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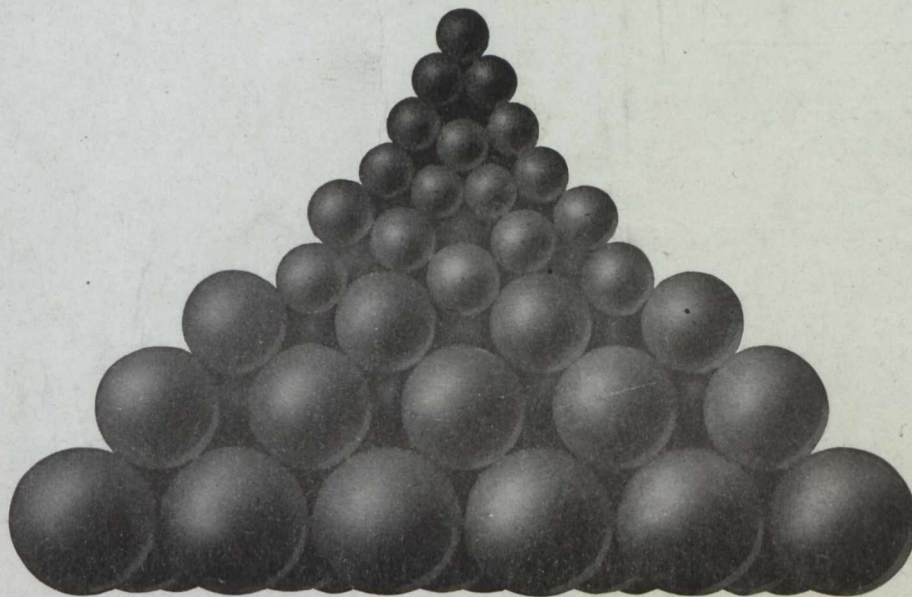
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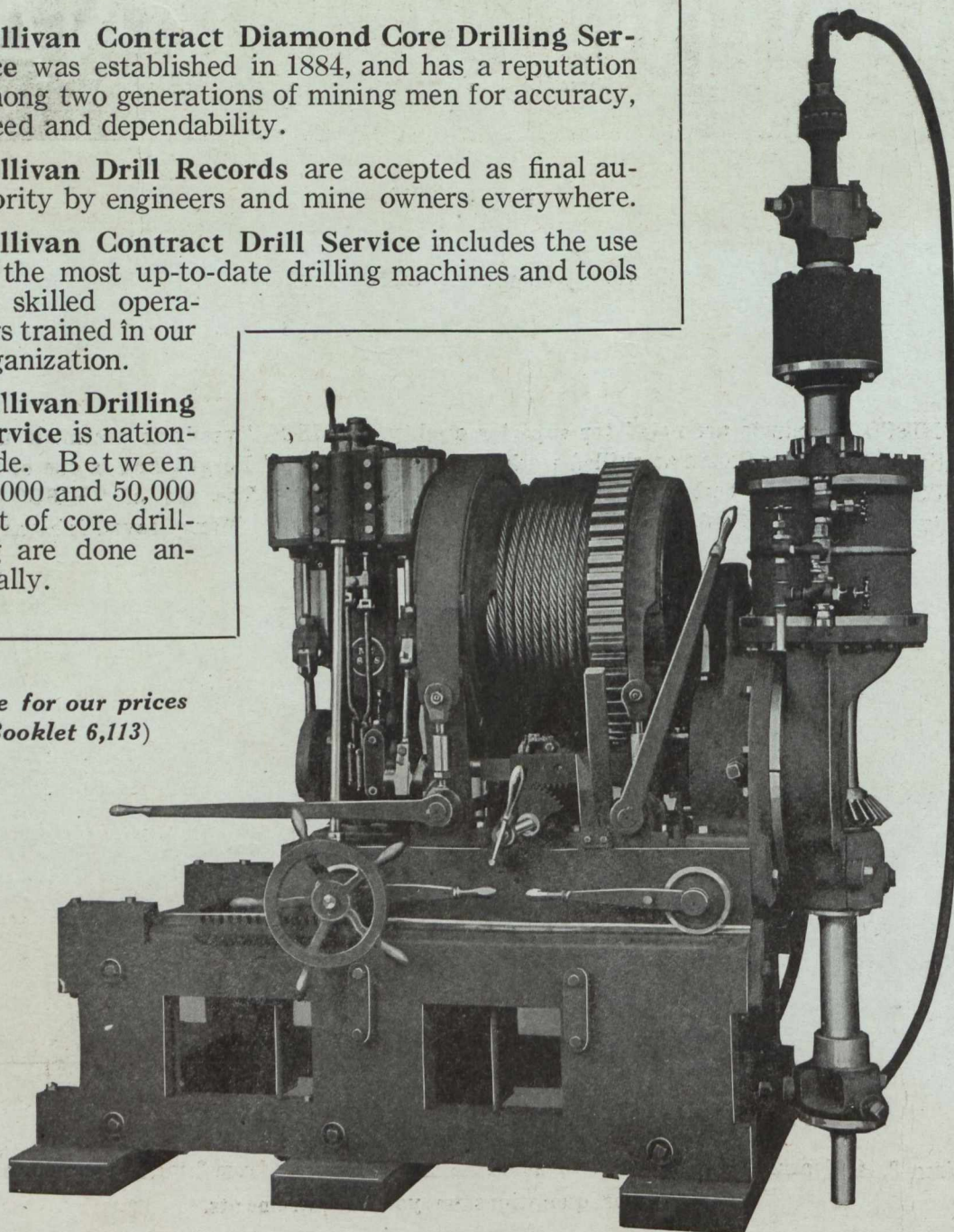
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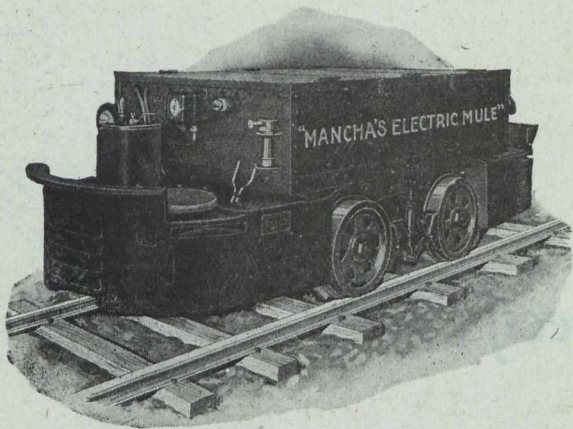
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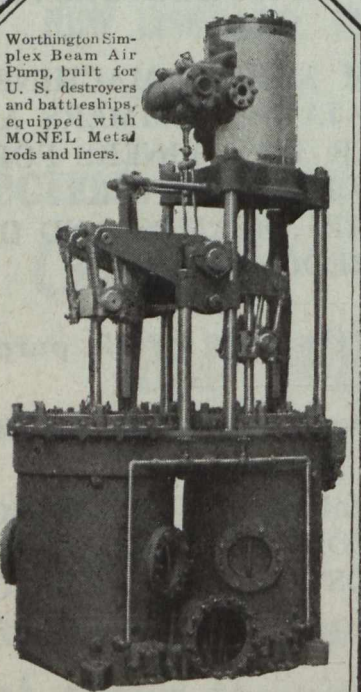
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VOL. XL.

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No. 30

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EDITORIAL

THE COBALT STRIKE.

Elsewhere in this issue will be found an editorial statement by the Montreal "Gazette" on the Cobalt strike. Two striking intimations are conveyed by this editorial. It is assumed that the Cobalt strikers felt convinced that the Minister of Labor favored a strike, and also that the necessity for a strike arose, not from intolerable industrial conditions, but from a desire to gain certain political ends. A graver accusation could scarcely be made against a member of the Government. It is admitted that "recognition" is the point of contention, and the strikers do not plead that wages were low or hours of labor too long. The Minister of Labor has characterised the mine operators as obdurate, and he has asserted the right of a trade union to be recognised by the employers concerned, but he has asserted an entirely new principle, namely that employers must recognise a given and selected union irrespective of its previous relations with employers and its record. This is stretching the privileges of unionism very far, and, if accepted, the effect of such a principle would give freedom of action to the trade union only and no freedom at all to the other party to the bargain. In these days it may seem heretical to advance the statement, but we believe that even an employer of labor has some rights.

The European Commission of the National Industrial Conference Board of New York, after an exhaustive study of the situation in Europe, has reported that "the solution of the worldwide unrest problem rests largely upon the separation of political and industrial issues."

That the Cobalt situation was not an industrial one is evidenced by the mutually satisfactory manner in which employers and mine-workers have adjusted their differences in the Porcupine District. There is a general belief at Cobalt that similar differences could have been compromised there had not the international union organizers succeeded in conveying to the mine-workers the feeling that the theory and propaganda of international unionism was favorably regarded in government circles, and when the "Gazette" puts forward the suggestion that the Cobalt strike is "the manifestation of a political movement of which we have already had evidence," it discovers the menace from which the "obduracy" of the Cobalt operators proceeds.

THE HAILEYBURY MINING SCHOOL.

The Haileybury Mining School, commencing September 2nd is furnishing a Mining Course for returned soldiers, particulars of which are contained in this issue. No commendation of such a policy is required, as it carries its own commendation.

As a concrete example of the new spirit that is moving in secondary and technical education in Canada the Haileybury Mining School is significant. This school would seem to typify the idea of "vocational training" in its most efficient form, as it will permit of instruction being given to young men and aspirants for higher positions in the mining trades while permitting them to follow their regular occupation. This is the only method by which really worth-while instruction can be given to ambitious young men and the subordinate officials in a mining district, and the Haileybury School is justified in receiving, as it has received and will doubtless continue to receive, the support of the local mining companies.

The instruction of the subordinate officials in mining districts has hitherto been lamentably poor in Canada, and the greatest reliance has been placed by aspirants for certificates upon correspondence courses. In their day these correspondence courses have been of invaluable service to men who could not obtain the benefits of college instruction, and their value will not be lessened, but rather increased by the provision of technical schools having the physical equipment for demonstration of the phenomena and problems mentioned in the text-books. But it is not right that ambitious mining men, who desire to rise in their profession, but are limited by occupational ties, by lack of money and remoteness from large centres of population, should be forced to rely entirely upon correspondence courses, or even upon provincial mining schools inadequately equipped with apparatus for demonstration.

The Provincial Government of Ontario is to be congratulated upon the Haileybury Mining School, which may well serve as an object lesson to other provinces of Canada. The writer could not help contrasting the fortunate situation of Haileybury, with its well-equipped Mining School, and its equally well-equipped High School adjoining, with Sydney, Nova Scotia, where with a resident population probably three times exceeding that of Haileybury, and a surrounding industrial population very much larger than is served by Haileybury, the attempt to provide a technical school, although several times made, has never succeeded. The

Cobalt District has one industry only. The Sydney District has many large and varied industries, but so far, the provision for vocational training and secondary education has been limited to the evening classes of the Technical Education Department, which do not provide adequate facilities, or opportunities in any measure commensurate with the magnitude of the industrial development of the district. No criticism is here intended of the work already accomplished by the Director of Technical Education. With the limited means at his disposal as much as possible, and probably more than could reasonably be expected, has been accomplished, but the whole conception of secondary education and vocational training needs to be enlarged.

CANADA'S COAL INSUFFICIENCY.—FURTHER REMARKS.

A leading article in "Toronto Saturday Night," dealing with the necessity to purchase coal at the present time, so as to stimulate production during the season of easy transportation conditions, and to avoid the autumnal rush, reviews the general world coal situation, and comes to the conclusion which has been consistently advocated by this Journal, and which no one can avoid who studies the subject, namely that there is a pronounced world coal shortage, particularly in Europe. In referring to Canada's ability to help, however, we think the writer does not do justice to our coal resources. The article states:

"All this goes to show that Europe is short of coal, and that the United States will be called upon to help out in making good the shortage. No opinion has been expressed as to the prospects for Canadian coal mines being called upon to help out. The only coal commercially available for such a purpose would probably be that which is being mined in Nova Scotia. This is a soft coal, only suitable for manufacturing and coking purposes, and it may be questioned whether it would be in general demand for the purposes for which coal is being drawn from the United States."

Canada is importing annually about sixteen million tons of bituminous coal and about six million tons of anthracite from the United States. We have no available anthracite in Canada, and even if we admit for the sake of argument that we must continue to import anthracite because of its greater suitabilities for domestic use than bituminous coal, yet there remains sixteen million tons of coal imported from the United States, which, considered on the grounds of quality only, could be furnished within our own borders.

But anthracite is not an irreplaceable substance, and there are many instances where Canadian-mined bituminous coal could be very advantageously substituted for anthracite.

There is no anthracite in Europe available for domestic uses, and if there were the people would be ignorant of how to use it. One Province of Canada at least gets along very nicely with "soft" coal, and many of its inhabitants would be puzzled to use "hard" coal. The truth is that anthracite is a convenient luxury, and it is suitable for use in large cities because of its smokeless character, but if we could not get it, we should speedily awaken to the possibilities of bituminous coal.

At least five million tons of the bituminous coal now being imported from the United States could and should be mined in Canada, and the declining or stationary condition of the Canadian coal-mining industry is a most serious matter.

After damning the possibilities of Canadian coal production with faint praise, and some rather cutting truths also, the writer of the article referred to says: "However, there is little to be gained from discussing the possibilities for the export of coal from Canada during the present juncture."

We differ. The questions of both the export and the import of coal in Canada will repay the fullest discussion and the greatest possible publicity. Canada could not only supply a much larger proportion of her own coal needs than is the case to-day, but could also export coal—and some day she will.



F. W. GRAY.

F. W. Gray, Associate Editor of the "Canadian Mining Journal," and Editor of "Iron & Steel of Canada," who has recently been appointed the Secretary of the Iron and Steel Section of the Canadian Mining Institute.

CORRESPONDENCE.

The Labor Situation at Cobalt.

To the Editor of the Canadian Mining Journal:

Sir,—An editorial in your issue of July 9th, entitled "Mining Profits and Wages," which is a misnomer, as far as the essential part of the editorial is concerned, implies a lack of understanding of the real situation in the Cobalt Camp.

The wages paid in Cobalt are, with few exceptions, as high as any paid on this continent. While a few of the larger mines could undoubtedly pay higher wages, the majority are living a hand to mouth existence. Higher wages necessitated a corresponding increase in the cost of all operations and works to the detriment of the district as a whole, and the demand for higher wages does not indicate any very constructive tendency on the part of the Union.

