non-metallic minerals of Manitoba. Prominent among these is good building stone, as may be seen from a visit to the new Parliament Buildings, built with Tyndall Quarry stone. These buildings are a noteworthy architectural achievement, and will become famous among Canadian architectural records as time goes on. This by the way.

Clay products, bentonite, gypsum, talc, oil, sodium-sulphate, garnetiferous sands, salt, bitumen were among the materials mentioned by Mr. McArthur as being found in commercial quantities in Manitoba.

A matter of some importance mentioned was that arrangements had been made to preserve and co-ordinate all the records of sinkings and borings done by the Government of Manitoba and also of Alberta.

Alloy Steels.

Mr. F. A. Fahrenwald was listed to speak on "Non-Corrosive Steels" with particular reference to reseaches into a possible non-corrosive metal for gun-barrels. Mr. Fahrenwald changed his subject, stating that his prepared paper would be presented through the Bulletin, and gave an illuminating talk of the general question of alloy steels. He showed a table of elements arranged in groups, and explained their family inter-relationships, which guide the metallurgist in his search for alloys designed to fit special purposes.

In connection with the corrosion of gun-barrels, this had been discovered to be occasioned by the alkaline residue of the primers used in detonation. Certain alloys were found to give resistance to corrosion, but also possessed undesirable physical qualities. After exhaustive experiments, iron-nickel and iron-chromium alloys were proved to give the best combination.

The speaker referred to an alloy which he had perfected for use in automobile pistons. The co-efficient of expansion differed from that of the cylinder case in such a manner that clearances between the piston and the cylinder could be reduced to a minimum, with the assurance that when the metals were heated the piston would not bind.

Alloys for resistance to high temperatures were also discussed, in particular the iron-chromium combination is being developed to fill a demand for moving parts required to operate under high temperatures and possess high physical strength. Such a metal would solve some of the problems met with in the utilisation of oil-shales. Aluminum, magnesium, cobalt and titanium were also mentioned as alloy metals. Titanium alloys were assuming considerable importance, and in this connection the mention of a titanium iron in the Crow's Nest District by Dr. Allan was interesting. Chromium, said Mr. Fahrenwald, was becoming a "king-pin" among alloy metals.

In answer to a question, the speaker said that cobalt could be sold for alloy purposes in larger quantities if produced at a lower cost. It was a desirable alloy for many purposes, but its cost was high.

Mr. Fahrenwald commented the provinces of Alberta and Saskatchewan in having scientific men so well represented in public affairs, and said that in new districts today the true pioneer was the scientist, and the greatest progress would be realized where this fact was recognised.

Excursion to Selkirk, Wednesday Afternoon.

The concluding afternoon of the meeting was occupied by a trip to the Rolling Mills of the Manitoba Bridge & Iron Works, and the open-hearth plant of this Company, and to the plant of the Manitoba Steel Foundries.

At the works of the Manitoba Bridge & Iron Company, the visitors were shown around by the President, Mr. Deacon, and Messrs. Mackay, Smith and other officials, and saw the plant for pulverizing coal, and the application of this fuel to the heating furnaces. The Rolling Mills were making bar and strip iron from rolled scrap. The open-hearth furnace, which is a McLain-Carter 15 ton furnace, was not in operation, being under repairs. A surprisingly large amount of scrap of excellent quality was observed in the stockyards, and was an evidence of the wear and tear in iron and steel structures and parts in the Middle West.

The plant of the Manitoba Steel Foundries is equipped with two Schneider electric furnaces, which were seen in operation, and the visitors saw a heat poured into the ladle, and from thence into the casting-boxes awaiting filling. The plant has its own motor-generator set for supplying current to the furnaces, which obviates any surge on the power company's lines. The power is supplied from the Lac du Bonnet site by the Winnipeg Electric Company.

The evidences of a local metallurgical industry at Winnipeg and the satisfactory utilisation of a local coal were the occasion of much congratulatory comment among the members of the Institute, who also appreciated the courtesy of the officials of both of the Selkirk enterprises in taking such a part in the proceedings of the meeting, and in arranging the afternoon's visit of inspection.

The Dinner.

The speakers at the First Annual Institute Dinner held in Winnipeg included Hon. Edward Brown, the Treasurer of the Province; Mayor Gray, of Winnipeg; Mr. J. A. Campbell, M.P., Mr. T. R. Deacon, President of the Manitoba Bridge & Iron Works, and Mr. H. A. Lovett, of Montreal, President of Coal Sellers, Limited. The President of the Institute, Mr. Whiteside, presided. About one hundred guests were present at the Dinner.

The speeches were rather more deliberate utterances than are usual at Institute dinners, and maintained a high order of excellence.

Mr. Brown handled the question of the ownership of natural resources in a very emphatic manner, stating that the stand taken by the Federal Cabinet was indefensible, amounting to flagrant injustice to the province. Mr. Brown's statements were indicative of a general feeling in Manitoba, and he announced that the Province intended to make one more attempt to gain what the people of Manitoba regarded as their inalienable heritage, and their rightful due according to all historical precedent and the practice of the British Empire.

Mayor Gray said he would like to see more British capital interested in mining in Manitoba, and referred to his participation in the recent trip to the Flin-Flon Mine.

Mr. J. A. Campbell — the Institute's sole representative in the Federal House at Ottawa—emphasized Mr. Brown's remarks in even stronger vein, remarking that every local recourse had been tried and that unusual means were demanded if Ottawa would not consent to give Manitoba control of its own things. He pointed out the detriment to mining advancement associated with the present indeterminate state of mining grants and regulations. He said Manitoba had a mining law, but did not own the mines. Ottawa owned the mines, but had no mining law, and between the two contradictory conditions mining was bedevilled and capital frightened away.

Mr. Deacon referred to the prior position of mining in every civilized country, and to the fact that it necessarily preceded agriculture. He read figures showing the growing excess of our imports over exports, and he pleaded for a decent regard for the rights of capital. Mr. Deacon proved himself an accomplished raconteur, as did also Mr. Howard of Taber, Alta.

Mr. H. A. Lovett spoke on development of western coal resources. The President's wide acquaintance with the membership of the Institute was revealed by his comments in introducing the speakers, and his nice discrimination in the Institute's traditional taste in stories was disclosed when he called upon a gentleman from Tabor, whose response to some extent made up for the omission of the anthem from the programme.

Those who organized the Winnipeg meeting have every reason to be proud of the attendance, the quality of the papers, the fullness of the discussions, and the assiduous manner in which the visitors took in every phase of the programme. The room provided by the Fort Garry Hotel was well suited for speaking, and well removed from first-floor distractions, and the speakers who presented papers had no reason to complain of lack of attention or lack of audience.

TORONTO COAL PRICES.

Toronto, Nov. 3. — Toronto coal dealers report that buyers are still holding off for lower prices and that the market is more or less on the skid. There is a possibility that the Interstate Commerce Commission in the United States may suspend the order requiring all open top cars at the mines which may have a tendency to stiffen the market. Transportation is slowing down somewhat and the coming of colder weather is not expected to help matters in this regard. Hard coal is quoted at $8 to $16 a ton at the mines. American funds. Mine run bituminous has taken another drop and is now quoted at from $10.50 to $11.50 f.o.b. Toronto. Smokeless coal is also down and is now quoted at $10.50 to $12.00.

PERSONALS.

Mr. J. B. Tyrrell has returned to Toronto from Newfoundland where he was examining mining properties.

Mr. A. G. Burrows of the staff of the Ontario Bureau of Mines has returned to Toronto after completing a geological survey of the Gowganda district.

Mr. H. H. Sutherland of Toronto is leaving for London, England, in connection with the financing of Davidson Consolidated Mines.

Mr. Robert Mond is visiting the Sudbury properties of the Mond Nickel company of which he is a director.

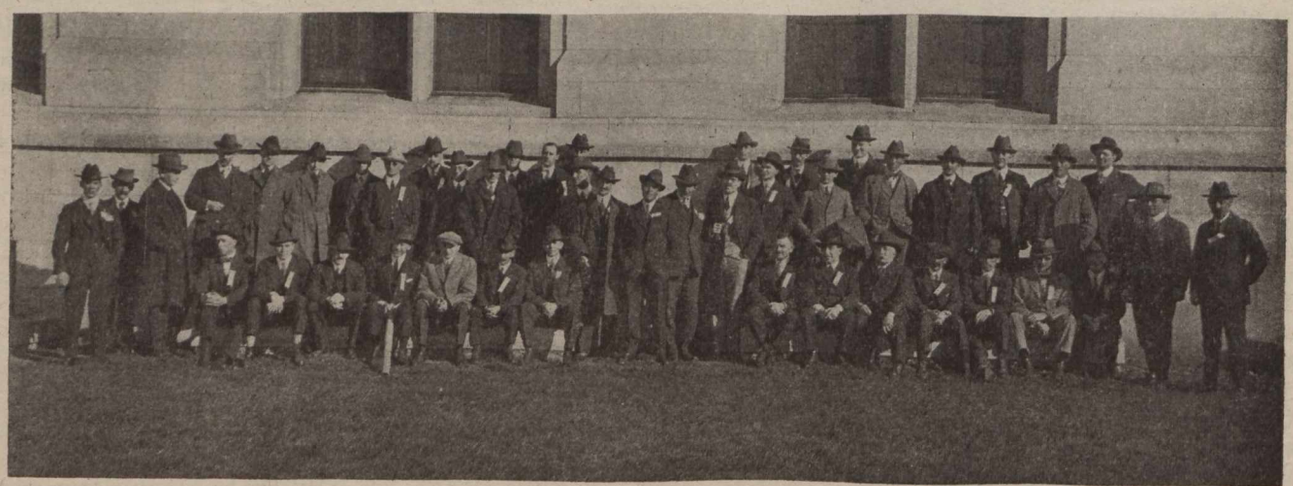
Dr. F. J. Alcock is on leave of absence from the Geological Survey. He will lecture during the winter in the Departments of Mineralogy and Geology at Queen's University, Kingston, Ontario.

Mr. T. J. Brown, who recently took the position of General Manager of the Inverness Coal & Railway Company, Cape Breton, has resigned. Mr. Brown passed through Montreal this week on his way to Toronto.

The Registration List at the Winnipeg Meeting

(Copied from the Register.)