The cost of developing properties in Northern Ontario is a particularly costly one, and one of the chief reasons for the small number of properties now being developed is this big expense for the preliminary operations. This is one of the chief reasons why so many of the companies are looking to other fields where preliminary costs are much lower.

You state that the managers should accept the invitation of the Union to get together and that past history of the Union should not be allowed to stand in the way of such a conference. It is not only the past history with which the managers are dealing but with the present history, as well. The organization is the same now as in the past. The miners have, contrary to your implication, full opportunity to express their views and have seized each and every one of the many opportunities which have presented themselves to air them.

The present trouble is largely due to the avidity with which the Department of Labor has listened to complaints and encouraged the Union in its demands.

To the big majority of the mine workers, the rate of pay and hours of labor were quite satisfactory. Living conditions are good and conditions under which men work are of the best. The whole question is really one of recognition of the Union. The different mine managers have always been willing and pleased to meet and deal with a committee of the employees, but the Union felt that this was destroying its influence and opposed such conferences.

The fact that the men were getting a square deal without the Union interference was too bitter a pill to swallow without causing trouble and the old story of recognition of the Union was once more revived. There were no particular issues at stake, but the fact that the relations between the employee and employer were harmonious and the membership in the Union low, was sufficient excuse to "start something."

Unfortunately the Department of Labor, possibly actuated by a keen nose for votes, and notwithstanding that the mines were operating under one form of collective bargaining, tried to insist that the particular brand of collective bargaining advocated by it and which called for recognition of the Union, should be practiced.

To the average man it would seem that whatever the functions of the Minister of Labor may be, they are not to act as a propagandist for the Western Federation of Miners.

Yours, etc.,

ENGINEER.

Editorial Note.

[The writer of the above letter has misinterpreted some of the remarks made in the editorial referred to. His letter will, however, help our readers to understand the situation at Cobalt. We suggested that the mine managers and the Union should attempt to settle their differences in conference, and suggested some of the reasons why miners should not expect too large a share of the profits of the few very profitable companies. Our correspondent seems to be under the impression that we were advocating the paying of higher wages. Our remarks were rather directed to the desirability of treating with the Union without putting too great stress on the past history of the Western Federation of Miners.

If we are correctly informed, the labor situation at Cobalt was very satisfactory when the Industrial Relations Commissions visited Cobalt a short time ago. Since then there have been many rumors of impending trouble. It would seem that the endeavors of the Government to find out whether there was dissatisfaction when there was none has aroused in the professional leaders a feeling that they were not doing their work well. They have since been very active in their endeavor to convince the Minister of Labor that the miners were not being fairly treated. Those who diligently look for trouble can find it or make it almost anywhere. If the searcher enlists the services of professional labor leaders he may reasonably expect to succeed in creating a state of unrest.

At Cobalt there have been many meetings between mine managers and their employees to discuss wages and conditions. The men have appointed committees to meet with the managers and there is little reason to doubt that there exists good feeling between the managers and employees at each mine. The present trouble is between the Union and the managers. The officials of the Union appear not to approve of collective bargaining unless the bargaining is conducted by them. Naturally the managers have other views.

If all the mine employees in the Cobalt district formed a Union and elected representatives, we would be strongly in favor of the question of wages being settled at conferences between such representatives and mine managers. Workers are interested in the wages not only at the mine at which they are employed, but at the other mines in the community in which they live. A standard wage for the district is desirable. The determination of such standard wages should be made by consultation between the representatives of all the workers in the district and the managers.

Unfortunately, there is at present no such organization among the mine employees. There is at Cobalt a branch of an International Union to which many of the men belong. Many of the mine employees do not belong to this Union and their views cannot properly be expressed by the Union officials. Moreover, the local Union is controlled in the United States, not in Cobalt. When the mine managers object to recognizing the leaders of the International Union or its local officers as the representatives of their employees, they are quite justified. The men do not properly represent the employees. If there is any need to argue the point we need simply refer to the fact that these professional leaders have called a strike when most of the workers appear not to believe conditions unsatisfactory.

While we do not believe in recognition of the Union as defined by Union leaders for the consumption of members and prospective members, we are nevertheless of the opinion that, since a considerable number of em-

ployees are satisfied to have their union officials represent them, the managers might well listen to the arguments of these officials. This is what we suggested in the editorial to which our correspondent objects. We have little doubt that if granted such an interview the Union officials would in their endeavor to increase membership say that it meant recognition as defined by them. Misrepresentation could, however, be to some extent prevented by giving full publicity as to the character of the conference.

While we urged that the operators should listen to what the union officials had to say, we do not believe that the strike for which those officials are responsible should be settled by conferences between the union officials and the mine managers. The employees of the mining companies have quit work. If they wish to return to work under the very good conditions which prevailed when they went out, they will doubtless take steps to get their views represented properly. How and when they will do it is for the workers to decide. A really representative committee of the workers would not be so much interested in members' fees as in work in the mines at good wages. If they and the mine managers can be brought together the strike will doubtless soon be settled, for wages and conditions at Cobalt are known to be good.—R.E.H.]

THE COBALT STRIKE.

The Minister of Labor has issued a statement or given an interview in which he attempts to defend his position in connection with the strike of miners, which has stopped production in the Cobalt mines. He would like people to believe that every effort was made to avert this strike, but that the mine-owners were obdurate. The principal issue in the Cobalt situation, the only one in regard to which no settlement seems possible, is the question of the recognition of the union in its affiliation with the Western Federation of Miners, represented on the ground by a gentleman of the name of McGuire. A Cobalt despatch to the Toronto Mail and Empire, a paper friendly to the Government, quotes Mr. McGuire as stating that the miners have the support of the Union Government, while "other members of the Miners' executive unhesitatingly state that the miners were told to strike by the Labor Minister."

The conduct of the Minister of Labor in regard to the Cobalt situation, is important, as illustrating his general attitude, and helps to explain why the Industrial Conference is being organized as an Organized Labor Conference. When the Royal Commission on Industrial Relations made its tour of the country last May, a visit was made to Cobalt, and a study made of conditions there. It was found that the operators had gone far in enabling the miners, by wage increases and by profit-sharing through the payment of bonuses based upon the price of silver, to meet the mounting cost of living. The Mayor of Cobalt, Mr. Malcolm McKinnon, in giving evidence before the Commission said, "As far as my knowledge of it goes, I would think there was very little unrest, if any, here. Every person seems to be well satisfied with the conditions here." One of the employers, described the camp as one of the most peaceful in which he had ever been. Another declared that the men on his property were perfectly satisfied. Representatives of the miners also testified, and the burden of their complaint was that the mine-owners would not treat with the miners' union. This the owners

frankly admitted, stating that they would have nothing to do with the Western Federation of Miners because of its history. The Minister of Labor claims for the Western Federation of Miners that it has changed its ways, that the evils of its policy and leadership of ten years ago are not now to be charged against it. The Cobalt mine-owners, however, are unwilling to risk it. Has the Minister of Labor any guarantee that the constitution of this organization will protect it in the future against domination by men with criminal records or by men who have been deported from any country as undesirable citizens? This question of recognition, was, and is, the whole trouble between the employees and the mining companies at Cobalt. On the question of wages there is not sufficient disparity to preclude a settlement. Yet the Minister of Labor pretends that the strike could not be averted because of the "rather unfortunate" attitude of the employers. His position, then, is that although all other differences might have been composed without a strike, the men were justified in paralyzing the industry as a means of enforcing recognition of their union. If this is not a correct statement of his attitude, perhaps he will clear up any doubts by stating it himself. If we are right, the Minister approves of a strike on a purely political issue, and is prepared to sanction the crippling of industry in order to serve the political ends, not of labor, but of organized labor. His actions and his statement lead to, and permit, no other conclusion. However right that position may or may not be, from the standpoint of Mr. Robertson as a trades unionist, it is an impossible one for a member of the Government, who must be the servant of all the people, and not of any organized minority. Otherwise, government becomes impossible, and Sir Robert Borden, or whatever constitutionally selected Premier may be in office, gives place to comrade Robertson, or some other comrade. It is a serious situation, requiring from the Government consideration and action. It is the manifestation of a political movement of which we have already had evidence, and which will never be easier to restrain than it is now.—Montreal "Gazette."

PERSONAL.

George E. Leighton, the Canadian representative of the Hardy Patent Pick Company, of Sheffield, England, is shortly leaving for England.

I. C. MacKie, for a number of years Chief Chemist of the Dominion Iron & Steel Company, at Sydney, N.S., has been appointed Metallurgist to that company.

Alexander McEachern, for a number of years superintendent of No. 4 (Waterford) District of the Dominion Coal Company, and Alexander MacDonald, also for many years superintendent of No. 3 District, have been appointed as Assistant General Superintendents with residence and offices at Glace Bay.

Lt. H. G. Young, C.E., returned to Canada from overseas on July 15th, and is now at the Military Hospital at Ste. Anne de Bellevue.

Professor H. M. Tory, of the University of Alberta, is visiting in Montreal and Nova Scotia.

Mr. G. M. Ponton has accepted a temporary position as assistant secretary to the Canadian Trade Commission.

Mr. H. E. T. Haultain, professor of mining at the University of Toronto, is visiting copper mines in Michigan.

BULLETIN OF THE HAILEYBURY MINING SCHOOL COURSE FOR RETURNED SOLDIERS.

Under an arrangement with the Department of Soldiers Civil Re-establishment, the Haileybury Mining School offers courses to returned soldiers in the various subjects pertaining to mining. The school is well equipped to carry on classes in ore-dressing, assaying, chemistry, physics, mineralogy, geology, surveying, draughting, mining and mathematics.

Beginning September 2nd, 1919, special short courses will be given in the above subjects extending over periods of from six to twelve months.

At present there is not a vocational officer in this district. Men intending to take this course should write Mr. F. S. Drummond, D.V.O., Sudbury.

The standard of entrance required is the High School entrance examination. Those who have not passed this examination may consult with the Principal of the school so that each case will be dealt with individually.

Outline of Courses.

Mathematics.—The school is prepared to give courses in arithmetic, algebra, geometry and trigonometry from the beginning of the subject as far as the senior matriculation. The courses will be adapted to the needs of those taking the classes.

Surveying.—The course includes chaining, levelling, contouring, transit surveys, stadia surveys, shaft plumbing, mine surveying, and plotting.

(Only those who have completed at least the mathematics of the second year of the high school should attempt this course.)

Physics.—A brief laboratory and class room course in mechanics, heat and electricity.

Chemistry.—Some knowledge of chemistry is necessary in order to intelligently follow the work in mineralogy, assaying and ore-dressing. The course will cover an experimental study of some of the common elements and their compounds, chemical principles, formulae, equations and nomenclature.

A student who has already taken elementary chemistry may proceed with a course in qualitative and quantitative analysis of ores and minerals.

Mineralogy.—A laboratory course covering about sixty minerals, their physical properties and blowpipe tests. This subject is essential to those taking ore-dressing and assaying. A large collection is available for study.

Geology.—A field course dealing with the rock formation of the district. Also class-room work on rock classification and structure, ore deposits and prospecting.

Fire Assaying.—The equipment of the assay laboratory is similar to that of any commercial plant, and the course is carried out along practical lines. Attention is specially paid to the principles of the various operations. The course covers all methods of gold and silver assays, and the analyses of cyanide solutions.

Ore-Dressing.—The ore-dressing plant is among the best in Canada, and probably excels that of any other educational institution in the country. It is equipped to carry on complete tests in the crushing, concentration, cyanidation and flotation of gold and silver ores. A detailed course in each of these operations will be given.

Mining.—The development of an ore body by means of shafts, drifts, cross-cuts, up-raises and winzes, diamond-drilling. Plan of surface lay-out for a small mine.

Mechanical.—Freehand sketching.

Draughting.—Machine parts, lettering, drawings to scale of machine parts and tracings of the same. Design of simple equipment.

CANADA'S COAL OUTPUT.

Production For May and Imports of Anthracite Below May, 1918.

The Dominion Bureau of Statistics issues the following monthly bulletin as a survey of the output of coal in Canada for May, 1919, as compared with May, 1918.

In addition the imports of bituminous coal for May, 1919, were 736,426 whereas May, 1918, shows 1,437,377. The imports of anthracite coal for May, 1919, were 461,701, and May, 1918, 465,561.

	Output for month of May, 1918.	Output for month of May, 1919.
	Net tons.	Net tons.
Sydney	375,120	288,468
Inverness	20,385	11,059
Port Hood	153	576
Pictou	47,009	43,305
Springhill	46,730	43,351
Joggins	20,180	17,074
Total for Nova Scotia	509,577	403,833
New Brunswick	23,209	11,090
Saskatchewan	21,479	17,819
Alberta bituminous	255,462	187,304
Alberta anthracite	12,141	0
Total for Alberta lignite	144,602	93,695
Grand total for Alberta	412,205	280,999
Crow's Nest	77,819	49,201
Inland	12,711	6,041
Island	160,989	137,553
Total for British Columbia	251,519	192,795
Grand total for Canada	1,217,989	906,536

CHICAGO MEETING OF THE AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS.

September 22 to 26 is the time set for the Chicago meeting of the A. I. M. M. E., at which the progress that has been recently made in technical lines will be fully discussed. Among the subjects to receive particular attention will be the iron and steel industry, which has reached such importance in Chicago. It is planned during the meeting for the Institute to make an excursion as a body to Gary, Indiana. Arrangements are being made to charter a steamer which will convey the members and guests across the south end of Lake Michigan, directly to the steel works. A tour will be made through the various departments of the steel plant, and luncheon will be served at Gary. Technical sessions on subjects in ferrous metallurgy will be held on the boat.

The banquet has been scheduled for the evening of Wednesday, the twenty-fourth, at the Congress Hotel. By putting this function in the middle of the week, it is expected that a maximum attendance can be obtained; members able to come for only a portion of the session can then be present at the banquet whether they come for the first or latter part of the week.

An elaborate programme for the entertainment of the ladies is being prepared, and all members are urged to bring their wives to this meeting.

THE CALGARY INDUSTRIAL CONGRESS.

The demand for a foreign trade commission to represent the western provinces of Canada, exclusively, organization from ocean to ocean in many special advertisement and urged by the president of that organization from ocean to ocean in many special addresses before public bodies, seems now to be certain of ultimate fulfillment, if one may judge by advices received at the headquarters of the Canadian Industrial Congress, August 11-16, from many sources.

Advices to this effect are received from Winnipeg, from Vancouver and even from Ottawa, and it is now apparent that many of the members of the Dominion Government look with favor on the idea.

The proposal for a foreign trade commission for the West was originated by Mayor M. A. Brown of Medicine Hat, president of the Alberta Industrial Association. It is based on the belief that only by a proper investigation of the foreign markets for Western Canadian products can the West build up industry to its maximum. Such an investigation, it is explained by Mayor Brown, would deal specifically with those possible markets for Canadian products lying on and adjacent to Pacific Ocean routes of traffic and the vast undeveloped Oriental markets.

Mayor Brown holds to the belief that eventually Western Canada will some day be manufacturing on a larger scale than Eastern Canada because of the great potentialities in this connection in China and Japan as well as along the western coast of South America and in Australia.

"The world does not realize," Mr. Brown points out, "that one-seventh of the population of the globe is living and striving and working along the banks of one river alone in China. The possibility of the development of this wonderful market is just one aspect of the great trade which Western Canada and the western portion of the United States will have the great opportunity to deal with.

"Great economists of the day, men with vision, see the development of the Pacific regions as the most striking aspect of the future of our continent. I may add that by Pacific regions I include those inland empires such as our own, Alberta, Canada."

Strong support is being given the project for a Western foreign trade commission especially in Vancouver, B. C., Victoria, B. C., Seattle, Portland, and other western cities more easterly, such as Winnipeg, Regina and Saskatoon. All these cities will be represented by good delegations at the forthcoming Industrial Congress, to be held in Alberta in August. The principal or "educational" sessions of this congress will be held at Calgary, Canada, August 13 and 14. The industrial men of the continent are being asked to participate.

That this is assuming a phase of international importance seems certain from the fact that already a large number of the chambers of commerce of the United States are planning on having delegations in attendance, as well as the city councils and municipalities themselves of many of the more important Western cities.

From as far east as Erie, Penn., and as far south as Florida, assurances are given that representation will be made at the congress, while from Minneapolis and other northern United States cities large delegations will come. From Minneapolis it is possible

that a special train will be arranged as very many of the industrial leaders of Minnesota are planning to be present.

A special representation is coming to the congress from Japan and this delegation will be accompanied by delegates from the Japanese Club of Seattle and a corresponding organization from San Francisco. It is possible that a Japanese speaker will be on the program for at least a brief address bearing on the relations as between Japan on the one hand and the United States and Canada on the other.

TESTING NEW ELECTRICAL PROCESS FOR SMELTING.

A test, which is causing considerable interest, is now being made to prove the commercial possibilities of smelting magnetite ore in British Columbia.

On July 9th Mr. J. H. Fraser, managing director for the Vancouver Magnetite Iron & Steel Smelting Company, owners of the Ronaldsay Howe Sound Pig-Iron Smelting Plant, obtained from the B. C. Electric Company, the use of the old power plant at Highland Station for the purpose of carrying out full tests of the Fleet process of smelting magnetite.

The Provincial Government is doing everything possible to encourage the development of the iron industry in British Columbia and has granted \$2,000 to carry out the test and has shipped 50 tons of Texada Island ore to be used. In addition to this the Provincial Government has agreed to pay a bonus of \$3 a ton for all iron smelted in British Columbia from British Columbia properties.

Mr. Fleet declares that, by his process, which is electrical he can produce magnetite pig iron at from \$11 to \$13 a ton, this being considerably less than the oil and coke method used at the Ronaldsay plant which costs \$22.

Should the Fleet process prove satisfactory a full plant will be erected and the pig iron then handled through the Ronaldsay smelter where it can be transformed by the oil process into the best of steel. This would place Vancouver on better than a level with iron and steel industries of the East, and will help to continue on the Pacific Coast the industry of steel shipbuilding.

Mr. W. D. Fleet, of Montreal, the inventor of the process is a well known authority in electrical matters. He was superintendent of the Canadian Copper Smelting Company at Sudbury for six years and later installed the electrical apparatus in the big hydro-electrical plant of the Calgary Power Company at Kananaskis and Horseshoe Falls. From Alberta he went to Manitoba, where he was on the Manitoba public utilities commission. His process, which is now being tested on the iron ores of British Columbia took three years of experiment and study and is declared by men who understand smelting to be a successful one.

THE YUKON.

Recently the steamer Dawson sailed for Mayo to tow the big dredge from McQuesten to Mayo, where it is to be knocked down and transferred to Highest Creek. It will there work out several miles of placer ground. L. H. Titus goes to Mayo to look after the transfer. He is manager of the new company recently formed to operate the dredge.

The Use of Explosives in Mines*

By H. Y. RUSSEL, Manager, Technical Division
Canadian Explosives, Ltd.

Probably it would be well at the outset to give a brief outline of the manufacture of explosives, as, in all probability, except by those directly engaged in their manufacture, less is known about the processes involved than about the manufacture of any other commercial product. This is not altogether due to the fact that any great secrecy is made of the processes, but rather because they are unusually hazardous and it is not desirable to expose more people than necessary to the dangers entailed. Consequently it is not the practice of explosive manufacturers to show people not directly connected with the industry through their plants. We believe, also, that it is the general opinion of the average layman that explosives are all the result of some chance discovery rather than the outcome of scientific investigations and calculations. The explosive chemist does not, ordinarily, accidentally develop or discover new compounds which are explosives. Rather, he sets out to manufacture a theoretical compound which he knows will be explosive, and what he discovers or invents is a commercial process for the manufacture of the compound desired. Practically all explosives are and have been formulated on paper and many of their characteristics determined by calculations before any of the actual explosives have ever been made. For this reason all up-to-date companies manufacturing explosives have large staffs of specially trained chemists whose duties are to continually test the raw materials that go into the explosive, the mixture of these ingredients as the process of manufacture develops, and the completed article.

The raw materials that go into the manufacture of explosives must be of a high commercial grade. They are bought upon certain standard specifications and, when received, they are tested under the supervision of the chemical division before being used.

The first step in manufacture is the examination and mixing of the "dope," or the material which absorbs and holds the nitro-glycerine or the liquid explosive base. The composition of the "dope" varies in different explosives, but it consists generally of soda. The constituent materials, whatever they may be, are first screened to remove any foreign bodies, and samples are sent to the chemical laboratory for analysis. If the necessary degree of purity is found, the materials go forward for manufacture; if not, they are rejected and properly purified, or if that is not possible they are discarded.

Each lot of satisfactory material is then thoroughly dried, to get rid of the excess moisture and afterwards grained and screened to insure each ingredient having its proper degree of fineness. These operations are of great importance, as any excess of moisture will have a very bad effect on the explosive, making it insensitive and apt to leak, while the screening not only removes small foreign bodies, such as pieces of stone, iron and steel, which would be a source of danger in subsequent operations, but the size to which the article is ground has a marked effect on the quality of the completed explosive. Samples of the dried and screened materials are tested by the chemists, and if satisfactory the dif-

ferent ingredients, with the exception of liquids, are put together in the proportions called for by the formula for the particular grade to be manufactured, and are run through a mixing machine which thoroughly mixes and then again screens them. The result is known as the "dope." This screening checks the first one and also removes any foreign matter that may accidentally have got into the ingredients since the preliminary screening.

Samples of the dope are sent to the chemical laboratory in order that the proper incorporation of the different ingredients may be checked and analysis are made to prove that the proper proportions of the different ingredients have been used.

The dope is now ready for mixing with the nitro-glycerine, or the liquid explosive. Each is carefully weighed to insure proper proportions being used, the dope again screened and put into the mixing machine first, the nitro-glycerine being added and the apparatus started up and run until a thorough mixing is accomplished. This completes the making of the explosive, and again the chemist checks up the results.

The explosives are then conveyed to the packing machines for punching into the paper shells. Different kinds of punching machines are used for nitro-glycerine and ammonia dynamites, and for gelatines (forcites). These machines are controlled as to the force of the punch they deliver and in this way the density of the cartridge and the number of cartridges to the case is largely determined and kept constant. This is checked every half hour or so by weighing several cartridges, so that any variation in the density will be caught and the machine adjusted if necessary.

At times it is a rather difficult problem to maintain a constant density, as some of the ingredients vary considerably in this regard. This is particularly noticeable in ammonium nitrate, which is used extensively in Permitted Explosives for coal mines, so that extra care has to be exercised in making up these explosives.

In calculating the formula for an explosive, particularly one for use in mining, where noxious fumes must be at a minimum, allowances of the oxygen-producing ingredients is made to cover the fume produced, even to the combustion of the waxed paper shell, and samples of the completed cartridges are sent to the works laboratory for final testing.

The packed shells, which are now called cartridges or sticks, are conveyed to the packing house. Those powders containing nitrate of ammonia, which is very hygroscopic, are dipped in a waterproofing compound in order to increase their water resisting keeping qualities. The cartridges are then packed in the cases and weighed, and, in order to again check the density, the cartridges in every tenth or twentieth case are counted and the number required to make the net 50 lb. checked. Both during the punching and packing processes extreme care is taken to throw out all defective cartridges, which consist of torn shells or those partially filled. However, even though the cartridges receive two handlings, it is almost impossible to insure against some cases containing a poorly packed cartridge here and there.

* Paper presented at the Annual Meeting of the Canadian Mining Institute in March, 1919.

Before nailing the case, the packer inserts a slip bearing his number for reference purposes in case of complaints. It is thus possible when complaints are accompanied by the packing slips, to trace the defect back to the packer. Besides the packer's slips the cases are marked on the outside with the month and year in which they were packed.

The analysis made at the laboratory is checked against the theoretical composition. Ballistic pendulum and mortar tests are made for strength, and centrifugal tests for exhaustion. Sensitive tests are also made. Samples are also placed in our magazines to be watched to see that the explosive will stand storage.

From the packing house the cases are taken to the magazine and stored ready for shipment. The magazines are so built as to insure their being dry and well ventilated, and stocks are piled so that oldest will be shipped first.

All through the process of manufacture extreme care is taken in the handling of the materials and of the finished product to avoid the introduction of any foreign material, and the motto of the explosive manufacturer is that "Cleanliness is next to Godliness." This extreme care is also necessary in order to reduce the possibilities of accidental explosion. Among the precautions taken may be mentioned the elimination, wherever possible, of all metal parts for containers and apparatus; where this is not possible, brass, bronze, or monel metal is used. All workmen are required to wear rubber-soled shoes, and are not allowed to wear any clothes having metal or bone buttons; nor are they permitted to have in their possession matches, jack knives, or any metal whatever. Employees are frequently searched during work to make sure these regulations are being obeyed, and any infraction means dismissal.

Rules are posted in every building, regulating the quantity of explosives permitted in that building at one time, the number of operators allowed, the methods of operating, the kind and number of tools permitted, and citing the necessary precautions to be taken to minimize the chance of accident.

As a safety precaution, the manufacture of explosives is carried out in several stages, each in its own house, and separated from the other buildings by a distance of 300 ft., each building being barricaded by mounds of earth extending up to the eaves of the building. These mounds are to prevent the lateral projection of missiles in case of an explosion in any of the individual buildings.

The above broad description of the manufacture of explosives will indicate the care and the safety precautions that are taken and also the very important part played by the staff of chemists who check up the different processes. To operate an explosive factory without chemists would be as impossible as to operate a mine and mill without assayers or assays.

The explosives discussed in this paper are those in which the explosive base consists of nitro-glycerine, nitro-glycerine in combination with gun cotton, or nitro-glycerine in combination with ammonium nitrate. They are known as "high explosives" as distinct from blasting powders or low explosives.

It was not many years ago that users of explosives had a very limited variety to choose from; in fact blasting powder and one or two grades of N.G. dynamite covered the production. As to some of the old dynamites, anyone using them now would think they were going through a gas attack in which there were a considerable number of duds. The improvements in high

explosives have been many, but they have been gradual, and they are due to the knowledge and ability of specially trained men. New explosive ingredients have been discovered, which, when added to nitro-glycerine, result in better and safer explosives, and the different steps in the manufacture are now under the supervision of experts, so that the finished product to-day is one that can be depended on for constant strength and reliability.

In the manufacture of high explosives, and in making improvements in explosives or producing new explosives, the main points to be considered are, safety in use, strength, adaptability for certain kinds of work, stability, and cost.

The danger in the use of explosives is due to their liability to premature explosion owing to receiving a sharp blow or shock; to leaking of nitro-glycerine owing to the use of improper absorbents or to exposure to moisture; to too high a thawing temperature; to defects in manufacture; or to getting on fire and then exploding.

To lessen the liability of danger from handling, ingredients other than nitro-glycerine are mixed with the N.G. and the result is an explosive of equal strength, but less sensitive to shock or fire. At the same time care must be taken that the sensitiveness is not so far reduced that the whole charge will not explode, thereby unexploded powder in the drill holes or chamber.

In the case of straight nitro-glycerine dynamites, the marked strength shows the percentage of nitro-glycerine contained. Thus a 40% N.G. dynamite contains 40% by weight of nitro-glycerine; a 50% N.G. dynamite contains 50% N.G., and so on. With gelatines, such as forcite, and with ammonia dynamites, on the other hand, the marked strengths do not mean that they contain the marked amount of N.G., but that other explosive ingredients have been associated with N.G. in such quantities that, when used in similar weights, these explosives develop the same energy as an equivalent grade of straight dynamite, though with different velocities of detonation, etc., which make them better than straight dynamites under certain conditions.

The relative "stability" of an explosive depends upon its ability to stand storage for a reasonable length of time without inclining to spontaneous combustion, losing strength, or otherwise deteriorating.

The principal explosives used in Canada to-day are nitro-glycerine dynamite; forcite (a gelatine dynamite); and ammonia dynamite. In the first the main explosive force is nitroglycerine alone; in forcite, it is nitro-glycerine and gun cotton, and in ammonia dynamite it is nitro-glycerine and ammonium nitrate. Before the war, explosives of the chlorate and nitro starch classes were manufactured in Canada. These explosives were used to a certain extent, though they are not so strong as the higher grades of dynamite, forcite or ammonia dynamite.