J. W. Harris, Winnipeg.
Duncan McDonald, Calgary.
John R. McDonald, Edmonton.
Wm. Ellis, Three Hills, Alt.
Sam Troman, Lethbridge.
J. H. Hicks, Winnipeg.
C. R. Bancroft, Pas.
Robt. Graham, Pas.
W. P. Williams, Bellevue, Alt.
E. W. Jackson, Winnipeg.
G. B. Hall, Winnipeg.
E. A. Campbell, Winnipeg.
John A. Allan, Edmonton.
J. D. Perrin, Winnipeg.
Jas. A. Richards, Edmonton.
A. M. Stewart, Winnipeg.
L. S. Thompson, Winnipeg.
R. W. Hiebert, Winnipeg.
J. P. Gordon, Pas.
Robt. Strachan, Fernie.
R. C. W. Lett, Winnipeg.
C. E. Jeililin, Minneapolis.
Peter Davidson, Pas.
G. Murray, Pas.
John F. Sweeting, Winnipeg.
John C. Allan, Montreal.
W. J. Dick, Winnipeg.
S. Scott, Winnipeg.
W. W. Berridge, Winnipeg.
Thos. Boyer, Winnipeg.
C. H. Wildridge, Selkirk.
J. J. Broadhurst, Winnipeg.
Frank M. Oliver, Winnipeg.
L. B. Dukerson, Rutherford, N.J.
Charles Emmerson, Goy Marisquisga, Peru.
F. W. Gray, Ste. Annes, Que.
F. J. Alcock, Ottawa.
R. C. Wallace, Pas.
W. A. Johnston, Ottawa.
O. E. S. Whiteside, Coleman, Alt.
J. W. Holms, Winnipeg.
B. Westcott, Edmonton.
K. S. Campbell, Edmonton.
C. H. Bilson, Edmonton.
J. S. DeLury, Winnipeg.
J. A. Morrison, Winnipeg.
Jos. Myers, Winnipeg.
R. R. Rose, Montreal.
H. Stutchbury, Edmonton.
E. F. Pullin, Porquis Jnc., Ont.
Geo. H. McDonald, Denver.
J. F. McCall, Calgary.
A. E. Wilson, Calgary.
Donald Downie, Vancouver.
J. Moore Benson.
H. A. Mackay, Winnipeg.
E. M. Burwash, Winnipeg.
M. J. Cantell, Winnipeg.
Jno. R. Davidson, Winnipeg.
J. Charbonnier, Blairmore.
Theo. Kipp, Winnipeg.
J. Galloway, Winnipeg.
G. R. Pratt, Winnipeg.
Geo. B. Saunders, Winnipeg.
F. A. Fahrenwald, Cleveland, Ohio.
Mont. B. Morrow, Canmore, Alb.
M. A. Daly, St. Paul, Minn.
A. A. Millar, Taylorton, Sask.
J. Shanks, Nordegg.
Jno. R. Howard, Taber, Alt.
R. W. Riddell, Coleman.
W. L. Hamilton, Winnipeg.
E. H. Oliver, Edmonton.
G. J. Lovell, New York.
John S. Leitch, Winnipeg.
G. H. Porter, Winnipeg.
J. A. Campbell, Pas.
J. B. Baird, Winnipeg.
D. C. McArthur, Sifton.
W. J. Trethewey, Toronto.
H. N. Baker, Winnipeg.
W. J. Barries, Winnipeg.
Geo. Wood, Winnipeg.
C. H. Canklin, Winnipeg.
T. R. Deacon, Winnipeg.
C. A. Merrill, Winnipeg.



WINNIPEG MEETING, CANADIAN INSTITUTE OF MINING AND METALLURGY. OCTOBER 25th TO 28th, 1920.

Group of Attendants at the Meeting, Fort Garry Hotel.

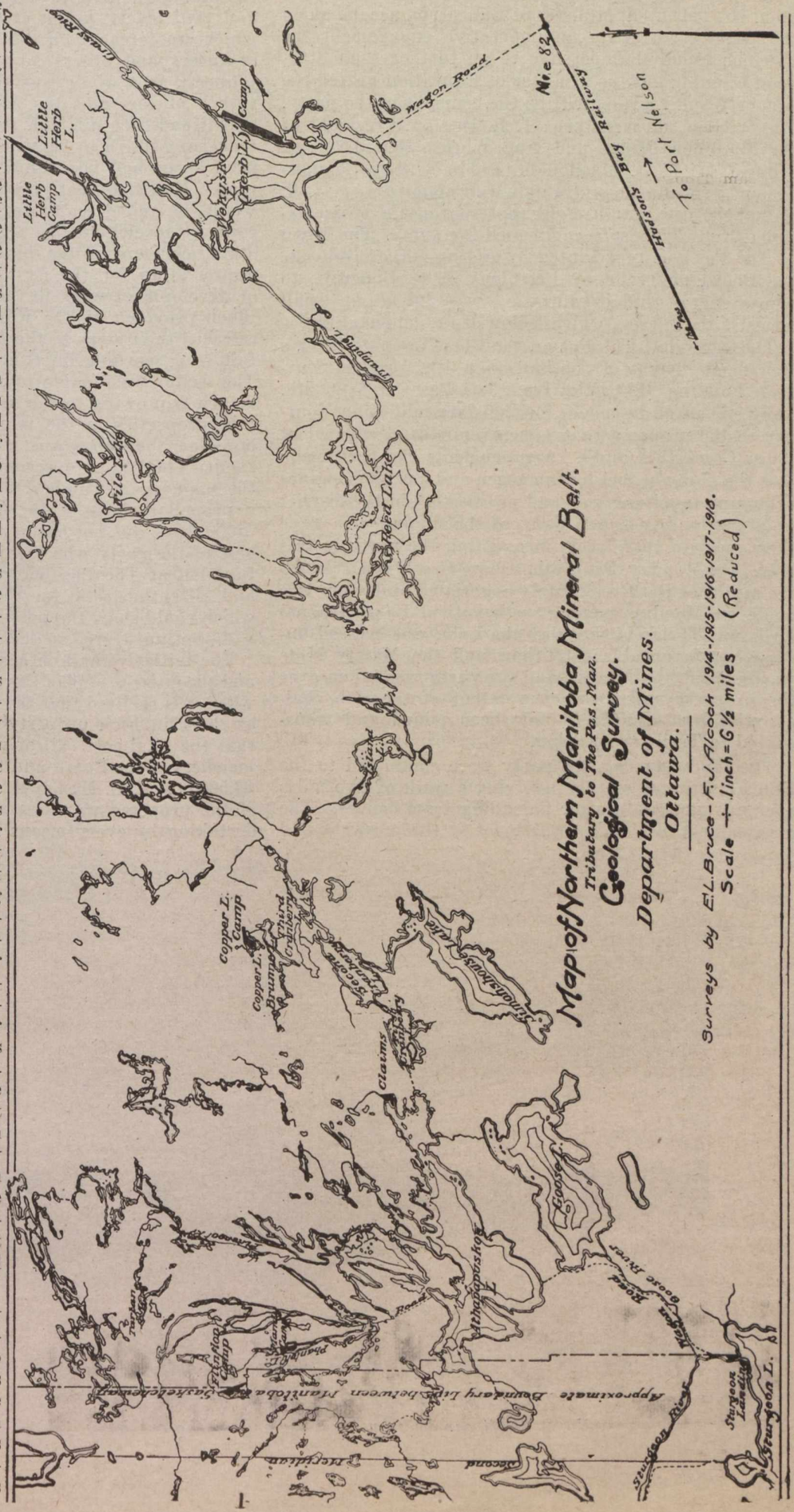
The gentleman witrout a hat is Mr. R. R. Rose, the efficient Assistant-Secretary of the Institute, and immediately above him is the President. Close by are Messrs. Fahrenwald, Stutchbury and DeLury. Dr. Allan is seated at the righthand of the stone bench, and to the right (standing) is Mr. Richards, Acting Chief-Inspector of Mines for Alberta. Others who may be picked out in the group are Messrs. Lovett, Shank, Howard, Gordon, Lett, Johnson, MacDonald, Williams, Saunders, Kipp, Westcott, Emmerson, McCall, etc.

VISIT OF THE MEMBERS OF THE LEGISLATURE OF MANITOBA TO THE FLIN FLON PROPERTY.

By R. C. WALLACE, Commissioner of North Manitoba.

In the early part of September there was carried out under the auspices of the Board of Trade of The Pas, an excursion which was successful in its completion as it was bold in its inception. The Pas Board of Trade has always shown itself alive to the needs of the country for which it is the central distributing point and the main business centre. Realizing as it did that during the next session of the House the question of the building of a railway to the Flin Flon property would in all probability come up for decision and realizing also that only by personal examination can a clear understanding be reached by those who have to deal with a situation such as this, they decided to invite the members of the Legislature and other prominent citizens of the Province to the property as their guests. The undertaking was particularly important for this reason as well that during the election this summer the Norris Government was returned not as a clear majority of the House but simply as the dominant unit in a house consisting of Norris supporters, Conservatives, Farmers, Independants and Labour Members. It will therefore be necessary in dealing with a business matter affecting the Province as a whole such as the completion of a railway to the Flin Flon property, that the matter be dealt with not in any sectional way but by a House which in all its sections realizes the importance of the undertaking in the development of the North Country and the Province.

Invitations were sent by the Board to all the members of the House and to other prominent citizens of the Province who were particularly interested in the North Country and its development. It was unfortunate that no members of the Labour Group,

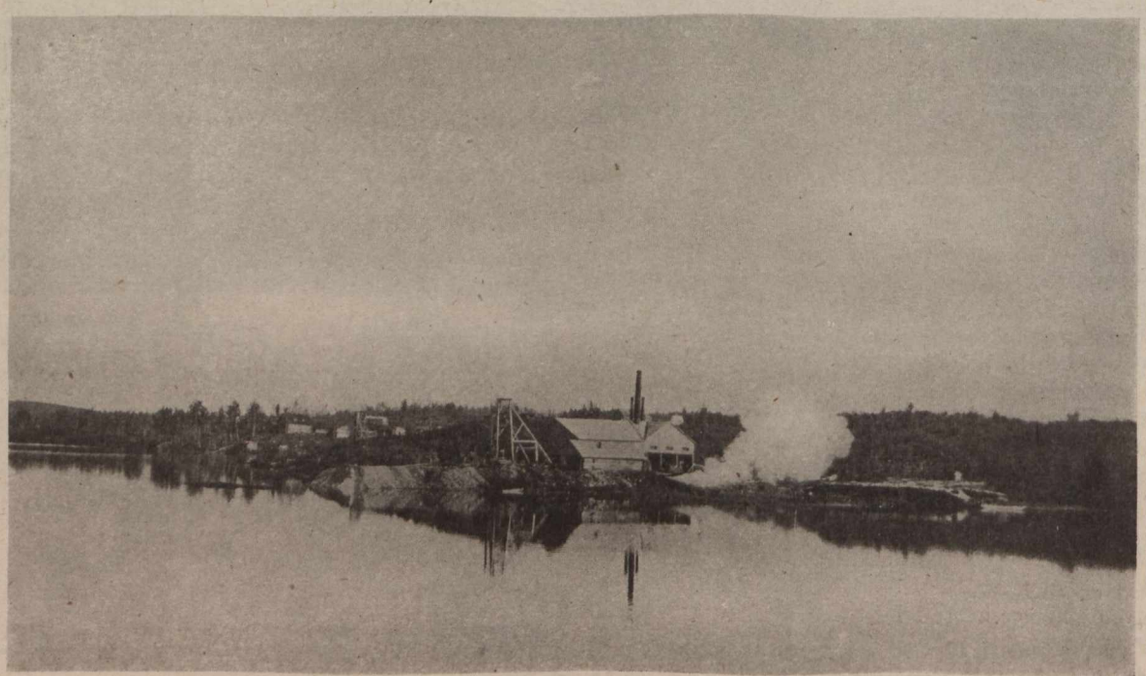


which is now a fairly large unit in the House, found it possible to take part in the excursion. All other sections were well represented and Premier Norris and Hon. Dr. Thornton, Minister of Education, accompanied the party. Owing to an imperative engagement the Premier found it impossible to go further than Sturgeon Landing but the Minister of Education visited the property and represented the Government in the party. Mayor Gray, of Winnipeg; T. R. Deacon, President of the Manitoba Bridge and Iron Works; Gen. Dyer, of Minnedosa; P. A. Macdonald, Public Utility Commissioner; J. A. Macdonald, Publicity Commissioner; J. A. Campbell, M.P., and J. Paul, representing Canadian National Railways also accompanied the party. The Town of The Pas was represented by Acting-Mayor Bullock; the Board of Trade by President G. R. Bancroft, to whose energy and organization was due in no small measure the success which followed the undertaking.