N.G. dynamites, forcite and ammonia dynamite are made in two varieties, "straight" and "low freezing" or "polar." Nitro-glycerine explosives of the "straight" variety, whether N.G. dynamite, forcite or ammonia dynamite, will begin to freeze at about 45 deg. F. To overcome this as far as possible, "polar" explosives are made. In polar N.G. dynamite the freezing point is lowered about 15 deg., so that it will begin to freeze at about the same temperature as water does. In polar forcite and polar ammonias the freezing point is lowered about 35 deg. The strength of the polar grades is the same as that of the straight grades. The exact

freezing point of polar explosives is uncertain and liable to variation. They have been used without thawing on open work where the temperature ran from zero to 6 deg. below zero for several days, they are known to have remained thawed after being exposed to a temperature of 10 deg. to 15 deg. below zero for over a week, again, they have been found frozen at a temperature of 8 deg. to 10 deg. above zero. From our experience in Canada we believe they will stand a temperature of from 10 deg. to 15 deg. above zero before freezing, and I could quote several cases where they have been soft, and were used without thawing, after exposure for several days to a temperature below zero.

The advantages of a polar explosive in the spring, autumn and winter are apparent for either mining or outside work. Their use does away with the necessity of thawing during five months of the year, when straight explosives have to be thawed. Almost anywhere in Canada polar explosives need not be thawed before the middle of November, nor after the middle of March, while with a straight explosive thawing should begin about the first of September and continue until the end of May, on account of the cold nights. Again, in some mines the underground temperatures are below 45 deg. F., and straight explosives will chill and freeze if kept there any length of time, with the liability, if used in this condition, of missed holes, burned holes, or partially exploded charges, which are both dangerous and expensive. Such powder must be returned to the thaw house and re-thawed. This does not happen with polar explosives. When polar explosives do freeze, however, they must be thawed in the same way as straight explosives.

While commercial high explosives of one kind or another are made in strengths of from 10 per cent to 100 per cent, there are certain limits which govern different forms. These limits may be due either to railway shipping regulations or to the impossibility of manufacturing a satisfactory explosive above or below certain strengths. High explosives of less than 17 per cent strength are known as "lifting powder," "railroad powder" (R.R.P.), or "Judson powder," and are used almost entirely in railway construction for large blasts.

Nitro-glycerine dynamite is made in strengths of from 17 per cent to 75 per cent, and is put up in cartridges 8 in. to 36 in. long and from $\frac{7}{8}$ in. to 5 in. diameter. Forcite (gelatine dynamite) is made in strengths of from 35% to 85%, in cartridges 8 in. or 16 in. long and from 1 in. to 5 in. diameter. Ammonia dynamites are made in strengths of from 30% to 60%, in cartridges from 8 in. to 16 in. long and from $\frac{7}{8}$ in. to 5 in. diameter.

While cartridges of the above lengths and diameters are made, the Bureau of Safe Transportation of Explosives places certain restrictions on the size of cartridges and percentage of nitro glycerine allowed to be shipped by freight. No explosive (except a gelatinized one) containing over 60% N.G. can be shipped by freight, also, explosives containing over 10% N.G. (except gelatinized explosives) can not be shipped by freight in cartridges more than 8 in. long and 4 in. diameter. The reason gelatinized explosives are excepted is that they are not so liable to leak or to be exploded by shock as are the other brands.

High explosives are graded with a 10 per cent difference in explosive content, as, 30 per cent, 40 per cent, 50 per cent and 60 per cent, and this grading has proved satisfactory to users of explosives. During war time

the Canadian Explosives, Limited, at the request of the Government, in order to conserve raw materials and to assist customers to reduce costs, offered to make 35 per cent, 45 per cent and 55 per cent strengths. These were tried out quite extensively in some of the mines, in certain cases they were successful and are still used.

The energy developed by an explosive depends on the amount of gas liberated on explosion and on the temperature of the gas. The work done depends, in addition to the above, on the velocity of detonation, or the quickness with which the gas is liberated. Speaking broadly, the higher the velocity of detonation the more shattering effect an explosive has, and the lower the velocity of detonation the more heaving and less shattering the results. Considering equal grades, N.G. dynamite, on account of its high velocity of detonation, is the most shattering of the commercial explosives; then come ammonia dynamites, then gelatine dynamites or forcites. Velocity tests are made in the open as there is no way to make such tests with the explosive confined, as in a drill hole.

The tendency of users of explosives in Canada today, particularly in mining, is to use the lowest strength explosive that will break their ground when it is properly drilled. Up till a few years ago considerable amounts of "gelignite" (a 75 per cent N.G. explosive) were used in the mines in Porcupine, Cobalt and British Columbia, but this has been replaced by 60 per cent, and often 50 per cent, explosives and a lowering of costs has followed. To-day by far the largest proportion of high explosives used in the mines of Canada is of 40 per cent strength, while little 60 per cent is used. This is due not only to the more careful supervision given to the use of explosives, but also to the fact that greater care is taken to see that the drilling is done properly.

In choosing an explosive for mining work the following considerations are important: Safety in use, breaking strength, minimum of injurious fume and smoke, and stability. It is also of advantage to use one kind and strength of explosive throughout the mine. After these considerations come points such as nonfreezing, plasticity (which allows the explosive to "stay put" in a hole, filling it completely when tamped, so that it does not run out of an upper when the cartridges paper is split), and cost.

Until such time as the Dominion Government, establishes a Department of Explosives with a testing station, the best a user of explosives can do towards deciding as to the safety or otherwise of an explosive is to take into consideration the standing of the company manufacturing the article from which standing he must judge how much weight can be attached to their assertion that the explosive is as safe to handle as it is possible to make it, and still have it explode when wanted.

In England there is a list of "Authorized Explosives," that is, explosives which are authorized by the Home Office for use in work outside of coal mines; but in Canada this procedure has not as yet been followed, and the permission of the mine officials to test an explosive in any working rests mainly on the standing and reputation of the firm of manufacturers and the persuasiveness of the company's representative. A few facts, however, can be borne in mind. A gelatine dynamite, such as forcite, will give off less fume and smoke than either a nitro-glycerine dynamite or an ammonia dynamite. Moreover, being denser, more of it can be tamped into the bottom of the holes

where the main work is to be done, and it will stand water and storage better than either of the other two.

Nitro-glycerine dynamite will shatter the rock more than the other two, and if there is a large amount of sand blasting or bull-dozing to be done, on account of not being able to pop-hole the large rocks, it is sometimes worth while to use it and have sufficient ventilation to take away the fumes.

Ammonia dynamites are more gassy than forcite, but are cheaper and run more sticks to the case. They are worthy of consideration in a dry mine with good ventilation.

To test an explosive for breaking strength, fume, and smoke, a good deal of trouble and at times some expense must be incurred, but both the trouble and the expense are very minor considerations if it is proved that the costs can be reduced and accidents prevented.

It is generally considered that in drifting, the ground is more difficult to break than in stoping, so that an explosive which will pull the drift rounds will be satisfactory in a stope. It is also more easy to judge the fume and smoke after a blast in a drift than in a stope, as the gases have not the same chance to get away. An average drift, therefore, should be chosen for the test, and the best machine men in the mine should be used to drill the rounds for testing the explosive. The standard round for the mine should be used and an official should examine each round before it is loaded, and note whether it is properly drilled or not, for it is evident that if a poorly drilled round breaks well, too strong and, therefore, too expensive an explosive is being used; while if the break is a poor one a notation that the round was poorly drilled may prevent the proper explosive from being condemned. A test of this kind should last from one to four weeks. The distance driven should be carefully measured and the cost of explosives per foot advance figured out and compared with past records.

Testing for fume and smoke is usually done by entering the drift a reasonable, and sometimes an unreasonable, time after blasting, and seeing how close to the face one can get before the gas becomes too bad. This is neither comfortable nor safe. The best way is to enter the drift protected by a gas mask, and take samples of the air at various distances from the face, and have them analyzed for injurious fumes. During the test care should be taken that the same ventilation is operating under the same conditions after each round of the test.

It should also be the duty of some official to see that the explosive is well thawed when used, that a careful record is kept of the amount used, and that the holes are well tamped. An explosive which is successful in a drift test can then be tested in stoping, and if satisfactory can be used throughout the mine, with the knowledge that the best and most economical explosive has been adopted.

Stability, which is the quality of standing storage in good magazines, as well as a reasonable temperature in a thaw house, without leaking or deteriorating, can be checked as the test goes on.

Opening or developing a mine is done through a shaft or adit, and for this work a stronger explosive should be used than is necessary when a large amount of stoping is done. Not only are shaft rounds particularly hard to pull, but the speed with which the mine has to be opened up makes a strong explosive advisable.

When the percentage of explosives used in stoping is

much larger than that used in drifting or sinking, a poor drifting or sinking round may be overlooked rather than use two grades of explosives; but when speed is a large factor it is expensive and annoying to have badly broken rounds.

To use explosives economically, the following points must be carefully watched:

The explosive must be well thawed, not only before it goes into the mine, but when it is loaded into the holes.

Use strong blasting caps. The stronger the cap, the better and quicker the charge is exploded. More work is done, and slight defects, such as insensitiveness, due to chilling, freezing, or long storage, are overcome with a No. 8 cap much more than with a No. 6. While a No. 8 cap is more expensive than a No. 6, it contains double the detonating charge. In lead block tests the No. 6 shows an expansion of 755%, the No. 8 of 1,215%; or, when detonated in the lead block, the No. 6 enlarges the cavity from 2 c.c. to 17.1 c.c., the No. 8 from 2 c.c. to 26.3 c.c.

The explosive should be well tamped. At least one foot of stemming should be used; two feet is better.

All loading and blasting should be done by a blaster or a blasting crew.

Using frozen or insufficiently thawed explosive is not only wasteful, but dangerous, as not only does powder in this condition do from 15% to 50% less work than it should, but missed holes occur and unexploded power is found in the bottom of the holes; both are a source of danger, the last especially.

When re-blasting is necessary it means, in most cases, either that the wrong kind of a round is being drilled; or that the round is improperly drilled; or that the wrong kind or grade of explosive is being used. Occasionally change of the rock is the cause, but the above-mentioned reasons apply in a great majority of cases.

Re-blasting old holes is very wasteful, the holes are enlarged at the top, and the rock is more or less cracked and shattered. It is frequently not much better than sand blasting or bull-dozing. If a close watch of the explosive consumption is kept at a mine which does much re-blasting, it will be found that from 15% to 20% of the explosive used in drifting goes for this work.

The use of good stemming will considerably increase the work done by explosives, and I think it is not too much to say that in mining work the increase would be 15%. In other words, the load in a hole can be reduced from 7 sticks to 6 if good stemming is used. With 40% forcite and \$25.00 per 100 lb. this is equivalent to a saving of over 3 cents per lb.

While many of the larger mines have blasting crews it is rarely that a special blaster is thought worth while at the smaller ones. This I think is a mistake. When this paper was written (December, 1918) the price of 40% forcite at the mills was \$25 per 100 lb. in carload lots of 360 cases or over. This figures out at 15 cents a stick. A mine could afford to pay a blaster \$100 a month if he could save 30 sticks of powder a day, and at the same time there would be an actual saving in costs.

The economical use of explosives is one of the questions that is occupying the attention of every mine manager. The field is a large one, and the time allowed for a paper does not permit going into too much detail. The writer, therefore, has thought best to bring up the points that one meets in every-day mining, and where any saving that can be made is tremendous when spread through the industry.

Special Correspondence

BRITISH COLUMBIA.

New Ore Treatment Rate Schedule at Trail, B.C.

Reference has been made to the dissatisfaction of the independent shippers of British Columbia with the treatment charges of the Canadian Consolidated Mining & Smelting Co. at its Trail Smeltery as set out in what is known as Schedule B. This, it will be recalled, led to an investigation by a special committee having authority from the Dominion Government, the report of which was issued a short time ago. The matter was discussed at a recent Mining Convention at Nelson, when it was announced by J. J. Warren, the company's General Manager, that a new schedule was being prepared and would be issued shortly. That schedule, Schedule C, now has been published and is effective. It provides the promised reduction in ore treatment rates and more especially affects those ores containing percentages of zinc and sulphur. The schedule is as follows, the introductory table being the basis of payment for silver and lead:

	Silver Payment.	Lead Payment.		Silver Payment.	Lead Payment.
10% zinc or under.	95%	90%			
Over 10% and including 11%	94½	89			
" 11 " 12 	94	88			
" 12 " 13 	93½	87			
" 13 " 14 	93	86			
" 14 " 15 	92½	85			
" 15 " 16 	92	84			
" 16 " 17 	91½	83			
" 17 " 18 	91	82			
" 18 " 19 	90½	81			
" 19 " 20 	90	80			
" 20 " 21 	89½	79			
" 21 " 22 	89	78			
" 22 " 23 	88½	77			
" 23 " 24 	88	76			
" 24 " 25 	87½	75			

Silver:—Will be paid for the extent shown by the above schedule on the fire assay at the average of the Engineering and Mining Journal, New York, quotations succeeding the date of sampling at Tadnac, B.C. In no case will the deduction from the silver assay be less than one-half (.5) oz. per ton.

Leads—The lead contents will be determined by the wet method of analysis deducting one and one-half units to arrive at the dry lead assay. Lead will be accounted for on the dry lead assay to the extent shown by the above schedule; provided, however, that in no case will the deduction from the said dry lead assay be less than one unit or twenty pounds per dry ton of ore.

The price for lead to be used in settlement will be our sales price delivered at destination in Canada less one and one-half cents per pound for refining and marketing as now in effect under the existing pooling scheme, which will be continued. There will be deducted also from the delivered sales price, \$2.30 per ton on sales at Toronto and common points and \$4.50 at Montreal and common points and similar differentials to other points. This freight adjustment is to cover actual increases in freights, e.g., should sales in any

month be 2,000 tons and say 1,200 tons for delivery at Toronto and 800 tons at Montreal, the freight adjustment would be 3-5ths at \$2.30 and 2-5ths at \$4.50, or \$3.18 per ton of lead.

The pooling scheme is outlined as follows:

(a) Settlement is based upon sales price as above provided and only to the extent of actual sales from month to month.

(b) Whenever sales are sufficient to settle for a full month's lead receipts this is done promptly.

(c) Lead from our own mines is pooled with that purchased from others, and is treated in exactly the same way.

(d) Each month a statement is issued showing the condition of the pool. All shippers have been sent a copy of the last one issued.

Deductions.

Smelting per dry ton of material nine dollars and fifty cents as a base rate, which will be modified in accordance with the following formula:

(1) Add to the base rate per ton, 60 cents per unit for all zinc contained.

(2) Deduct from this result the total units of silica, iron, manganese, lime and magnesia at nine cents per unit.

Provided that in no case shall said base rate be reduced more than \$4 per ton as the net result of the said additions and deductions.

Provided also, that in making the above computation, iron, silica and lime if 1% or under, and manganese and magnesia if 3% or under, will be disregarded.

Sulphur:—A charge will be made in addition to the above for all sulphur contained in excess of two per cent. at thirty cents per unit per dry ton of material, provided that such charge shall not exceed three dollars per ton in any case.

Moisture:—A minimum moisture deduction of ¼% will be made. The following penalty for moisture will apply to fine concentrates and clayey ore only.

If over five per cent, charge for all contents at ten cents per dry ton per unit.

Size:—Coarse and fine concentrates and ores should be shipped separately. If mixed so that over 30% will pass through a ¼ inch screen, an extra charge of fifty cents per ton will be made.

Sampling:—If the shipment is less than a car lot or contains more than one lot per car, a deduction may be made for extra sampling, assaying, etc., of \$10 per lot.

Weights and Samples:—To be used in settlement shall be those made at the smelter.

Representation:—Shippers are expected to notify us as to who will represent them while their shipments are being weighed and sampled. Failure to do so will be construed as meaning that the smelter will have authority to appoint one of the local mine representatives at the shipper's expense unless the local shipper notifies us that a representative is not required.

Assays:—Shippers will supply the smelter with their assays on smelter pulps shortly after sampling. In case of difference in assays requiring it, the umpire pulp will be referred to an umpire mutually agreeable. The party whose result is farthest from the umpire's result, will pay his fee.

Settlement:—(a) Shortly after sampling an advance payment of 90 per cent of the apparent value is made. The prices used in estimating the apparent value will be the New York price for silver and the Montreal price for lead of the date of sampling.

(b) When final settlement is rendered possible by silver quotations being available for the second calendar month after sampling and by all of the lead received during the calendar month in which the ore is sampled, having been sold, the final value will be computed and any adjustment necessary will be made between the smelter and mine.

(c) Advances made on account will be carried by the smelter without interest until the last day of the second calendar month in which the ore arrives. Interest at 6% will be charged on advances upon lead after that date.

The above rates will be effective on shipments received here on July 1st, 1919, and are subject to change without notice.

Ore Receipts at Trail.

Ore was received at the Trail (B.C.) Smeltery during the week ending June 30, 1919, as follows:

Mine—Location.	Gross Tons.
Centre Star, Rossland	1,262
Florence, Princess Creek	134
Josie, Rossland	236
Molly Gibson, Kitto Landing	25
Mandy, Le Pas	94
No. 1, Sandon	46
North Star, Kimberley	173
Sally, Beaverdell	26
Sullivan (zinc), Kimberley	4,241
Sullivan (lead), Kimberley	468
Total	6,705

Minister of Mines' Annual Report.

According to the Annual Report of the Minister of Mines for the year 1918, which has just been issued, the value of the mineral production for that period was \$41,782,474.00. The preliminary report published early in the year estimated the valued production at \$41,083,093.00. It will thus be seen that the officials of the Provincial Bureau of Mines were not far astray in their prediction of the monetary value of minerals produced during the past twelve months.

The report is in every respect a credit to the Department. It comprises many interesting tables of statistics and is well illustrated. Referring to the shipping mines of 1918 it is pointed out that there were 2,892,849 tons of ore shipped; that the number of mines shipping was 175; that the number of mines during the year shipping over 100 tons was eighty, and that the number of men employed above and below ground was 4,148. Figures show that coal mining produced has produced more than any other separate class of mine, a total of \$187,147,653. Next in importance is copper, the value of which is placed at \$145,741,069, and the next in order is lode gold at \$97,121,786, while placer gold takes fourth place at \$75,436,103. These, of course, are the gross values of the respective minerals mined in the Province up to the end of the past year.

The production of placer gold during the year decreased to the extent of \$176,000, but an increase is indicated in the output of lode gold of \$1,036,622, making a total increase of \$860,622. The amount of silver produced was \$3,498,172 oz., having a gross value of \$3,215,870, an increase in the number of ounces of 568,

956. In 1918 the output of lead was 43,899,661 pounds, valued at \$2,928,107, which is an increase over the production of the preceding year of 6,592,196 pounds, but a decrease in value of \$22,913 due to the drop in price of metal. Copper production totalled 61,483,754 pounds, valued at \$15,143,449, an increase in amount of 2,476,189 pounds, or about 4.2 per cent. The value of the product was less than that of the previous year by \$894,807, a decrease of nearly 8 per cent due to lower prices. The total tonnage of ore mined in the Province during the year was 2,892,849 tons, having a gross value of \$27,590,278, and with the placer gold a total value of \$27,910,278. The following table shows the tonnage derived from the various districts of the Province:

Cassiar-Omineca District	963,260
Southern Coast District	745,169
Boundary-Yale District	723,403
Slocan Mining Division	142,700
East Kootenay District	141,570
Train Creek Mining Division	112,349
Ainsworth Mining Division	44,937
Nelson Mining Division	15,348
Other Mining Divisions	4,113
Total	2,892,849

The conditions as to operations in connection with the various metals are dealt with, gold being the first considered. Production of placer gold is pointed out was about \$320,000 as nearly as can be ascertained, there being considerable difficulty in obtaining exact figures. Placer gold mining is confined almost entirely to the Atlin and Cariboo Districts, 96 per cent of the total coming from these two sections. As to hydraulic placer mining, from which about 90 per cent of the placer gold obtained in British Columbia is derived, it has been well demonstrated that the gold output is in direct proportion to the number of days in which the water is available for piping. In touching upon lode mining the increase for the year of \$1,036,622, or about 43.7 per cent, is explained as being largely due to the entry into the producers list of a new mine, the Surf Inlet Property of the Belmont Surf Inlet Mines, which made an output of about 411,600 ounces. Silver produced during the year represented an increase in value of \$950,121, which was partly due to the high price of the metal. The Slocan District led all other sections in the production of this metal. As to lead, it is shown that the production was increased in the Fort Steele, Slocan and Windermere-Golden Districts, and decreased in the Ainsworth and Nelson District. It should be remembered that the Sullivan Mine of the Canadian Consolidated Mining and Smelting Company is located in the Fort Steele Division. Usually it contributes nearly all of the Division's output but last year over 860,000 pounds came from the North Star mine. Dealing with copper the report mentions the very large production of the Hidden Creek Mines of the Granby Consolidated Mining and Smelting Company in the Skeena Division, and of the Britannia Mine in the southern coast district. In discussing the Granby Company's mines at Phoenix in the Boundary District it is said that they were unable to supply the smelter at Grand Forks with sufficient ore to run the smelter at capacity. "The ore reserves at these mines" the report continues, "are approaching exhaustion so that the large scale production of former years cannot be maintained. Also the high operating cost during 1918

left but little margin of profit in working the low grade ores at Phoenix." The recent closing down of the Phoenix mines and the Grand Forks Smelter bears out the conclusion to be drawn from the foregoing observations. As to the Canada Copper Corporation's operations at Greenwood, it is stated that the Mother Lode Mine contributed to the smelter there a slightly smaller tonnage than in 1917. About 154,000 tons were handled from which 1,832,382 pounds of copper was recovered, together with lode gold and silver contents. Towards the end of the year the smelter was closed, the ore reserves at the Mother Lode Mine being exhausted.

The following table shows the production of copper according to districts:

	Lbs.
Skeena Division	30,190,606
Southern Coast District	18,475,013
Boundary-Yale District	9,940,125
Trail Creek Division	1,654,356
Omineca Division	543,843
All others	579,811
Total	61,483,754

The zinc production of 1918 amounted to 41,772,916 pounds compared with 41,848,513 pounds in 1917. The value of this production is placed at \$2,899,040. The following table shows the production of zinc according to districts:

	Lbs.
Fort Steele	26,704,806
Slocan	14,107,682
Omineca	313,112
Ainsworth	640,991
All others	6,325
Total	41,772,916

Thus an increase over 1917 is shown in the Fort Steele District of nearly six million pounds, which output comes entirely from the Sullivan Mines, the ore being treated in the Electrolytic Zinc plant at Trail. In the Slocan District the heaviest shipper was the Standard with a production of over seven million pounds.

Taking up other minerals the report discusses iron ore, stating that it has been strongly advocated in many quarters that the conditions are favorable for the establishment of an iron smelting plant somewhere on the British Columbia coast. So far nothing definite has materialized, although there is apparently a prospect of such a plant being established on this coast. As is well known there is on the coast in the aggregate an adequate supply of magnetite iron ore quite sufficiently free from impurities as to be within the "Bessemer limit" to supply ore for such a plant.

Dealing with coal, it is shown that the gross production of 1918 was 2,578,724 long tons, of which 276,479 tons was made into coke, leaving the nett production at 2,302,245 tons. These figures show an increase as compared with 1917 of 180,009 tons gross, and of 152,270 tons nett. The quantity of coke made was 188,967 tons, which is an increase of 29,062 tons over 1917.

The report then goes on to give an outline of conditions during the year in the six mineral survey districts by the resident mining engineers of those districts. Generally speaking they show that the mining industry over that period was in a very satisfactory state and that gratifying development may be expected.

GRANBY BEGINS TO PRODUCE COKE AND BY-PRODUCTS.

On July 11, the Granby Consolidated Mining, Smelting & Power Company began to produce coke and by-products in their coke ovens at Anyox. The big plant, which is the only one of its kind on the Pacific Coast, has been two years in preparation and is now in full operation.

Coal for the thirty-two ovens is supplied from the Granby's properties at Cassidy, Vancouver Island, from which steady shipments have been made to the northern smelter town for several weeks past. The coke produced is said to be of excellent quality and continued operation is expected.

The by-products of the coke plant include toluol, benzol, sulphate of ammonia and coal-tar, for all of which there is a consuming market. The coal-tar will be shipped to Vancouver to be fractioned into pitch and creosote, and will provide British Columbia points with a dependable product.

FORTY-NINE ON SALMON RIVER SHOWS HIGH RETURNS.

The work at "Forty-Nine" will begin the week, commencing July 5th, under the direction of Harry Howson, formerly of the Payne Mine in Sandon.

Silas Silverman, representative of his father, Sam I. Silverman, was expected to arrive also, but had to return to Seattle from Ketchikan.

This property was bonded a few months ago by Chas. A. Caldwell, Harry Howson and Sam I. Silverman and has a splendid showing.

The "Forty-Nine" lies just east of the Yellowstone group, on Salmon River. The locators were Dan and Andy Lindeborg. Three cuts showing an average vein width of twenty feet is the extent of the development. The highest open cut is thirty-seven feet wide and shows eight feet of fine looking ore. A recent assay went \$359. in silver and \$120. in gold to the ton.

During June Mr. Frederick W. Bradley, President of the Bunker Hill and Sullivan Silver-Lead Mines of Coeur d'Alene, Idaho, and head of the Treadwel Mines at Juneau was in Dawson and went on to Mayo to look over the silver properties there. Mr. Bradley was accompanied by Mr. Thomas McDonald, Mining Engineer.

Mr. F. Wernickie, Geologist for the Alaska Juneau Mine and other properties in which Mr. Bradley is interested, was also in the Yukon looking over properties.

Alex. McLeod, one of the pioneer mining men of British Columbia, died at the Kootenay Lake General Hospital, Nelson, recently. He had been in the Ainsworth District for more than 35 years. The Tam o' Shanter silver-lead mine was owned by Mr. McLeod and, while it is not producing at present, the deceased had been doing his assessment regularly and had confidence in the property. Among the properties on which he worked since coming to the Province were the Blue Bell Mine at Riondel, the No. 1 Mine at Ainsworth and the Highland Mine at Ainsworth.

NORTHERN ONTARIO.**The Cobalt Strike.**

Cobalt, in the afternoon of the 23rd of July, witnessed the spectacle of a thousand men on "strike" parade. Since when not a wheel has been turning at the mines. The pumps have been withdrawn from underground and the industrial war which has threatened the camp since early summer is at last a reality. The die has been cast, twenty-two hundred men have ceased to work, a pay-roll of close to \$300,000 monthly has ceased. Merchants and business are being hit hard locally, manufacturing concerns to the south are suffering, and the country as a whole is losing the benefits heretofore accruing from the production of from \$40,000 to \$50,000 worth of silver every twenty-four hours.

Among those affected there does not appear to be a very favorable opinion of the ability of Senator Robertson, Minister of Labor, at Ottawa, as demonstrated in the manner in which he handled the situation. It is even intimated that he blundered hopelessly.

As to just how long the labor strike will last, it would be extremely difficult to hazard an opinion at this time. As to where the entire responsibility rests perhaps no one individual could be singled out, and it would be folly to condemn the efforts of any man.

The great pity is that hundreds of men who can ill afford to be out of work for any very great length of time are now idle. Already the second-hand dealers are doing increased business, including the purchase of jewellery from individuals who declare they are disposing of excess personal belongings so as to pay for transportation to other districts.

The Union is keeping pickets at work, but the work in this direction is slight, due to the fact that no attempt is being made to operate the mines. Instead, as previously stated, the underground workings are being permitted to flood with water.

General opinion appears to be that the strike will not be of long duration, but as to this it would be impossible to intelligently forecast. At worst, the cost of closing down, and, at some future date, the cost of pumping out may represent the sole loss to the shareholders of the various companies. There is even a possibility that the elimination of the usual silver output from the mines of Cobalt might cause the quotations for silver to increase sufficiently to offset the expense incurred. Should this prove to be so, the present period may be considered but a lull in the prosperity of the mines.

Situation in Porcupine District.

The impression seems to be that the mine workers in the Porcupine district will abide by the decision recently reached whereby the mine employees and the mining companies will co-operate in an endeavor to reduce the cost of living. This plan, provided it proves successful, bodes well for the Porcupine mines, and the great gold field may reasonably be expected to attract mine workers in abundance, a condition which has not existed since the second year of the recent war. The labor strike at Kirkland Lake continues. In the Boston Creek district, as at Porcupine, operations are proceeding without interference.

Late advice from the Porcupine district indicates the likelihood of the Hollinger, McIntyre-Porcupine, Dome Mines, and Porcupine Crown adopting some satisfactory method of protection by insurance against sickness by which the men will receive indemnity equivalent to half-pay.

The arrangements for opening a co-operative store are in full swing. A. F. Brigham, General Manager of the Hollinger, together with R. J. Ennis, General Manager of the McIntyre-Porcupine are giving the matter their personal attention and in this connection they visited Toronto a few days ago.

It is understood the men who represented the employees at the conference with the mine managers presented the outline of the arrangement to a meeting of the Union and the plan was endorsed by a large majority.