The party left The Pas on the Ross Navigation Co.'s steamboat "Nipawin" on Sat. Sept. 4th., reached Sturgeon Landing (130 miles from The Pas) on Sept. 5th. They embarked in canoes for the sixty-mile canoe journey to the property that same evening and camped at Goose Creek that night. Arrangements had been made that the party be met by canoemen and gasoline engines belonging to mining men and prospectors in the district at Sturgeon Landing. Many of the mining men gave their services very freely in assisting the party in this way. On Monday, Sept. 6th., Goose Creek was crossed, the rapids of Rat Creek safely negotiated and camp was made on Monday evening on beautiful Lake Athapapuskow. The following day the Lake was crossed under very favourable conditions and the Mandy Mine was reached by nightfall and the party was taken over the property and shown the extent of the rich chalcopyrite lens which has now been mined and transported to Trail for smelting.

The following day the party were conducted to the Flin Flon property, this involving a walk of two miles over a wagon train after unloading from canoes. The greater part of the day was spent at the property and the underground workings fully investigated by all the members. They had an excellent opportunity of examining the extent of the ore body both at the 100 and 200' levels in the cross cuts and the impression which was created on discussing the matter with the engineers and others who were familiar with the property as a whole was very significant. In a short speech at the mine the Minister of Education stated that it had been difficult for him in the past to get the true perspective in connection with northern development as he had been unfamiliar with northern conditions. Now that that perspective had been obtained he would be relied on to further the interests of north country development in whatever way he could. Many other members of the party expressed themselves as appreciating for the first time fully the significance of development work in the north. After an excellent lunch provided by the Flin Flon Syndicate the party retraced their steps to the Mandy and re-embarked the following morning for Sturgeon Landing and The Pas. The writer was unable to accompany the party on the return trip owing to the necessity of investigating certain properties in the mining belt. He understands, however, that a certain amount of transportation difficulties had to be overcome, such as the stranding on the sand bar in Cumberland Lake and the breaking of a propellor shaft in the Saskatchewan River. Such difficulties did not damp the enthusiasm of the members of the party who expressed themselves in a public function at The Pas before leaving the Town, as one and all enthusiastic for the development of a country which could show the possibility of wealth such as they had seen uncovered in the Flin Flon ore body.

The initiative and enthusiasm of the Board of Trade and the citizens of The Pas will be appreciated the more when it is realized that the party numbered on arriving at the Flin Flon property some seventy members and that the total cost (all of which was subscribed by the members of the Board and their friends) was more than $3,500.00. J. E. Hammell, who represented the owners of the property was indefatigable in assisting the undertaking by every means in his power.



THE FLIN FLON ORE BODY FROM THE SOUTH.
No. 2 Shaft can be seen over the end of the ore body to the left.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

The past week has been marked in mining circles by considerable criticism of an Order-in-Council passed on October 13th, declaring all patented mining claims forfeited on that date on which a certain provincial tax of five cents per acre had not been paid, and declaring these claims open for re-staking on or after noon of the 28th October.

Owners of important properties declare they were totally unaware of the existence of such a tax, having received not the slightest intimation of it from the Government.

On the other hand, the Ontario Department of Mines declares the fact was advertised in the press some months ago, and the claims were all recently listed in the Ontario Gazette. The Department states also that notice was sent in all cases where the address of the owner was available.

The fact is, however, that included in the forfeited claims was the Teck-Hughes Gold Mines, The Hudson-Kirkland, Lang-Caswell and Ontario Solid Silver Mines, all properties considered to be in strong hands. Indeed, the Teck-Hughes, a steady gold producer valued at many hundred of thousands of dollars, became forfeited over a mere tax of something like $5.50.

A veritable avalanche of criticism swept through the press of Ontario, especially Cobalt and Toronto on the morning of the 28th, and caused the Department to take serious notice of the unprecedent situation. As a consequence, at 11.30, just thirty minutes before the Order was to go into effect, the Teck-Hughes and Kirkland Hudson were withdrawn from staking. It was a little later on the same day that another Order withdrew the Ontario Solid Silver Mines from staking.

In the meantime stakers were on the ground in each case, armed with anything from a pick handle to a telegraph pole, and all participating in the restaking of these valuable properties. Men swarmed around the boundaries of the Teck-Hughes mine bent upon staking out this big gold producer already proven. In their ears was the continual rumbling of the big modern mill steadily grinding out the yellow metal, and each staker conjured up visions of great personal wealth. It was accordingly a cruel moment for these men when it became known that the Government had withdrawn the property from re-staking.

The Lang Caswell mine, in Lorrain, is one of the properties listed as forfeited and still listed among those not withdrawn.

Operations at the Cobalt mines are below normal due to shortage of power, but wet weather has now set in and relief is looked for shortly. Some of the mines have been obliged to close down at intervals, accordingly as regulated by the amount of power available.

Announcement is made that one of the veins on the Lumsden property of the Camburn Silver Mines Company in which rich silver occurrences have been discovered, has been found to carry silver in every round of shots over the last fifty feet of drifting done. It is now intended to concentrate effort on the work of stoping on this vein.

The Coniagas Mines, Ltd., closed its fiscal year on Monday of this week, and is understood to have experienced very satisfactory prosperity. Output is said to amount to close to the previous year's figures, and the company was enabled to disburse 12½ p.c. in dividends, or some $500,000. The annual statement is now in course of preparation and is expected to be issued early in December.

Arrangements have been made to explore a part of the Chambers-Ferland mine through a shaft on the Right of Way Mines. Cross-cutting has been undertaken at a depth of 385 feet, for the purpose of cutting through an area of conglomerate formation lying between the Nipissing and the La Rose Mines. This piece of territory is believed to offer considerable promise, and the present plan is to carry out all reasonable work in determining its value. The work commenced about October 5th, and already upwards of 130 feet of cross-cutting has been done.

Accidental fire destroyed the shaft house on the La Rose mine, the property on which silver was first discovered in Cobalt. Miners working underground were brought to surface through another shaft, with no loss or injury to the men.

In South Lorrain.

The mill on the Keeley mine has been completed, and trial runs were made during the past week. According to official figures, the ore reserves as of the end of August on the Keeley were estimated to contain 400,000 ounces of silver as well as a large quantity of cobalt which it is hoped may be marketed at a profit. This official advice is taken to indicate the Keeley has taken a place among the regular silver producers of this country. The new mill is fitted with 20 stamps with corresponding equipment. The ore in sight is largely the result of less than one year's operation.

Preparations are being made to commence work on the Haileybury Silver and the Haileybury-Frontier properties, situated in the vicinity of the Keeley. These properties are to be worked for the cobalt metal contained in the known veins.

Elk Lake.

Negotiations are still pending for the White Reserve mine at Maple Mountain. It was stated this week that something definite would be known within the next week or two as to whether the control is actually to be taken over by English interests, or not.

Chas. Dalby, superintendent of the Anvil Lake Silver Mines is now on the ground making arrangements to commence work. This property was formerly known as the Rubicon, and has some very promising silver showings at surface.

Ore shipments during the week ended October 29th from the Cobalt field amounted to more than three quarters of a million pounds, made up of a total of twelve cars. A feature of the week was the large number of shippers, eight different consignees being recorded.

The Nipissing was the leader with four cars containing 284,674 pounds, as shown in the following summary:—

Shipper.	Cars.	Pds.
Nipissing	1	284,679
Temiskaming	1	106,857
McKinley-Darragh	1	94,496
Mining Corp.	1	66,938
Dominion Reduction	1	65,000
O'Brien	1	64,033
Coniagas	1	60,619
H. F. Strong	2	34,643
Totals	12	777,265

THE GOLD MINES.

The condemnation of the McFadden gold bill calculated to pay a premium of $10 an ounce on new gold produced within the United States has been announced by the American Bankers' Association. The announcement has not conveyed any surprise to the gold mine operators in this part of Canada. Indeed, these operators have repeatedly stated they did not consider such a measure feasible. This stand was also taken by Sir Thos. White from the beginning when the bonus on gold was first mooted.

Cornish miners for relief of the mines of Porcupine are a reality. Confirmation has been obtained in connection with last week's report in the "Mining Journal" that several score miners were en route over the Atlantic on their way to the Dome Mines. It is also learned that early reports are entirely correct in respect to this company ordering a large number of additional machines with which to be prepared to receive and employ these new miners.

The Hollinger Consolidated Gold Mines is said to be treating an average of about 1,600 tons of ore daily and with prospects of being able to employ additional stamps and increase tonnage before the end of the year. The equipment available and only awaiting the desired number of workmen, is adequate to treat an average of over 3,000 tons of ore daily. This would be at the rate of over one million tons annually, and in view of the ore reserves being estimated to contain an average of $9.09 per ton would indicate a possible output at the rate of over $9,000,000 annually. This illustrates the importance of present indicated improvement in the supply of labor, although the point should be kept in mind that the process of securing a full supply of men may spread over several months, and the increase over the present rate of output will in all brobability be brought about gradually.

Arrangements have now been completed for the distribution of 76,667 shares of Dome Mines, which have been paid to the Dome Extension Mines, Ltd. for the properties and assets of that company. Each shareholder is asked to send in his shares for transfer and is entitled to one share of Dome for each thirty shares of Dome Extension. Shareholders will also receive 25 cents on each share of Big Dome issued to them. This payment is equal to the dividend declared by the Dome Mines Co., payable October 20th. The Trusts and Guarantee Co., Ltd., are the transfer agents.

It is learned officially that the estimates place a value of over $1,250,000 on the ore in sight on the Porcupine V. N. T. Mines. Ore is estimated to amount to 130,000 tons, and the grade is not far under $10 per ton. The plans of the company are to increase the mill to perhaps a capacity of 200 tons daily soon after work is resumed. Development work will be continued to a depth of 900 feet, the present shaft being already down to the 600-ft level at which point commercial ore is in evidence over several feet in width.