So far as can be learned, mining operations in the South Lorrain district are not being interfered with by the labor strike in Cobalt, the management of the properties not having been notified as to any demands from the union.

The Pittsburg-Lorrain and the Keeley are the only two properties being worked in a small way.

A shortage of labor continues to retard progress in the Porcupine district, in spite of the fact that about 450 men have left the Kirkland Lake camp due to the labor strike there and that in Cobalt there is a surplus of labor even before the strike. The Hollinger mine is stated to have a less number of men on its present pay-roll than the number employed before the Kirkland Lake strike was called. Just where the mine workers have gone from the Kirkland Lake camp, and from the Sudbury mines as well, remains somewhat of a mystery. Although the readjustment is slower than had been expected, yet the change, even though gradual, is, nevertheless, inevitable. The reward, when reaped, will probably be found to have abundantly justified the magnificent patience which the average shareholder has shown.

According to reports from the Porcupine district, the Dome Mines Company is now paying \$4 daily to its underground employees, this being equal to the wages being paid at the Hollinger and at the McIntyre-Porcupine.

In the Porcupine district a shortage of labor is still felt, but it showing gradual improvement, and is expected to still further improve because of the labor troubles in the Cobalt District.

Progress in the Newer Districts.

Geological surveys being made in the gold bearing districts of the North will this year provide the necessary data to prepare a geological map embracing the Kirkland Lake, Boston Creek, and Larder Lake districts.

Surveys have previously been carried out in each of the districts mentioned, but not in a manner that would permit the connection of the three fields. This year's work is expected to be of considerable value to prospectors and mining men active in the three districts referred to.

The Miller-Independence mines is proceeding with the erection of additions to its mill. It is planned to have the equipment installed and treating about 75 tons daily before cold weather sets in.

The number of drills is to be increased to about seven, it is stated officially.

Diamond drilling on the O'Donald property during the currency of an option held by the Allied Gold

Mines resulted in indicating a vein some 28 inches in width containing from \$19 to \$29 in gold to the ton.

The O'Donald is situated between the property of the Patricia Syndicate and the R. A. P. Syndicate. At the time of writing, further drilling is being done near the west boundary of the Patricia.

Mining interests engaged in the development of properties in the Boston Creek district continue to criticize the Ontario Government for its failure to provide a road for the benefit of the mines. It is pointed out that a definite promise was made last spring to build the road, but as yet nothing has been done. The Boston Creek camp is about the only important mining centre in Northern Ontario which has received no assistance from the government.

Some difficulty is reported in the Kirkland Lake district in regard to the construction of the macadam road from Swastika to the centre of mining activity. It is learned that it has been found less convenient to secure the desired waste rock from the mines than had been expected. As to the seriousness of the situation, and as to whether or not it is due to the mines being closed due to the labor strike has not been ascertained.

Prospectors, and particularly returned soldiers are urging that some steps be taken in an endeavor to throw the Gillies Limit open for prospecting this fall. October 1st is the date suggested. It is pointed out that after that date there is little or no danger from forest fire and that prospectors would have time to explore the surface of their claims and conduct further exploration work during the winter by the sinking of test pits. This would aid the prospector, and provide work for quite a number of men, in addition to being of much benefit to merchants and business men in the Cobalt district. It would also result in a substantial revenue for the Province in claim recording fees. Hon. G. Howard Ferguson, Minister of Lands, Forests and Mines, is expected to lend a sympathetic ear to the proposal.

Favorable assays as a result of a careful sampling of the Hull-Kipper claims in the Tashota section of the Kokwash gold area has attracted considerable attention. The mineralized dike is stated to be upwards of two hundred feet in width, with a section some fifty feet in width containing a large tonnage of low-grade ore. Although some of the mining companies operating in Northern Ontario have endeavored to secure the property on a working option basis the present owners have not consented to deal along such lines. Big interests have endeavored to secure an option of sufficient length to permit a thorough exploration of the property by diamond drills.

Gold in the Aguinica Mine.

The discovery of visible gold in ore taken from the old Aguinica mine situated a little to the east of the silver producing area of Cobalt has aroused a good deal of curiosity. In the feverish hunt for silver in the early days on this property, the presence of native gold was apparently overlooked. It would appear that the gold occurs only where the vein passes through Keewatin formation. On surface, where the vein occurs in conglomerate, the filling consists of calcite containing a high percentage of cobalt mineral, with low silver values. As a depth of about 150 feet where

the vein passes into the underlying Keewatin, the filling of the vein changes to quartz containing visible gold. The Aguinica is under option to one of the leading silver mining companies of Cobalt and a thorough examination of the property is being conducted.

Cassel Cyanide Co. to Incorporate in Canada.

The Cassel Cyanide Company, the most successful cyanide manufacturer in the world announced in last week's Journal that it will incorporate a subsidiary company in Canada. The chief reason for this important step is not difficult to find.

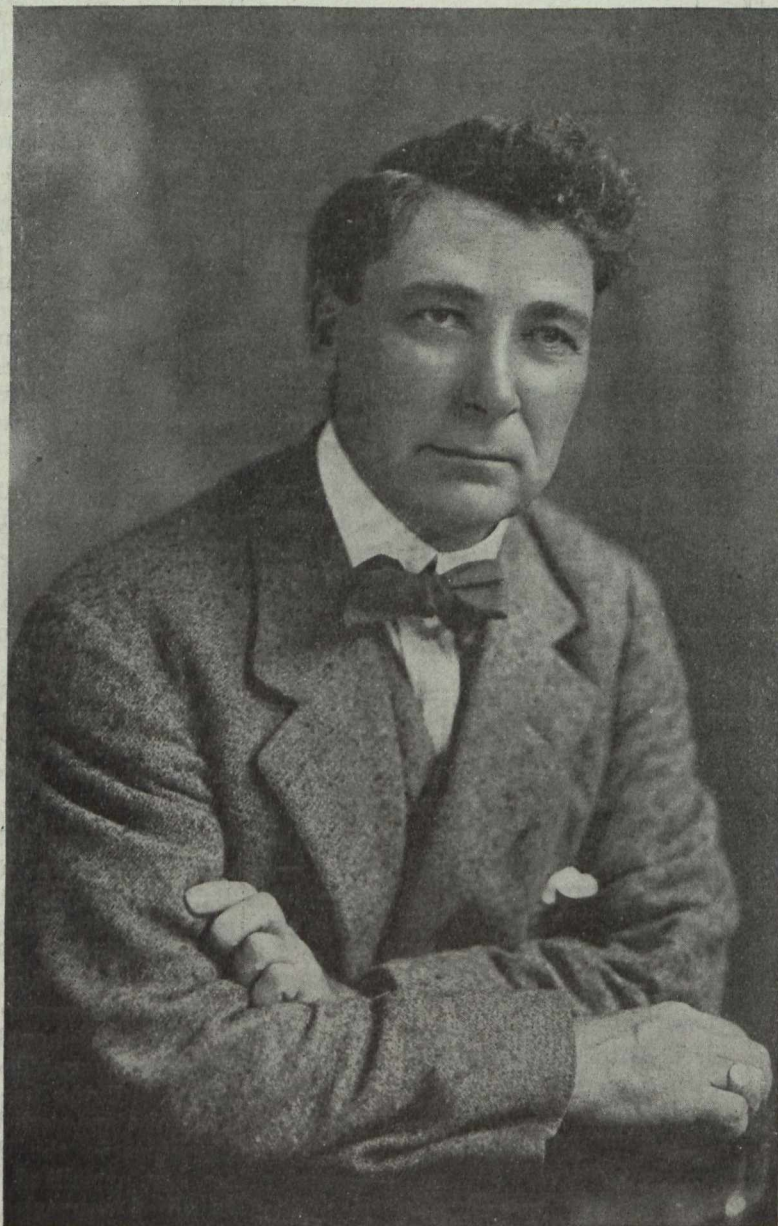
The mining industry of Canada, particularly Northern Ontario, is growing apace. Manufacturers of low-grade cyanide are making a strong, yet ineffective bid for the patronage of our mines. Home industry is bound to ultimately be given the preference. At least, should Canadian manufacturers be able to successfully demonstrate the manufacture of a material that could take the place of the high-grade article imported from Glasgow, Scotland, then there is every reason to believe the Canadian product would soon be filling at least ninety per cent of the requirements of the mines of this country.

As yet, the cyanide manufactured in Canada has not come into favor at the mines. Its use is more general in other directions, particularly in the fumigation of orchards and as a fertilizer. Although love for home enterprises would undoubtedly weigh the scale in favor of Canadian preference, yet no Britisher and least of all Canadians should hesitate to continue the patronage of the Cassel Cyanide Company unless or until Canadian enterprise succeeds in producing an article that can closely compare in quality with the high-grade material now being imported from Scotland.

At the outbreak of war a large amount of cyanide used in the British Empire was being imported from Germany. British ingenuity was taxed to the full limit of its powers to meet the situation. Gold mines everywhere faced the possibility of not being able to operate. All eyes in the Empire turned to the one hope—the Cassel Cyanide Company. The Germans lauded their alleged cyanide monopoly as one of the weapons that would win the war. They reckoned without the ingenuity of the bull-dog breed. The Cassel Cyanide Company not only succeeded in supply the requirements of the mines in the British Empire at almost normal prices, but permitted the export of the limited quantities to allied countries.

Canada, therefore, is glad to welcome the incorporation of a subsidiary company in this country. If the move is backed by similar enterprise as that which defied the alleged German monopoly, then the Canadian manufacturers will be compelled to put forward the best efforts to carry on successful competition.

A cyanide test is being conducted at the ore-testing laboratory of the Haileybury Mining School, for the purpose of comparing the low-grade cyanide manufactured in Canada, at Niagara Falls, and the high-grade article manufactured in Glasgow, Scotland. The test will cover a period of about twenty-four days, and the result might reasonably prove to be of far-reaching importance for the Cassel Cyanide Company of Glasgow, or for the American Cyanamid Company, of Niagara Falls, N.Y.



T. J. BROWN,

General Superintendent, Nova Scotia Steel & Coal Co.,
Sydney Mines, N.S.; Member of Council of the
Mining Society of Nova Scotia, and recently ap-
pointed Chairman of a special committee of the
Canadian Mining Institute to consider the forma-
tion of a Coal Mining Section of the Institute.



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The Cost of Coal Production as Influenced by the Balancing of the Working Organization

(From Iron and Steel of Canada)

The initial cost of fuel very gravely and intimately concerns manufacturers and fabricators of iron and steel, and at the present time the high costs of mining coal are probably the chief deterrent to lower prices for iron and steel products.

Prominent among the reasons for the increased expenditure required to produce coal is the unbalanced condition of the working forces at the collieries, primarily due to the requirements of military service.

At the collieries in Nova Scotia voluntary enlistment acted in a very discriminating manner, because by a natural selection there was attracted to the colors the very pick of the productive forces at the collieries. The specifications of military fitness, which as is well known were more exacting in the early months of the war than was the case later, encouraged the selection of young men, physically vigorous; and, by a similarly discriminating process, voluntary enlistment chose the men of mental and spiritual energy. The effect of all this upon the colliery organizations was extremely partial, because, in the first instance, the nature of underground employment tends to create two fairly sharply divided classes of workers, in the first of which classes, usually known as the "producers" will be found the young, vigorous and more ambitious workers employed chiefly at the "face" where the actual digging of coal takes place. The second class, namely, the so-called "non-producers," include the shiftmen, repairers, haulage attendants and the surface workers, and these men are, broadly speaking, made up of boys too young for work at the coal-face, and older men past their prime, or unfitted by capacity or inclination for actual production of coal. Among the first-named class are also to be found a large percentage of young married men, because the miner reaches his maximum earning capacity in early manhood, and he usually marries early.

The effect of voluntary enlistment was therefore to greatly reduce the numbers of the producing class, and to reduce very slightly, or not at all, the non-producing classes. The financial result was inevitable, seeing that the tonnage of coal produced sharply declined without any diminution of the overhead charges and the cost of taking the coal away from the face. This unbalancing of the working forces at the collieries has been, and still is the main factor in increasing the production costs of coal.

Apparently this phenomenon is not peculiar to Nova Scotia, and, with the close of the war, some figures are available from British sources showing that a similar cause has operated to raise the production costs in

Great Britain. The following figures, condensed from some informative tables compiled by Mr. Finlay A. Gibson (Secretary of the Monmouthshire & South Wales Coal Owners' Association) compare the annual coal production of the United Kingdom for 1913 and the war years, with the number of workmen on the surface and underground, and show the percentage of increase or decrease from the standard of 1913:

A study of the table will show that while the production of coal in 1918 fell to 21 per cent below that of 1913, the number of workmen employed on the surface was only lessened by two per cent.

If it were possible to still further separate the figures of the underground workers into face-workers and the remaining classes, it would undoubtedly be apparent that the entire reduction, or nearly so, would be found in the number of the workmen employed at the coal-face.

Read in conjunction with the foregoing tables, Sir Auckland Geddes' recent announcement in the House of Commons that the production of 1919, owing to the reduction of the working hours to seven hours per day, would not exceed 214,000,000 tons, and that the number of workmen engaged in the industry is now equal to the average of 1913, namely 1,111,000 men, it is quite clear that the cost of coal in Britain must be rapidly increasing.

There is no data available on which to institute comparisons with the United States in this connection, but, as that country was able to learn from our experiences, and was able to organize for war under a selective draft system that avoided the dislocation of pivotal industries, it was also able to avoid the unbalancing of the colliery organizations to the same extent as occurred throughout the British Empire as a whole. There was some little inconvenience in 1914 when British citizens and citizens of other belligerent countries went home in large numbers from the United States coal districts, but between that date and the entry of the United States into the war the colliery forces had been recruited to normal strength.