The Kirkland Lake Field.

During the month of September, according to the regular monthly report of manager R. C. Coffey, the Lake Shore mine poduced $40.150. This compares with $35,261 during the preceding month. In September, 1,480 tons of ore was treated, an average of $27.12 being recovered from each ton treated, comparing with the former average of between $24 and $25. Total output to date from this mine, equipped with only a 60-ton mill, now amounts to $1,051,730. The work of deepening the main shaft is progressing, and was reported to be 72 feet below the 400-ft level at the end of September. The objective is a depth of 800 feet, and the plan is to open up development levels at the 600 as well as 800-ft level.

High grade ore is being developed at the 500-ft level of the Kirkland Lake Gold Mines. Good results are also being met with on this property at the 900-ft level. Average mill heads are now such as would indicate a very substantial margin of net profit.

At a meeting of the shareholders of the Hunton-Kirkland, held in Haileybury, October 28th, a by-law was passed authorizing an increase of 1,000,000 shares in the capitalization. This raises the capital from $1,500,000 to $2,500,000, the added shares being for the purpose of financing extensive underground operations as well as to be used at such time as a mill is required. It is believed likely that it will not be necessary to issue the full amount. However, such will be available with which to meet any contingency. At the meeting, it was announced that at a depth of about 70 feet, some high grade ore is in evidence, and the outlook in regard to the physical condition of the mine is considered favorable.

In a statement to the shareholders of the Ontario-Kirkland Gold Mines, president Frank Huth states that the work is proceeding on the new 100-ton mill which is expected to be in operation before September 1st, 1921. Development work on the 300 and 450 feet levels is showing satisfactory results, and a new shaft is projected at the mill site to the 450 feet level to serve as a main hoisting shaft.

On the Argonaut mine, at Beaverhouse Lake, work of extending the shaft below the 200-ft level has commenced. It is planned to carry this work to a depth of 500 feet.

In the meantime, the small mill is being operated, a gold brick valued at $4,000 having just been sent out.

With the completion of the Wright-Hargreaves mill within the next two months, and with the installation of a new mill on the Ontario-Kirkland by September, next, the combined milling capacity of the plants in the Kirkland Lake field will amount to about 730 tons daily, capable of treating over a quarter of a million tons of ore yearly. Ore is estimated to average about $13.50, and the indicated output when operating at full capacity is estimated at the rate of $3,000,000 annually by that time.

With the price of material steadily declining, and with indications of the labor supply increasing the outlook for the gold mines is more favorable than for several years.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, November 5th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	20
Copper casting	19½
Tin	49
Lead	8¼
Zinc	9
Aluminum	35
Antimony	8¼

TORONTO MINING STOCKS.

Following are average quotations for active gold, silver and oil stocks on the Standard Mining Exchange for week ending October 30th 1920 :

	High	Low	Last
SILVER			
Adanac Silver Mines, Ltd.	2½	2	2¼
Beaver Consolidated	38	37½	37½
Chambers-Ferland	4½	3	3
Coniagas	2.39	2.37	2.39
Crown Reserve	25	20	22
Gifford	1¾	1¼	1¼
Hargraves	2	2	2
Kerr Lake	3.40	3.40	3.40
La Rose	30	28½	28½
McKin.-Dar.-Savage	49½	49	49
Mining Corp. of Can.	1.73	1.67	1.70
Nipissing	9.50	9.35	9.40
Ophir	2	2	2
Peterson Lake	11½	11	11½
Silver Leaf	2⅜	2¼	2¼
Trethewey	28	23¾	24½
GOLD.			
Boston Creek Mines	15¼	15	15
Dome Extension	43	42	42½
Dome Lake	4⅜	4	4
Dome Mines	13.00	12.50	12.50
Gold Reef	3⅜	3¼	3⅜
Hollinger Cons.	5.60	5.50	5.50
Keora	16½	15½	16
Kirkland Lake	45	42	42
Lake Shore M. Ltd.	1.05	1.05	1.05
McIntyre	2.02	1.94	1.94
Newray Mines, Ltd.	5¼	5	5
Porcupine Crown	23	23	23
Porcupine Tisdale	1	1	1
Schumacher	21	20	20
Porcupine V. N. T.	24½	23½	23½
Teck-Hughes	6	5¼	6
Thompson Krist	7½	7	7
West Dome	6½	5½	5¾
Wasapika Gold M. Ltd.	9¾	9¾	9¾
OIL.			
Vacuum G.	29	27½	28

TORONTO NOTES.

According to Deputy Minister of Mines, Thomas Gibson, about ninety per cent of the mining claims in New Ontario that have been forfeited by reason of non-payment of taxes have been voluntarily abandoned as not worth working. Many of the remainder were speculative claims. Justification for withdrawal from staking at the eleventh hour of several claims lies in the fact that much development work might have been lost to the province had the order-in-Council not been passed. It is stated that most of the properties forfeited that are worth anything have already been re-staked by their original owners. In the opinion of some of the mining men from the North, mining in that country was given a severe check by the action of the Government in selling the claims for non-payment of taxes without directly notifying the owners.

The special meeting of the Black Lake Asbestos shareholders called for last week was called off as a result of a temporary injunction obtained by the Toronto shareholders. This week the injuction was sustained in the court, it being held that the dissentients were justified in their objections. As matters now stand it will be necessary for the Montreal interests to begin all over again if they still desire to call a special meeting with the object of ousting the present board. In the meantime the bondholders committee has not been inactive, and it is expected that further developments will be announced in another week. What these may be is not known, but it is understood that drastic steps are contemplated, and as the existing income bonds are virtually first mortgages, since the redemption of bonds take precedence, it is understood that the income bondholders consider themselves in a strong position.

At the annual meeting of the North Davidson Mines, Limited, held at the head office of the company in the Royal Bank Building, Toronto, the President, R. T. Jeffery told the shareholders that the results from development and exploration had been exceedingly gratifying and that they had every reason to feel enthusiastic over the prospect. The following officers were elected: R. T. Jeffery, Toronto, President, J. Johnston, Ottawa, Vice-President: Directors, L. G. Harris, J. J. Jeffery, Thomas Cain, Toronto. The financial statement submitted showed that $73,256 had been expended in development, plant etc., up to September 30, 1920.

Mr. Jeffery stated that when the property was purchased the directors regarded it as one of great promise. Diamond drilling brought results which were far beyond their expectations. Veins of great width were cut and the assays disclosed values higher than the average of some of the best mines in the camp. A complete mining plant was purchased in Nova Scotia and shipped to the property and the road from the railway put into shape.

A shaft was sunk away from the ore body with the idea of cross-cutting to pick it up at a depth of 250 feet, where a large body of ore had been proved to exist by the diamond drills. At the depth of 52 feet a vein four feet wide cut where the ore was liberally sprinkled with free gold. Samples taken at random and containing no visible gold assayed over $400 to the ton, according to Mr. Jeffery's statement.

Prince George, B. C.

There is a possibility that one or more of the same type of giant gold dredges that have been operating in the State of California will be constructed and turned loose on the gold bearing gravels of the Fraser River and of the historic creeks and gulches of the Cariboo District. A party of operators from the United States, one of whom represents the Yuba Manufacturing Co., of Marysville, Cal., have been visiting Prince George for the purpose of investigating conditions and forming an estimate of the prospects of success attending the proposed venture. This part of British Columbia would seem to offer a promising opportunity for these monsters of the alluvial fields as it is a virgin territory for operation on such a scale and there is no doubt that the sands and gravels carry values. Years ago, as an aftermath of the Cariboo gold excitement, several small dredges were installed on the Fraser River and elsewhere. The remains of these still may be seen in the river and on the banks just below the town of Quesnelle. There is a dredge on the Quesnelle river and one was taken up stream beyond Fort George to the Little Smoky River, while it lies a derelict today.

Mineral Exhibit

WINNIPEG MEETING, C.I.M.&M.

(Specimens assembled and arranged by Mr. L. G. Thompson, University of Manitoba).

NORTHERN MANITOBA METALLICS.

Flin Flon Ore-Body.—Collection of Rock and Ore Types.

1.—Hornblende schist, carbonate gangue, leached quartz-porphry, talc schist from footwall, andesitic porphry.

2.—Banded solid sulphide, containing gold, silver, copper and zinc.
Ore of disseminated type, containing large cubical crystals of iron pyrite.
Grey schist, with disseminated sulphides.

3.—Leaf copper—very beautiful frond-like specimen.

NOTE.—This collection was representative of all the typical rocks and ore types of the Flin Flon deposit.

Gold Ore specimens from Rice Lake District.—Extension Mine. Pan Extension Mine, from 120 ft. level. Shuniah Mining Company, Long Lake area. Deep Rock Gold Mines. Commonwealth group, Gold Lake area. Pendennis Gold Mining and Reduction Co. September Morn and Bruce claims. Martin Mining Company. Wolverine Gold Mines. Montcalm Mining Co. Gold Pan Mine, White Dove Mining Co., Long Lake. Kingfisher Mining and Development Co., Long Lake.

Gold Ore specimens from Herb Lake District.—Cabin and Caribou Claims, Little Herb L. Northern Manitoba M. and D. Co., Herb Lake, Bingo Mine, Herb Lake. Red Rose property, Copper Lake.

GOLD BULLION SPECIMENS.

1.—**Northern Manitoba Mining and Dev. Co., Herb. Lake.**—53 3-10 ozs. gold, obtained from 30 tons of ore. Concentrates showed value of $1,260.00 per ton of ore, $7.80 per ton of tailings and had 20 tons of tailings.

2.—**Bingo Mine.**—3 1-2 ozs. from 1-2 ton of ore, being average sample of ore, for milling test.

Mandy Mine.—Rock and Ore types.—High grade copper ore, and low-grade sulphides, with specimens of accompanying rocks.

Chalcopyrite.—Le Vasseur claim. N. E. arm of schist Lake, Pas. Baker-Patton property. Rosen property (specimens of molybdenite, cobalt bloom, copper ore). Bear Lake, 3rd Cranberry Lake, Pas.

Nickel-copper Ore.—Bear River, Manitoba. (Several large specimens with norite specimen accompanying.)

Tungsten Ore.—Scheelite. Falcon Lake, Ingolf, Man.

Molybdenite.—Falcon Lake (large crystals).

Manitoba Non-Metallics.—Mottled Limestone from Tyndall. Quarry.—Rough and dressed specimens. Selenite and Gypsum. Manitoba Gypsum Co., Gypsumville, Man. Clay Products.—Larivier hard shale. Morden soft shale. Red and dark buff bricks, vitrified brick, vitrified pipe and hollow tile, made from mixtures of above shales, by Reliance Clay Products Co.

Miscellaneous Exhibits from points west of Manitoba.

Oil.—Fort Norman. Great Slave Lake. Okotoks — crude, and gasolene from natural gas.. Peace River—McArthur No. 2 well series of oil and distillates, Southern Alberta Oil Co., No. 1 well.

Bitumen, from Athabaska Tar Sands.

Salt.—Salt River, Alberta.

Salt—Solar Evaporation Salt, Senlac, Sask.

Talc.—Alberta B. C. Boundary.

Mica.—Upper Peace River

Sands.—Black Gold carying sands, North Saskatchewan River, Edmonton, and Garnet Sands same locality. Black sand, carrying gold and platinum from Peace River.

Sodium-Sulphate.—Crystals from Fusilier, Sask.

Bentonite.—Rosedale, Alt.

Bog Iron.—N. Saskatchewan River.

Magnetite shale.—Barmis, Alt.

Iron Ore—Mackenzie River.

Alabaster and gypsum.—Peace River.

Magnetite, from Atikokan Mine, Ont.

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British Columbia Letter

Victoria, B.C.

One hundred and four residents of the coal mining centres of the Province of British Columbia are availing themselves of the correspondence course established by the Government for their benefit. These coal miners are studying all branches of coal mining, from the most elementary to the most advanced, the latter covering the technical knowledge required of the holder of a Mine Manager's Certificate. The different districts are represented in this Correspondent School as follows: South Wellington, 3; Nanaimo, 21; Cassidy, 5; Cumberland, 32; Vancouver, 1; Britannia Beach, 1; Merritt, 14; Princeton, 4; Coalmont, 4; Fernie, 10; Michel, 4; and Corbin, 5.

The discovery of coal in the centre of the City of Vancouver has been reported. While driving a tunnel beneath one of the chief traffic arteries of the community, workmen struck a seam of coal about 18 inches wide. For some weeks the men have been taking home a sackful each night. They report that it is of good quality, burning brightly and furnishing good heat. These fortunate laborers at least appear to have solved the fuel problem for the winter.

Peace and industry once more reigns in the Crow's Nest Pass District of British Columbia. The same condition prevails, in practically the same degree, in the coal mining fields of the Province of Alberta. Strife for the moment is at an end and it should not be long before the collieries of Coal Creek, Michel, as well as those of Alberta, are on a normal basis as to production. It cannot be said what result of the comparatively short walk-out has been except that it would appear that the One Big Union has been worsted and that the Agreement now obtaining between the U. M. W. of A. and the Operators is likely to be amended in such a way as will remove any ground the former organization may have for dissatisfaction and at the same time be acceptable to the Operators.

The Government's Mine Rescue Station at Fernie is being enlarged to accommodate more adequately the apparatus with which it is equipped and for the training of the miners in its use. This Station is provided with about as complete a line of appliances for mine rescue work as can be procured. There are six sets of Gibbs apparatus, one pulmotor, one oxygen inhaler and six sets of Draeger Apparatus, together with the necessary spare parts, etc. The Draeger apparatus is being replaced by a more modern instrument. The Fernie Station was the first in British Columbia and one of the first in the Northwest to be provided with the Gibbs type of breathing apparatus. The government also maintains at a high state of efficiency stations at Nanaimo, Cumberland and Merritt. That at Nanaimo has been outfitted with six sets of the Paul apparatus and four sets of the Gibbs; that of Cumberland is equipped with the Draeger apparatus of the 1917 model but this shortly will be replaced with the modern type, and that of Merritt, which recently was taken over by the Provincial Department of Mines, has six sets of the Draeger and four sets of the Gibbs.

T. A. Link, geologist who has been conducting an exploration of the far northern country with a view to the determination of its oil possibilities, reports from Edmonton, Alberta, that a large oil field, extend-

EXTENDED

Service

To Our Advertisers.

Realizing the Development which is bound to take place in trade between Canada and the United Kingdom, the

Industrial&Educational Publishing Co., Limited

will open its own office in England early in January.

Mr. C. H. Armstrong, Jr., who will be in charge, has investigated trade conditions in Canada from coast to coast.

Any advertiser or subscriber who is anxious to make connections as a representative of firms in the United Kingdom, is invited to communicate with Mr. Armstrong, The Canadian Mining Journal, Gardenvale, P.Q.

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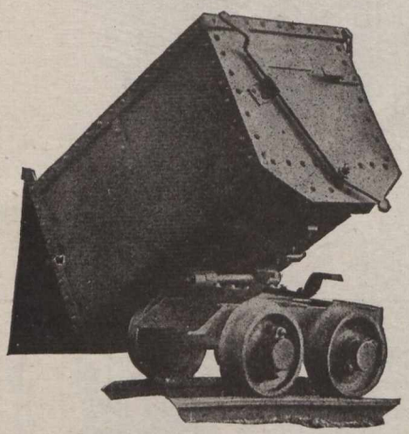

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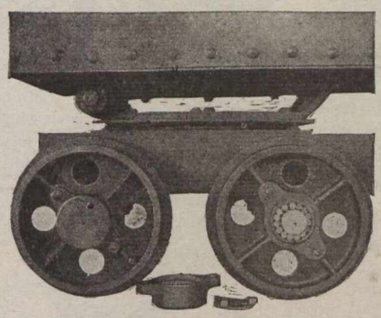
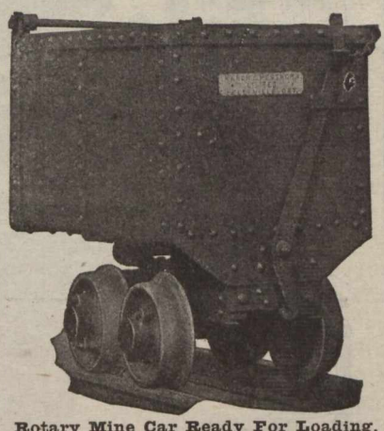


Showing the Roller Bearings supplied in all four wheels of our Mine Cars. Note the dust-excluding cap, with ample capacity for holding grease or oily waste.



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ing from Fort Norman to the Arctic Coast, has been discovered. He is quoted as stating that the season's work has absolutely proved the existence of an enormous body of oil-bearing rock in the Mackenzie territory.

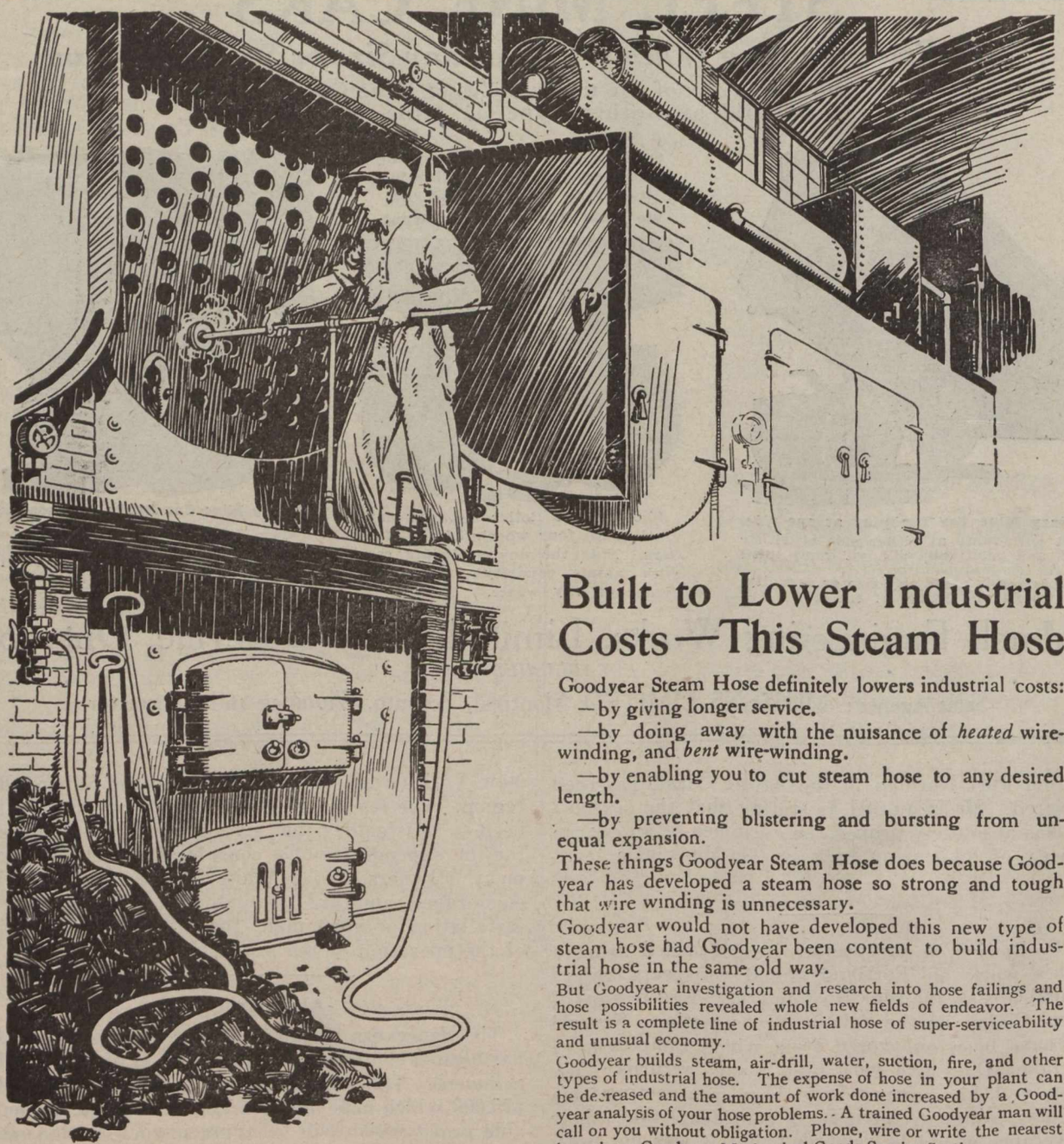
S. G. Benson, a prospector, just returned from a season's work on Portland Canal prospects, refers optimistically to the Blue Bird and Nest Egg Groups of Mineral Claims on the Salmon River section. Several veins have been uncovered from which samples have been taken that give very high assay returns. Mr. Benson and his partner have been prospecting this particular country for years, confident that their perseverance would be rewarded, but it was not until last year that they found the mineral. This was due to the fact that a glacier, which has been receding about two hundred feet each year, formerly covered the outcrops. It is the intention to begin tunnelling next season. On the Lucky Boy Group in the same locality it is said that a vein has been found about sixty feet in width and carrying values as high as $400 to the ton, the average being estimated at $120 to the ton. It is stated that the galena from this property is the cleanest seen in the country so far, there being no zinc shown so far. Considerable development has been done but next year permanent camps will be established. A tunnel will be driven into the hillside about fifty feet from which a shaft will be sunk an equal distance, this being followed by cross-cutting. This property is situated between the Premier Mine and the town of Stewart. Much is expected, too, of the New York Group of Claims, also in the Salmon River region. The results of recent work is reported to have been so satisfactory that arrangements are being made for the expenditure of a considerable sum on development. Owners of the White Mouse, also, have been encouraged and are understood to be planning the installation of mine plant for the further facilitation of the operation of the property.