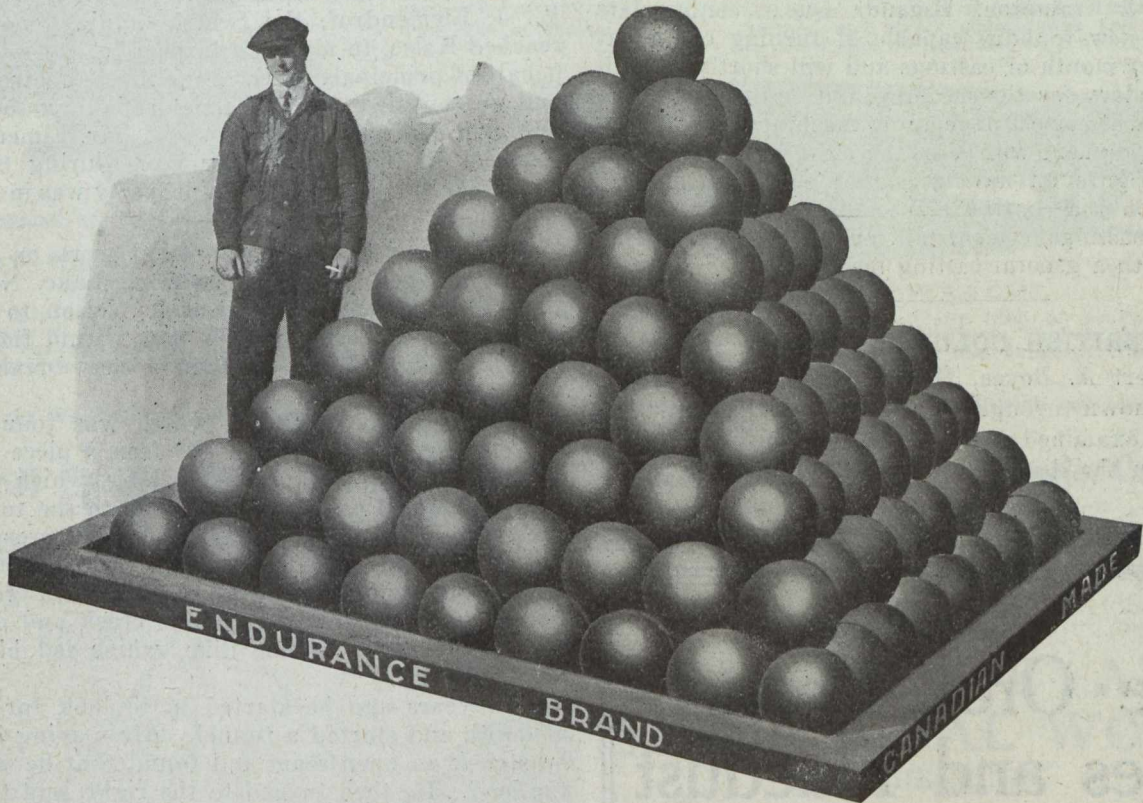
During the war period, the United States took advantage of its unparalleled resources of coal, and increased coal production in a really marvellous fashion, and that it was able to do so, was largely due to the fact that the selective draft recognized the necessity to retain coal producers at their work.

The larger steel companies of Canada are all miners of coal for their metallurgical processes, and there is probably no department of their operations which is

Year.	Tons.	Underground.		Surface.		Total.
		%	%	%	%	
1913.....	287,441,869	..	909,834	..	218,056	1,127,890
1914.....	265,643,030	-7	915,381	-1	218,365	1,133,746
1915.....	253,179,446	-12	754,673	-17	198,969	953,642
1916.....	265,348,531	-11	792,911	-13	205,152	998,063
1917.....	248,473,119	-13	811,510	-11	209,830	1,021,340
1918.....	227,714,579	-21	794,843	-13	214,024	1,008,867

* Denotes percentage of increase or decrease compared with 1913.

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more important in its bearing on their ability to compete in the steel markets than the question of economical organization at the collieries for the production of coal.

It is perhaps some little consolation to know that similar factors of increase in cost are operating in other countries, or otherwise Canada would be placed at a serious disadvantage. The inclusion in the draft of the League of Nations of the clauses relating to labor and the hours of work may yet serve to safeguard those allied countries where the rate of production is being decreased and the cost increased by the adoption of greatly shortened hours of work.

Burnett & Crampton, Rigaud, Que., contemplate building a new foundry capable of turning out about 250 tons per month of castings and will shortly be calling for tenders for the building and equipment. The equipment will consist of molding machines, which with all other equipment will be of the most up-to-date type, and they figure on having one of the most modern foundries on the continent specializing in high grade machinery castings, cement mill and mining equipment together with a general casting business.

BRITISH COLUMBIA NOTES.

Mr. Robert A. Boyce, Mining Engineer of Cobalt, and well known throughout the Cariboo District, B.C., has lately examined some promising looking quartz prospects in the district.

During his visit Mr. Boyce was the recipient of congratulations from his Cariboo friends on his election as a Councillor of the Canadian Mining Institute.

A pack train which recently took supplies up the Illiance trail to the United Metal property, Alice Arm, could not bring out ore as planned on account of the very bad condition of the trail. Considerable work above eight mile is necessary to allowing the mines to get out ore this season. The district engineer has advised that an appropriation for this work has been requested.

After an absence from the Nelson district of a year, W. J. Elemendorf, the Seattle mining engineer has reached Kalso, to make an inspection of the Slocan on behalf of principals south of the line. His work, which will be confined to the district adjoining the K. & S. line, will consume nearly a week. Mr. Elmendorf was engineer of the Slocan Star mine during the period when that well known Slocan property was in litigation.

After two years of development work on the Rand group at Apex, above Cottonwood Lake, Nelson district, John Swanson who was in Nelson to purchase supplies, estimates that he is now within four feet of the long-sought lead, and that he may break through to it any time.

This is the property on which was found, nearly 30 years ago, at a depth of 100 feet, a piece of galena and zinc float, nearly two feet long, which contained free gold, the float assaying \$1,000 to the ton. Many times Mr. Swanson came back to his old prospect, hoping to find the lead from which the float came, and at last he found it outcropping from a gulch. At first he ground sluiced from the creek and confirmed his find, striking a lime dike, which led him to expect galena.

Two years ago he started in to look for the vein at depth and started a tunnel. After going in 40 feet he struck an open seam and found that he was above the lead. He then turned to the right, and this cross-cut has now gone in 40 feet, and he has struck ore, which is apparently just outside the lead itself.

The Rand group is owned by three partners, Mr. Swanson's associates being Otis Hawkins and T. Burnham.

UNITED MINE WORKERS OF AMERICA REVOKE CHARTER OF DISTRICT NO. 18, ALBERTA AND BRITISH COLUMBIA.

Because the district officials of District No. 18 of the U. M. W. of America have taken out membership cards in the "O. B. U." the International Headquarters of the U. M. W. of America has revoked the charter and announced that the district ceases its affiliations with that body. The miners in District No. 18 are at the present time on strike, and indeed the district has become notorious for its constantly disturbed condition, and its disregard of union rules. The dissatisfaction of the International Executive of the U. M. W. with the conduct of affairs in District 18 is very natural, and there can be little doubt that it would welcome the opportunity which the action of the local leaders has given to rid the parent union of an unprofitable and unruly district.

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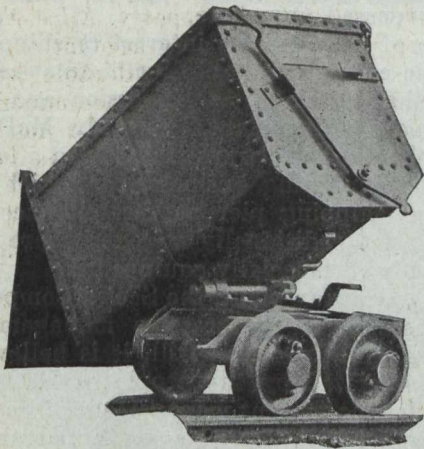
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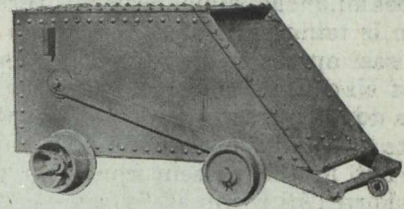
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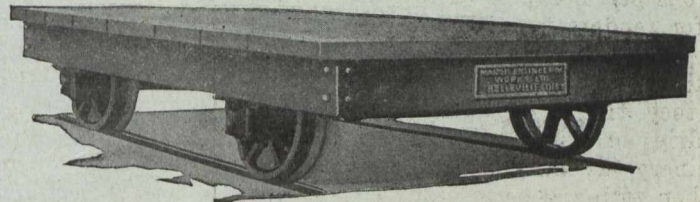
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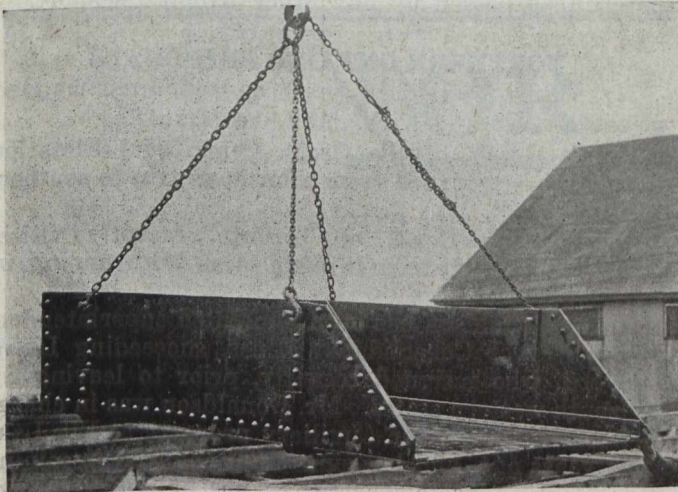


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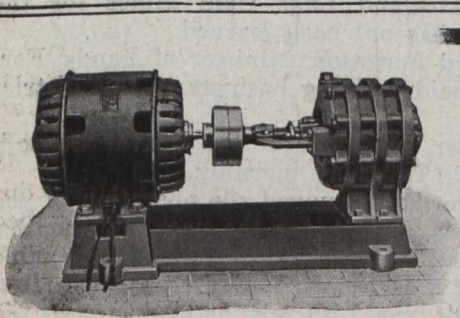
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NOVA SCOTIA NOTES.

The leaders of the United Mine Workers of America in Nova Scotia have again announced that the five days week will be inaugurated commencing 2nd August, and in making the announcement the leaders state the union is taking this step on its own initiative and that the coal operators have not been consulted thereon. This ill-considered action of the union leaders would no doubt attract more attention were there any immediate possibility of the collieries working six days a week, but in the present condition of orders and shipping it will be fortunate if some collieries can get three days work weekly. Hon. Robert Drummond, in the "Mining Record" comments ironically as follows:

"Admitted that the C. B. miners leaders' view on economics are somewhat or largely fantastic, they know what they are doing in respect of a five day week. It is not to reduce the output. It is to prove to the operators that though they have called them by times, by harsh names, they carry no ill will toward them, in fact are desirous at times to make demonstration of their good will. The five day week is not advocated for the purpose of reducing output. At the present time or rather in normal times the days worked by men did not average more than five days, if it went that high. The proposal of the executive is that instead of numbers being idle on each day of the week, the men will after the first of August all be idle on the same day. This we are sure will be received with approval by the operators. If the men all stay idle on one day and work the remainder, then the ordinary six days output is secured on a five day costs sheet. Elsewhere we state that the men won't work five days. In that event even the output, we are forced to admit, will be reduced, but the important fact remains that the costs sheets will extend over five and not six days a week. We present this view of the subject to drive off some of the gloom the five day week announcement caused, and to show that there is a silver lining on at least one side of the cloud."

It is somewhat significant that the reiteration of the five days week announcement should coincide with a semi-official explanation of the temporary closing of the Sydney Steel Plant which states that it is not unconnected with the unsatisfactory state of labor in the district, and that the unascertainable nature of the costs of manufacture due to the labor conditions at the collieries is preventing the Dominion Steel Company from making quotations for new business.

Mr. D. H. McDougall, president of the Scotia Company, has completed, for his company, the purchase from the British Ministry of Shipping, represented by Director J. B. Whyte, of New York, the coal handling plant on the Canadian National Railways terminals at Halifax. This plant is one of the most modern and efficient of its kind on the Atlantic coast, and its erection was deemed necessary by the Admiralty in order to enable the port of Halifax to take its proper place as the best and most advantageous shipping port on the North Atlantic coast.

The plant played a most important part in making Halifax the main artery of all troop transport movements in Canada during the past few months. Without this plant the Olympic, whose magnificent efficiency during the war caused her to be affectionately known

by the Halifax people as the "Atlantic ferry," could not have been coaled satisfactorily. By its aid, however, this magnificent steamer has been accustomed to call and get away from the loading plant with full bunkers of 5,000 tons in three days, a performance that cannot be surpassed anywhere.

"It is therefore of considerable interest to shipping men and the whole coastal trade of North America to know that Scotia has obtained the possession and use of this splendid coal loading plant," said Mr. McDougall yesterday. "Scotia has always maintained a leading position in the bunkering business, for which its splendidly situated shipping pier at the entrance of Sydney harbor and the traditionally excellent character of old Sydney coal have especially equipped it.

"In acquiring the Halifax plant, the Scotia Company shows another instance of progressive management and farsightedness, and its action will, it is believed, be thoroughly appreciated by the people of Halifax. It is an evidence that the present management of Scotia is prepared to taken advantage of every opportunity to enlarge and improve the company's facilities for handling and disposing of its vast stores of raw material.

"The people of Halifax are to be congratulated that the growing importance of Halifax and its still greater future should be thus recognized and much significance is to be attached to the entry of such a well-equipped and experienced bunker company as Scotia upon the Halifax waterfront. Without such a plant the capabilities and possibilities of Halifax have been very much curtailed. With such a magnificent plant and the backing of the Scotia Company, Halifax is now able to offer facilities for coaling with regularity and dispatch unsurpassed by any other Atlantic seaport."

NORTHERN ONTARIO PERSONALS.

Mr. Harry Donaldson has been appointed manager of the Beaver and Kirkland Lake Mines.

Frank Groch, of the Groch Centrifugal Flotation, Limited, has returned from a business trip to southern points.

Martin Childerhose, of Toronto, recently visited Kirkland Lake district in connection with mining interests there.

Harry Donaldson has been appointed superintendent of the Beaver Consolidated Mines, succeeding L. W. Ledyard, who resigned recently, prior to leaving for the south-western states. Mr. Donaldson was in charge of work at the Beaver Auxiliary property at Elk Lake some years ago, and has since been engaged in mining near Madoc. As to whether or not he will also take charge of the Kirkland Lake Gold Mines for the Beaver Company has not been learned.