Alice Arm, B. C.

The Esperanza Group of Mineral Claims, Alice Arm, has been taken over by a syndicate of Vancouver businessmen. The consideration is said to have been $75,000 which nets the owner, Petro Salina, a comfortable profit which will be appreciated when it is stated that he acquired the property some years ago at a Sheriff's sale for $200. Recent development work has been encouraging in its results it being stated that a considerable body of high grade silver ore has been uncovered.

Princeton, B. C.

Active mining operations have been started by the Canada Copper Corporation at Copper Mountain and Allenby, the power line from Bonnington Falls and the railway to the mine both having been completed. The power has been turned on and the trains are running. Thus starts an industry which in its initiation has involved the expenditure of approximately $7,000,000. The first train of ore moved to the concentrator at Allenby on October 19 and shipments are being increased daily. The force of men employed gradually is being increased and it is expected that



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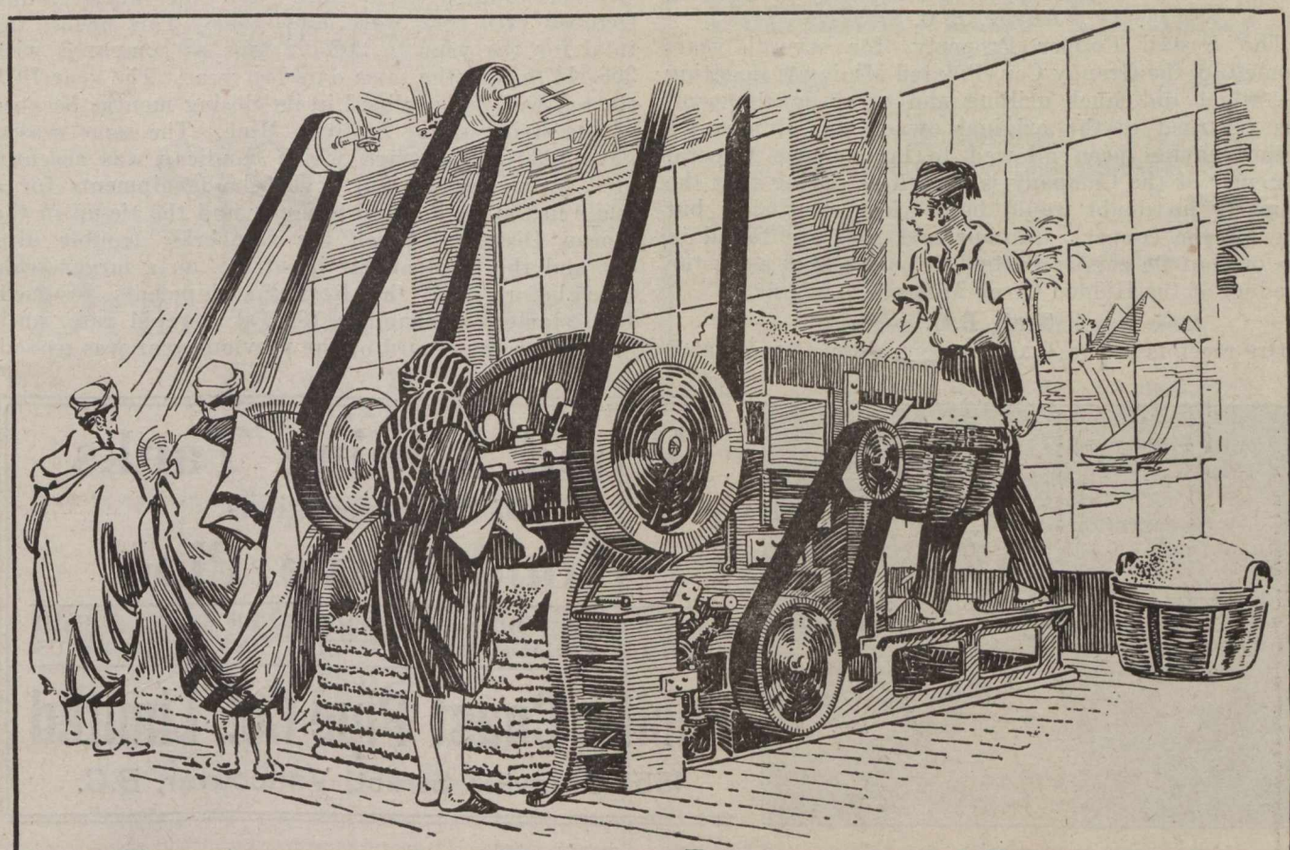

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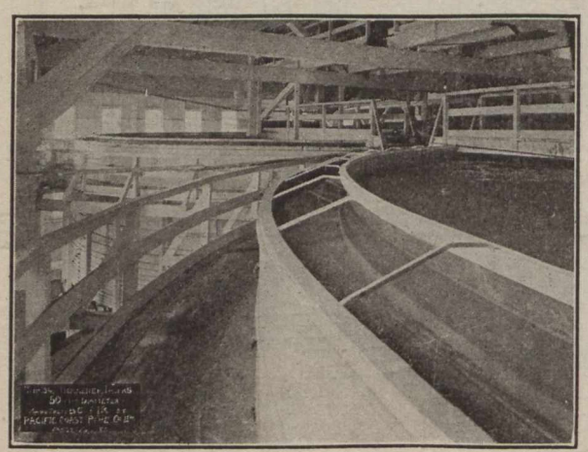
Anyox, B. C.

The Ecstall Copper Property, for several years bonded by the Granby Consolidated Mining & Smelting Co. which did much drilling and other development, has returned to the original owner, the Company's option having been allowed to lapse. The General Manager of the Company is quoted as saying that the property no doubt would be worked eventually but not for the copper. Sulphur and iron are found in the ore but its copper content is not as high as in the product of the Hidden Creek Mines.

Trail, B. C.

Ore receipts at the Trail Smelter of the Consolidated Mining and Smelting Company for the first week of October totalled 8,133 tons. For the week ending October 14th they were 7,900 tons. This brings the total for the year to 267,768 tons as compared with 266,543 tons at the same date last year. The year 1919 started well but declined in its closing months because of the strike at the Sullivan Mine. The same reason gave 1920 a bad start, which handicap was accentuated by the suspension of Rossland shipments for a while in the Spring and Summer and the tie-up in the Slocan District. When the Kimberley trouble died out and the Sullivan hit its strike, on a larger scale than before, and the Rossland shipments resumed, 1920 started overhauling 1919 at a rapid rate, until this month the record of the previous year was passed.



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MINING OPPORTUNITIES IN MANITOBA

Mineral Areas

Approximately three-fifths of the total area of Manitoba is Pre-Cambrian. In the Pre-Cambrian of Ontario, the well-known camps of Sudbury, Cobalt and Porcupine have been developed. In Manitoba, there was but little prospecting before 1912, when the Rice Lake Camp was opened up, and the Hudson Bay Railway gave access to the mineral areas in Northern Manitoba. Attention is being directed particularly to the Pas Mineral Belt and the Rice Lake Area, but prospecting is being carried on in the Cross and Pipestone Lake Area, the Oxford Lake, Knee Lake, God's Lake and Island Lake Area, and the West Hawk Lake, Falcon Lake, Star Lake Area.

Development

Since 1915, development has been rapid in the Pas Mineral Belt. Twenty million tons of low-grade copper ore have been explored by diamond drilling at Flin Flon Lake and are now being actively developed under option. High grade copper is exported from Schist Lake to the smelter at Trail, B.C.; over seven million pounds of copper have already been realized. Other copper prospects are under development and the building of a smelter at the Flin Flon property will lead to the establishing of a large copper industry. Gold is now produced at Wekusko (Herb) Lake, and active underground development work is being carried on at Wekusko Lake, Copper Lake and in the Rice Lake District east of Lake Winnipeg

Transportation

Transportation is available to the Rice Lake Area by steamboat from Winnipeg to the Hole River, and thence by launch and Provincial wagon road. The Copper Belt is reached from The Pas by the Ross Navigation Co's. steamboats to Sturgeon Landing, thence by wagon road and canoe. Herb Lake is reached from Mile 82 on the Hudson Bay Railway (less than one day from The Pas.)

Mining Regulations

The mineral resources are under Federal control and the Federal mining regulations apply to Manitoba. No mining license is required. Work to the value of $100.00 a year must be performed for a period of five years on claims filed under the quartz mining regulations. The office of the Mining Recorder for the Rice Lake district is in Winnipeg, and for The Pas Mineral Belt at the Pas.

Opportunities

The districts are comparatively new, and on the eve of substantial development. There are good opportunities at the present time for prospectors, mining companies, and particularly for development companies.

For maps, reports and general information, apply to—

THE COMMISSIONER OF NORTHERN MANITOBA

THE PAS, MANITOBA.

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Brazilian Rough Diamonds:
Diamond Drill Carbon Co.

Brazilian Mica:
Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co.

Brazilian Ballas:
Diamond Drill Carbon Co.

Brazilian Rock Crystal:
Diamond Drill Carbon Co.

Brazilian Tourmalines:
Diamond Drill Carbon Co.

Brazilian Aquamarines:
Diamond Drill Carbon Co.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

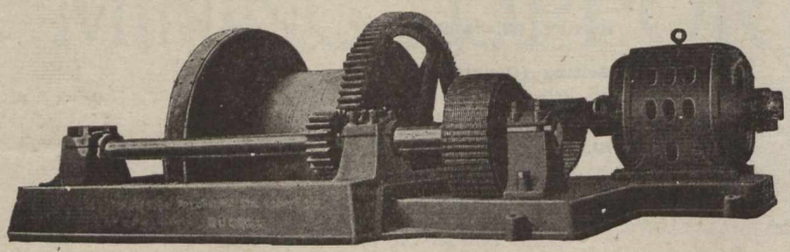
Buckets, Elevator:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.
Peacock Brothers Limited.

Cable—Aerial and Underground:
Canada Wire & Cable Co.
Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.

Cableways:
Canadian Mead-Morrison Co., Limited
Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Mine & Smelter Supply Co.
Mussens, Ltd.
The Wabi Iron Works

RENOLD DRIVING CHAINS



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(This drive has been operating over 10 years.)

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POSITIVE — EFFICIENT
COMPACT and DURABLE

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STEEL WIRE ROPE

We are manufacturing Steel Wire Rope for all purposes, and have in Stock at each of our Warehouses a good assortment of standard sizes in Siemens Martins Steel, Crucible Cast Steel, Plough Steel and Extra Plough Steel Qualities.

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592 Notre Dame Ave., WINNIPEG
738 11th Ave. W., CALGARY
358 Water Street, VANCOUVER, B. C.

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Hamilton, Ont.
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Rubber Insulated Wire
Lead Covered and Armored Cables
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LIMITED

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1280 ST PATRICK ST
MONTREAL

SALES OFFICES: Halifax, Quebec, Ottawa, Calgary
BRANCHES: Toronto, Winnipeg, Vancouver

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:
Standard Underground Cable Co of Canada, Ltd
Canada Wire & Cable Co.
Fraser & Chalmers of Canada, Ltd.
Northern Electric Co., Ltd.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Cable Railway Systems:
Canada Wire & Cable Co.
Canadian Mead-Morrison Co., Limited.

Cam Shafts:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
Peacock Brothers Limited.

Car Dumps:
Sullivan Machinery Co.
R. T Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
Canadian Foundries and Forgings, Ltd
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
John J. Gartshore
MacKinnon Steel Co., Ltd.
The Electric Steel & Metals Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Marsh Engineering Works
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Car Wheels and Axles:
Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Peacock Brothers Limited.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co
The Wabi Iron Works

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd

Castings (Iron and Steel)
Burnett & Crampton
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd
Osborn, Sam'l (Canada) Limited.
Peacock Brothers Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works

Cement and Concrete Waterproofing:
Spielman Agencies, Regd.

Cement Machinery:
Northern Canada Supply Co
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd
Osborn, Sam'l (Canada) Limited.
Fraser & Chalmers of Canada, Ltd
Canadian Fairbanks-Morse Co., Ltd
The Electric Steel & Metals Co.
R. T Gilman & Co.
Burnett & Crampton

Chains:
Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que

Chemical Apparatus:
Mine and Smelter Supply Co.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mine and Smelter Supply Co.
Mussens, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q

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

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

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

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

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

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

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

Coal Pick Machines:
Sullivan Machinery Co.

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

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

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

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

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

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

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

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

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

Consulters and Engineers:
Hersey Milton Co., Ltd.

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

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

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

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

Conical Mills:
Hardinge Conical Mill Co.

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

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

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

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

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

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

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

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Bell Telephone, 603 St. Catharines

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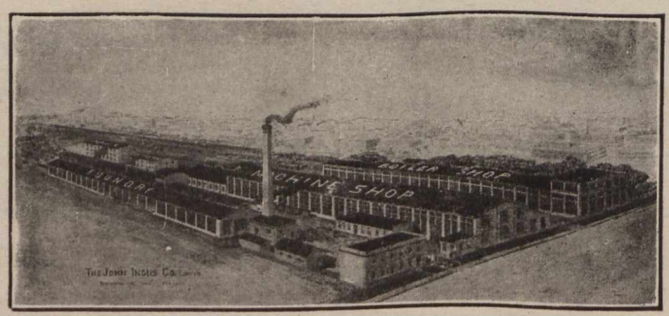

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Canadian Miners' Buying Directory.—(Continued)

The Mine & Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Lt
The Wabi Iron Works

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

Cyanide:
American Cyanamid Company.

Cyanide Plant Equipment:
The Dorr Co.
The Mine & Smelter Supply Co.

D. C. Units:
MacGovern Co.

Derricks:
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Mussens, Limited

Diamond Drill Contractors:
Diamond Drill Contracting Co.
E. J. Longyear Company
Smith & Travers
Sullivan Machinery Co.

Diamond Tools:
Diamond Drill Carbon Co.

Diamond Importers:
Diamond Drill Carbon Co.

Digesters:
Canadian Chicago Bridge and Iron Works

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

Dredger Pins:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd
The Electric Steel & Metals Co.
Hadfields, Limited

Dredging Machinery:
Canadian Steel Foundries, Ltd.
Canadian Mead-Morrison Co., Limited
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.

Dredging Ropes:
Allan, Whyte & Co.
Greening, B., Wire Co., Ltd.
R. T. Gilman & Co.

Drills, Air and Hammer:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
The Mine & Smelter Supply Co.
Mussens, Limited

Drills—Core:
Canadian Ingersoll-Rand Co., Ltd.
E. J. Longyear Company
Standard Diamond Drill Co.
Sullivan Machinery Co.

Drills—Diamond:
Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company

Drill Steel—Mining:
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rock
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Drill Steel Sharpeners:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Osborn, Sam'l (Canada) Limited.
The Wabi Iron Works

Drills—Electric:
Canadian Fairbanks-Morse Co., Ltd
Sullivan Machinery Co.
Northern Electric Co., Ltd.

Drills—High Speed and Carbon:
Canadian Fairbanks-Morse Co., Ltd
Osborn, Sam'l (Canada) Limited.
H. A. Drury Co., Ltd.
Hadfields, Limited

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

Dynamos:
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Company

Ejectors:
Canadian Fairbanks-Morse Co. Ltd.
Canadian Ingersoll-Rand Co., Ltd
Northern Canada Supply Co

Elevators:
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, I
Jones & Glassco (Regd.)
Mussens, Limited
The Wabi Iron Works

Engineering Instruments:
C. L. Berger & Sons

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

Engines—Gas and Gasoline:
Canadian Fairbanks-Morse Co., Ltd.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd.
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
The Mine & Smelter Supply Co

Engines—Haulage:
Canadian Ingersoll-Rand Co., Ltd., Mor t.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.

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

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

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

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

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

Feed Water Heaters:
MacGovern & Co.

Fire Fighting Supplies:
Gutta Percha & Rubber, Ltd.

Flashlights—Electric:
Spielman Agencies, Regd.

Flood Lamps:
Northern Electric Co., Ltd.

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

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

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

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

Frequency Changers:
MacGovern & Co., Inc.

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

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

Gaskets:
Gutta Percha & Rubber, Ltd.

Gears:
Hans Renold of Canada, Limited, Montreal, Q
Jones & Glassco (Regd.)

Gears (Cast):
Hull Iron & Steel Foundries, Ltd.
Canadian Link-Belt Co., Ltd.

Gears, Machine Cut:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Hamilton Gear & Machine Co
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works

Granulators:
Hardinge Conical Mill Co

Grinding Wheels:
Canadian Fairbanks-Morse Co., Ltd

Gold Refiners
Goldsmith Bros

Canadian Miners' Buying Directory.—(Continued)

Gold Trays:
Canada Chicago Bridge & Iron Works

Hose (Air Drill):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Fire):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Packings)
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.

Hose (Suction):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hose (Steam):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hose (Water):
Goodyear Tire & Rubber Co
Gutta Percha & Rubber, Ltd.

Hammer Rock Drills:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
The Mine & Smelter Supply Co.

Hangers and Cable:
Standard Underground Cable Co. of Canada, Lt

High Speed Steel:
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
International High Speed Steel Co., Rockaway

High Speed Steel Twist Drills:
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.

Hoists—Air, Electric and Steam:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Jones & Glassco
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Canadian Link-Belt Co., Ltd.

Hoisting Engines:
Canadian Fairbanks-Morse Co., Ltd
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.

Hoisting Towers:
Canadian Mead-Morrison Co., Limited.

Hose:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd
Northern Canada Supply Co

Hose (Steam, Air, Water):
Gutta Percha & Rubber, Ltd.

Hydraulic Machinery:
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Industrial Chemists:
Hersey, M. & Co., Ltd.

Ingot Copper:
Canada Metal Co., Ltd.
Hoyt Metal Co.

Insulating Compounds:
Standard Underground Cable Co. of Canada Ltd

Inspection and Testing:
Dominion Engineering & Inspection Co.

Inspectors:
Hersey, M. & Co., Ltd.

Jacks:
Canadian Fairbanks-Morse Co., Ltd
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
R. T. Gilman & Co.
Mussens, Limited

Jack Screws:
Canadian Foundries and Forgings, Ltd

Laboratory Machinery:
Mine & Smelter Supply Co.

Lamps—Acetylene:
Dewar Manufacturing Co., Inc.

Lamps—Carbide:
Dewar Manufacturing Co., Inc.

Lamps—Miners:
Canada Carbide Company, Limited
Canadian Fairbanks-Morse Co., Ltd.
Dewar Manufacturing Co., Inc.
Northern Electric Co., Ltd.
Mussens, Limited

Lamps:
Dewar Manufacturing Co., Inc.

Lanterns—Electric:
Spielman Agencies, Regd.

Lead (Pig):
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
Hoyt Metal Company.

Levels:
C. L. Berger & Sons

Locomotives (Steam, Compressed Air and Storage Ste:
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R T. Gilman & Co
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited

Link Belt
Canadian Fairbanks-Morse Co. Ltd.
Canadian Link-Belt Co., Ltd.
Northern Canada Supply Co.
Jones & Glassco

Machinists:
Burnett & Crampton

Machinery—Repair Shop:
Canadian Fairbanks-Morse Co., Ltd

Machine Shop Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Magnesium Metal:
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.

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

Metal Marking Machinery:
Canadian Fairbanks-Morse Co., Ltd

Metal Merchants:
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canada
Canada Metal Co.
C. L. Constant Co.
Everitt & Co
Hoyt Metal Company.

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

Metallurgical Machinery:
General Engineering Co., New York
The Dorr Co.
The Mine & Smelter Supply Co.

Metal Work, Heavy Plates:
Canada Chicago Bridge & Iron Works

Mica:
Everitt & Co.
Diamond Drill Carbon Co.

Mining Engineers:
Hersey, M. Co., Ltd.

Mining Drill Steel:
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
International High Speed Steel Co., Rockaway, N

Mining Requisites:
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Mining Ropes:
Dominion Wire Rope Co., Ltd.

Mine Surveying Instruments:
C. L. Berger & Sons

Molybdenite:
Everitt & Co.

Monel Metal (Wire, Rod, Sheet and Foundry Metal):
International Nickel Co.

Motors:
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
MacGovern & Co.
The Mine & Smelter Supply Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

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

Nails:
Canada Metal Co.

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

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

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

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

Oil Analysts:
Constant, C. L. Co.

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

Ore Sacks:
Northern Canada Supply Co.

Ore Testing Works:
Ledoux & Co.
Can.. Laboratories
Milton Hersey Co.
Campbell & Deyell
General Engineering Co., New York
Hoyt Metal Co.

Ores and Metals—Buyers and Sellers of:
C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.

Packing:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd.

Paints—Special:
Spielman Agencies, Regd.

Perforated Metals:
Northern Canada Supply Co.
Hendrick Mfg. Co.
Canada Wire and Iron Goods Company.
Greening, B., Wire Co.

Permissible Explosives:
Giant Powder Company of Canada, Ltd.

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

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

Pillow Blocks:
Canadian Link-Belt Company

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

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

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

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

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

Platinum Refiners:
Goldsmith Bros.

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

Powder:
Giant Powder Company of Canada, Ltd.

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

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

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

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

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

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

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

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

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

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

Pumps—Diaphragm
The Dorr Company

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

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

Quarrying Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields, Limited
Mussens, Limited
R. T. Gilman Co.

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

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

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

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

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

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

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

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:
Allan, Whyte & Co., Ltd.
Canada Wire & Cable Co.
Dominion Wire Rope Co., Ltd.
Greening, B. Wire Co.
Northern Canada Supply Co.
Mussens, Limited

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

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

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

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

Screens—Cross Patent Flanged Lip:
Hendrick Mfg. Co.