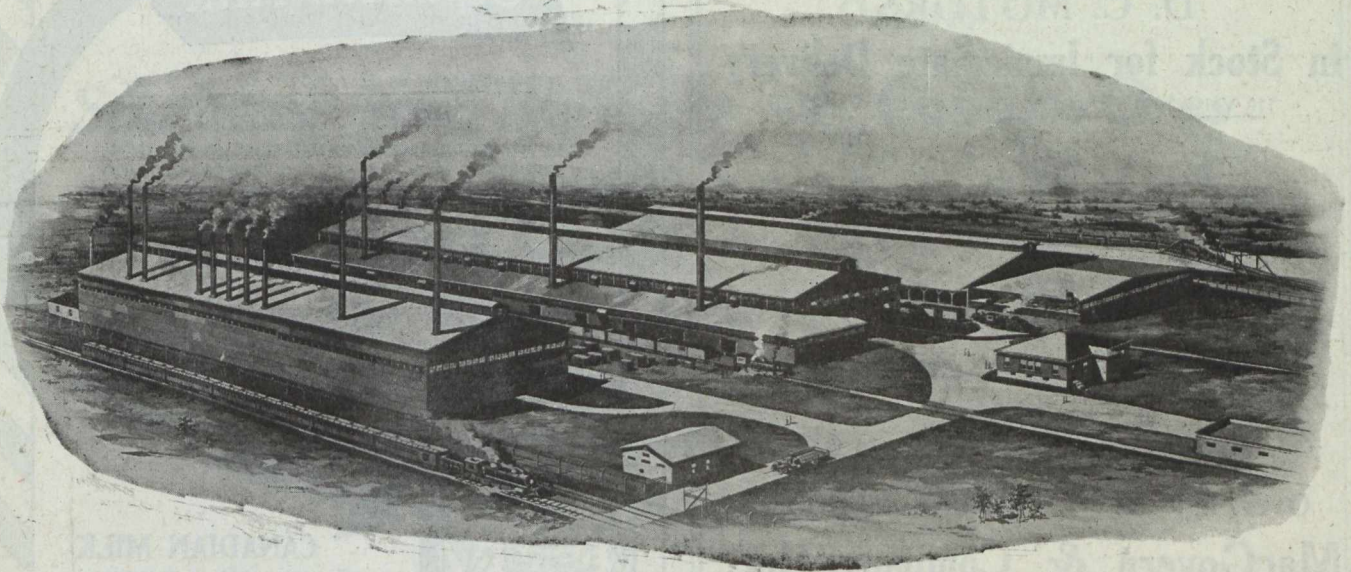
Hon. G. Howard Ferguson, Minister of Lands, Forests and Mines, paid a flying business to this district early this week.

Frank L. Culver, president of the Beaver Consolidated came north Thursday morning.

D. McPhail, who has managed the operation of the Hudson Bay Mines, Cobalt, for the past few months, has been appointed manager of the Dome Lake mine at Porcupine. It was reported a few days ago that Mr. Hutchinson, of New Liskeard, had taken over the management. This report was erroneous. Mr. Hutchinson is secretary-treasurer of the Hudson Bay and the Dome Lake Mines.

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FOR SALE

2 Norwalk straight line three stage Compressors for charging air locomotives, having compound steam cylinders and two flywheels.

Air pressure 800 lbs. Steam pressure 110 lbs.

Size of steam cylinders—High pressure, 20 ins. diameter. Low pressure, 38 ins. diameter.
Stroke, 36 ins. diameter.

Size of air cylinders—23 ins., 16 ins., and 8 ins. in diameter.

ALSO THE FOLLOWING LOCOMOTIVES:—

Maker	Size	Description	Dia., Driver	No. Wheels	Wheel Base	Weight	Length Overall
2 Porter	7" x 12"	Simple	23"	4	4'0"	14000	13'4"
4 Porter	10½" x 14"	"	26"	4	5'3"	30000	19'4"
2 Porter	7" x 14"	"	24"	4	5'3"	20000	18'0"
1 Baldwin	11" x 14"	"	28"	6	6'6"	40000	22'8"
1 Baldwin	11" x 14"	"	28"	6	6'5"	34000	19'8"
1 Baldwin	9" x 14"	"	28"	4	5'6"	25000	17'0"

These locomotives are 3 ft. gauge and have a clearance height from top of rail of 4 ft. to 5 ft. 2 in.
This machinery is all in working order and is open to inspection at Glace Bay.

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1-10	1-25	5-15
1-13	1-30	4-20
2-15	3-35	2-25
1-20	4-40	3-30
1-22 1/2	1-52	1-35
2-25	1-60	1-40
	2-80	2-50
	1-90	1-52
	1-200	2-65
		1-75
		1-300
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H.P.		
4-2		
4-3 1/2		
1-4		
7-5		
7-7 1/2		
2-8		
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	1-8	

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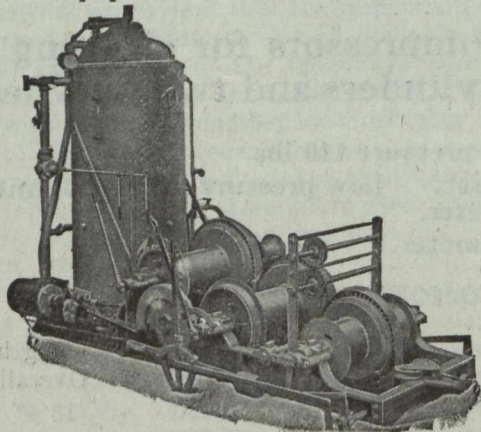
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 To Close
 To Protect
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 To Save Life

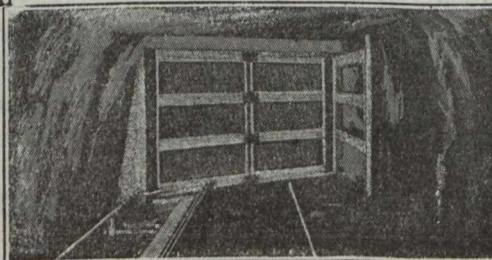
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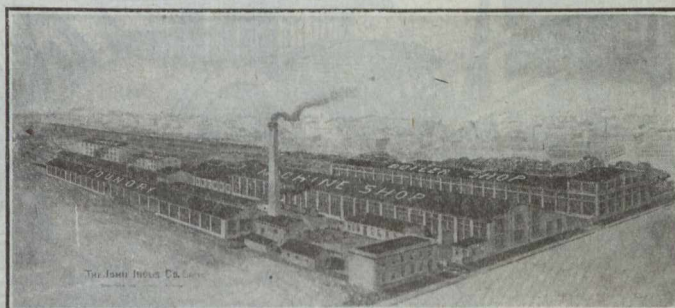
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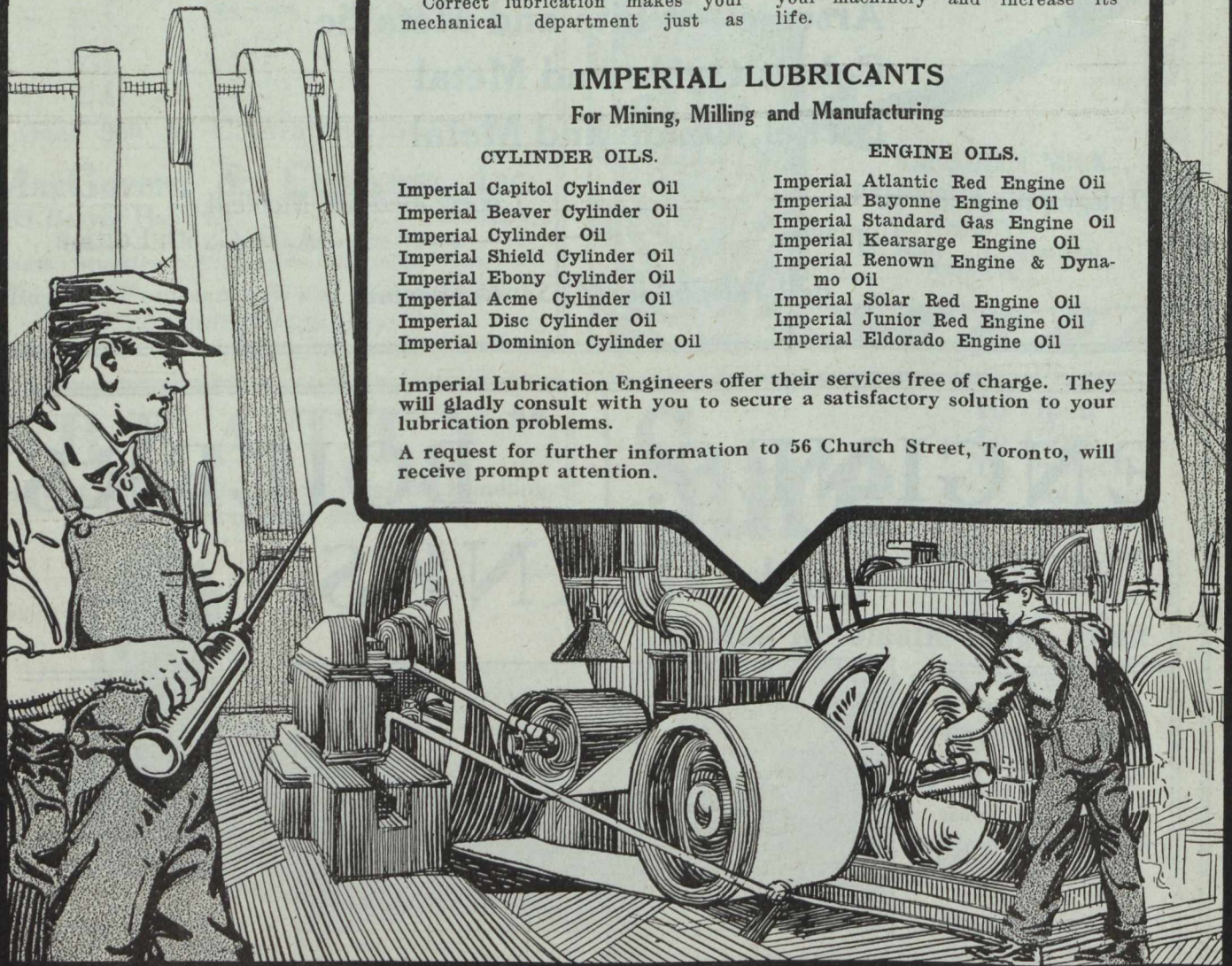
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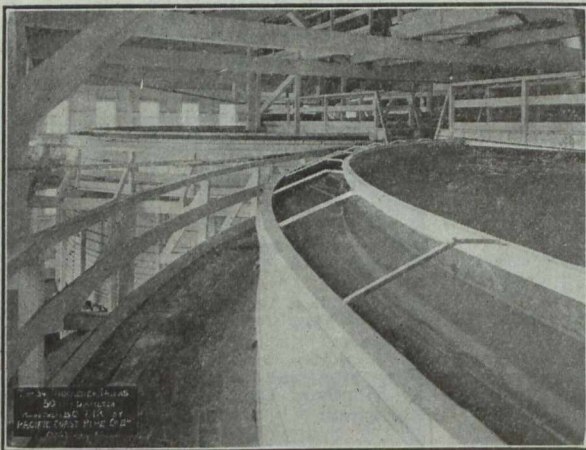
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AT

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The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.

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Mussens, Limited.

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Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.

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Hadfields Ltd.
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Canada Metal Co.
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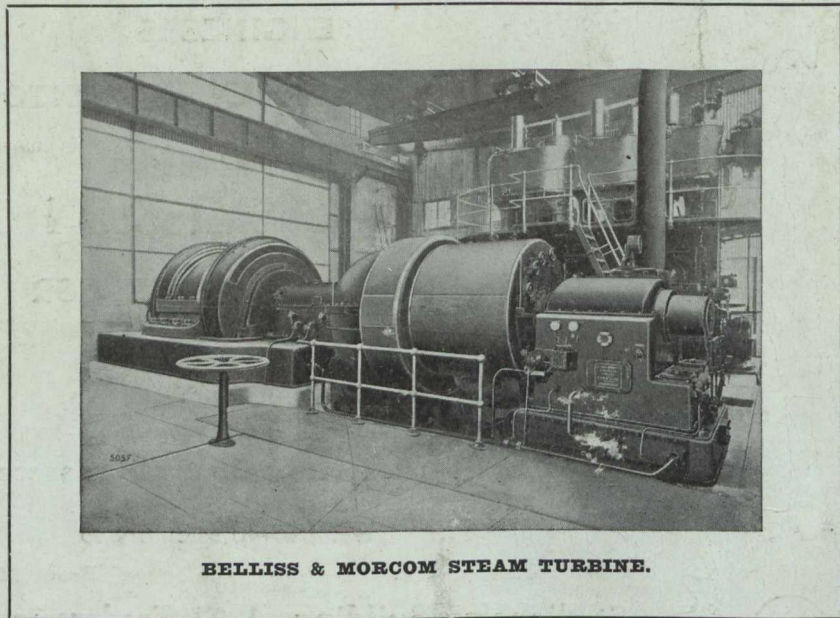
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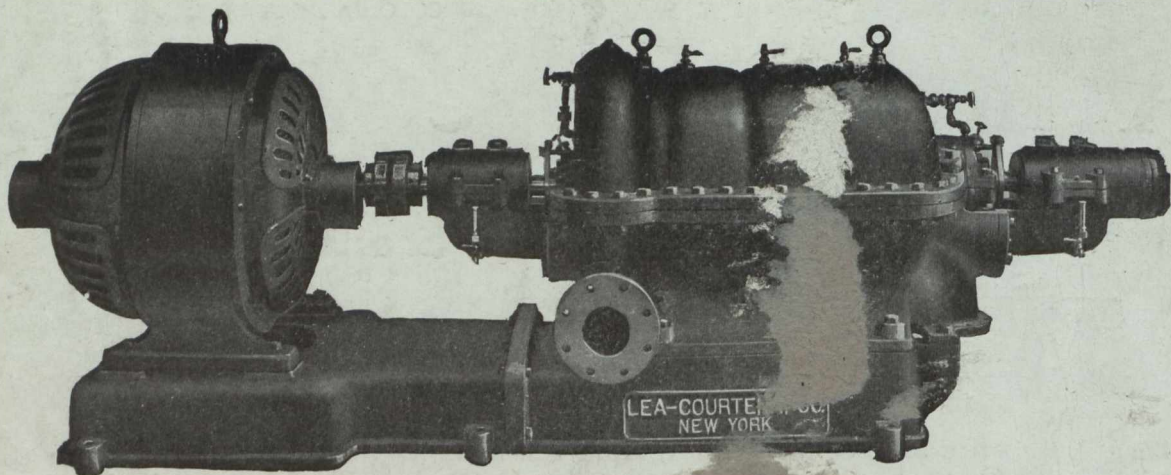
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