Screens—Perforated Metal:
Hendrick Mfg. Co.

Screens—Shaking:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Screens—Revolving:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Scheelite:
Everitt & Co.

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

Shaft Contractors:
Hendrick Mfg. Co.

Sheet Metal Work:
Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:
Hendrick Mfg. Co.

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

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

Ship Bunkering Equipment:
Canadian Mead-Morrison Co., Limited.

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

Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

Silver:
Coniagas Reduction Co.

Saline Refiners:
Goldsmith Bros.

Smelters:
Goldsmith Bros.

Sledges:
Canada Foundries & Forgings, Ltd

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

Solder—Bar and Wire:
Hoyt Metal Company

Special Machinery:
John Inglis Co., Ltd.

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

Sprockets:
Hans Renold of Canada, Limited, Montreal, Que.
Canadian Link-Belt Co., Ltd.
Jones & Glassco (Regd.)

Spring Coil and Clips Electric:
Canadian Steel Foundries, Ltd

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

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

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

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

Steel Drums:
Smart-Turner Machine Co.

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

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

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

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

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

Surveying Instruments:
C. L. Berger

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

Switches and Turntables:
John J. Gartshore

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

Tanks:
R. T. Gilman & Co.

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

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

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

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

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

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

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

Canadian Miners' Buying Directory.—(Continued)

Tramway Points and Crossings:
Canadian Steel Foundries, Ltd
Hadfields, Limited

Transits:
C. L. Berger & Sons

Transformers:
Canadian Fairbanks-Morse Co., Ltd
R. T. Gilman & Co.
Northern Electric Co., Ltd.

Transmission Appuiances:
Jones & Glassco (Regd.)

Transmission Machinery:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Troughs (Conveyor):
Hendrick Manufacturing Co.

Trucks—Electric:
Canadian Fairbanks-Morse Co., Ltd

Trucks—Hand:
Canadian Fairbanks-Morse Co., Ltd.

TTrucks:
Canadian Fairbanks-Morse Co., Ltd.

Tubs:
Hadfields, Limited

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

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

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

Turbines—Water Wheel:
MacGovern & Co.

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

Twincones:
Canada Foundries & Forgings, Ltd.

Uranium:
Everitt & Co.

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

Welding—Rod and Flux:
Prest-O-Lite Co. of Canada, Ltd.
Imperial Brass Mfg. Co.

Welding and Cutting—Oxy-Acetylene:
Prest-O-Lite Co. of Canada, Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Imperial Brass Mfg. Co.

Wheels and Axles:
Canadian Steel Foundries, Ltd.
Hadfields, Limited
The Electric Steel & Metals Co.
The Wabi Iron Works

Winches—Power Driven:
Canadian Mead-Morrison Co., Limited.

Winding Engines—Steam and Electric:
Canadian Fairbanks-Morse Co., Ltd
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

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

Wire—Bare and Insulated:
Canada Wire & Cable Co.

Wire Rope:
Allan, Whyte & Co., Ltd.
R. T. Gilman & Co.
Canada Wire and Iron Goods Company.
Canada Wire & Cable Co.
Dominion Wire Rope Co., Ltd.

Wire Rope Fittings:
Canada Wire and Iron Goods Company.
Canada Wire & Cable Co.

Wire Cloth:
Northern Canada Supply Co.
Greening, B. Wire Co.
Canada Wire & Iron Goods Company

Wire (Bars and Insulated):
Standard Underground Cable Co. of Canada, Ltd
Northern Electric Co., Ltd.

Wolfram Ore:
Everitt & Co.

Woodworking Machinery:
Canadian Fairbanks-Morse Co., Ltd

Zinconium:
Everitt & Co.

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

Zinc Spelter:
Canada Metal Co., Ltd.
Hoyt Metal Co., Ltd.

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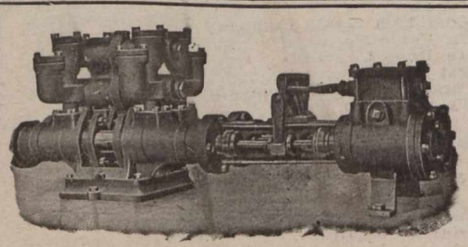

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"Sirocco"

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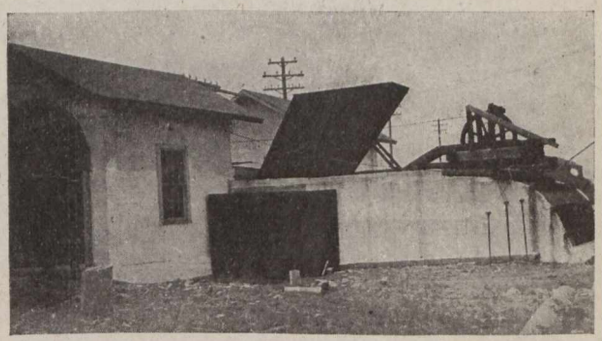
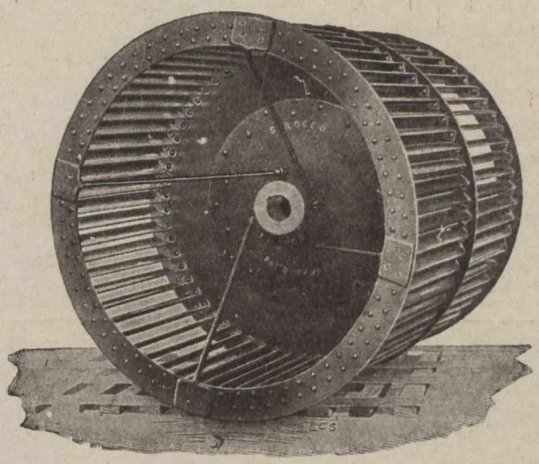
MINE FANS



Equipment in use at the Nova Scotia Steel & Coal Company's Mine.



DELIVER
MORE AIR WITH LESS POWER

Ordinary mine fans use a lot of power, and did you ever figure out how much that power is costing a year?

Suppose you are using 200 h.p., an average of 7000 hours a year. If that power delivered to the fan costs less than 5 cts. per horsepower hour you are doing better than the average.

$$\text{Now figure:} \quad \frac{200 \times 7000 \times 5}{100} = \$70{,}000$$

In many mines the figure is greater—we know of one mine where the yearly cost of power to operate the fans is figured at nearly $125,000.

So when we say that Sirocco Mine Fans deliver more air with less power, we are talking money—getting right down to brass tacks.

The limited space at our disposal here prevents going into the reasons for Sirocco superiority, but they are explained thoroughly in our 66-page illustrated booklet on mine ventilation.

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Diesel Engines
Steam Turbines
Steam Engines
Condensers

LAURIE & LAMB

211 Board of Trade Bldg.
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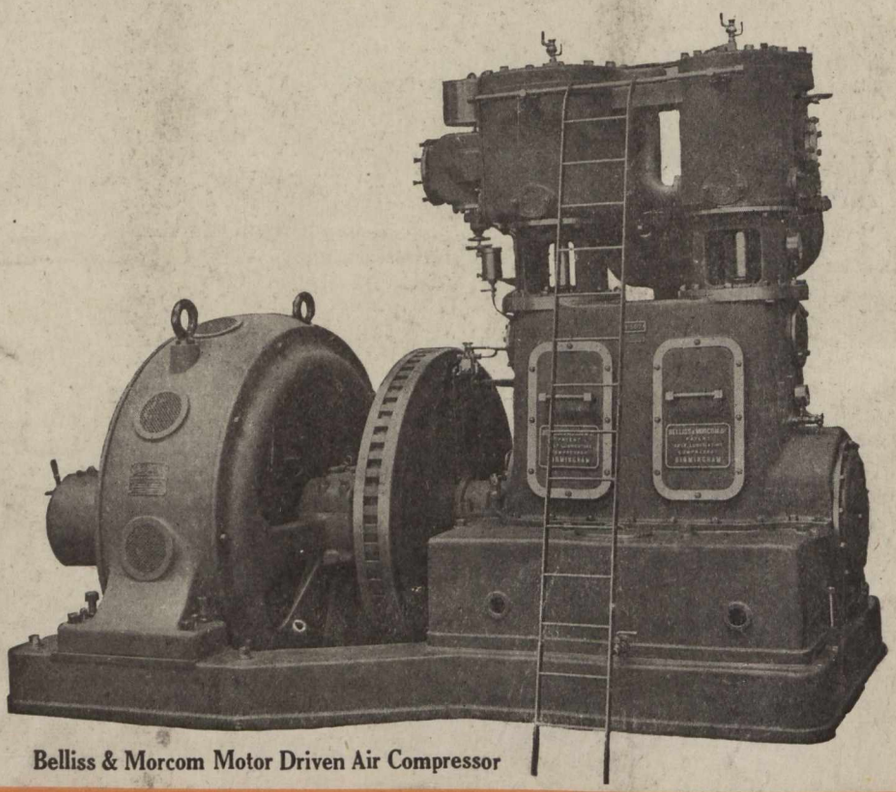


Belliss & Morcom Motor Driven Air Compressor

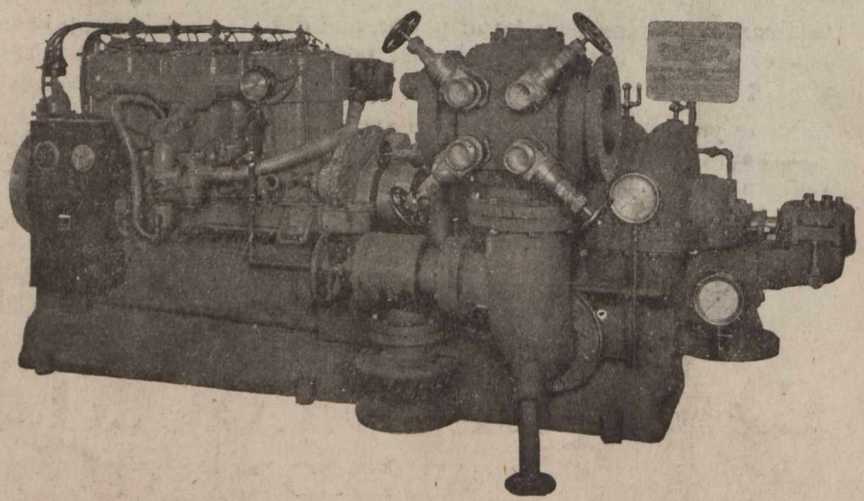
Lea-Courtenay self-contained fire pump unit for the protection of the isolated plant.

Lea-Courtenay Centrifugal Pumps are built on insurance standards; in capacities of 500, 750, 1,000 and 1,500 G.P.M., to be operated by gasoline engine, steam turbine or electric motor; singly or in combination for emergency. Ask for bulletin giving details.

The first successful self-contained fire pump equipment was a

LEA-COURTENAY CENTRIFUGAL PUMP

coupled to a gasoline engine. There are no stand-by charges for electrical current. Its operation does not rely on your Power Plant or the Central Station.



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