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CONTENTS, SEPTEMBER 15.

There has just been published the report of the Department of Mines, of Quebec, on mining operations during 1917. A preliminary report by Mr. Denis, published in March, gave a summary of the production during 1917. The report includes information on asbestos, copper and sulphur ores, iron, chromite, zinc, lead, molybdenite, gold, silver, magnesia, mica, kaolin, antimony, graphite, mineral paints, building materials, silica, peat and coal. Particularly interesting and useful are the accounts of development of "war minerals." Quebec has important deposits of chromite, molybdenite, magnesite and pyrites, and these deposits are being worked very successfully, and Quebec is making an important contribution of minerals for munitions.

The Department of Mines has just published two reports that will be of special interest to those engaged in developing mineral resources of Northern Manitoba. Memoir 105; The Amisk-Athapapuskow Lake District, by E. L. Bruce, and the Summary Report, 1917, Part D, by E. L. Bruce, F. J. Alcock, J. R. Marshall and W. A. Johnston, are full of information on the mineral resources of Manitoba.

THE ADVISORY COUNCIL'S REPORT.

There has recently been much talk over proposals to establish in Canada, institutes like the Mellon Institute of Pittsburgh and the Bureau of Standards, Washington. There can be no doubt that these institutes are doing very valuable work in the United States and that we should have had similar ones here years ago.

Approval of the proposal to establish a central research institute in Canada is contained in the report of the Advisory Council for Scientific and Industrial Research just published. According to the press despatch which contains this announcement, the Advisory Council has discussed the matter at great length for the last nine months and the chairman has, on several occasions, consulted collectively and individually the heads of the various technical bureaux in Washington on the subject and a majority of the members of the Council visited Washington to discuss the matter.

Apparently the Advisory Council has profited by its own preaching. When first appointed, some of the members took great delight in talking about subjects of which they obviously knew little. If they had had the good sense to consult the technical heads of Canadian bureaux, as they have since done, those of Washington, they would probably not have been so careless in their statements. Fortunately, they were correct in their main argument: that Canada will benefit by paying more attention to the application of research to industry. They have themselves demonstrated that research is good for Advisory Councils.

The Advisory Council has important work to do and it has the assistance of men who can do good work. If the Council has the ability to use to any appreciable extent the volunteer service that is represented on its various advisory committees, it should be an important factor in industrial development. While we have not been able to give the Advisory Council any great praise for its statements concerning industrial research in Canada, we still have hopes that it may eventually fill the place it occupies. If it can carry on a successful campaign for the establishment in Canada of research bureaux it will deserve our thanks, particularly if it can do so without spreading misinformation concerning the mining and metallurgical industries.

The Advisory Council, if we may judge from the publicity given to the subject, evidently considers its most important accomplishment to be the exploitation of the lignite deposits of Saskatchewan. On the advice of the Council, the Dominion Government and the Governments of Manitoba and Saskatchewan are spending a large sum of money on an experimental briquetting plant at Estevan, Manitoba. If this plant proves to be a commercial success the Council, together with the Commission of Conservation which has advocated the

briquetting of the lignites, and the Department of Mines, which did most of the experimental work, some of it years ago, will have been of great help in providing local fuel for the Prairie Provinces.

An objectionable feature of the publicity in connection with this experiment has been the failure to give proper consideration to the coals of western Alberta. Judging by newspaper comments, the continual comparing of lignite of Saskatchewan with coals from the Eastern United States has led the public to believe that there is not in Western Canada any satisfactory substitute for the American coals now imported. It cannot be too often emphasized that the main reason that so little of the high grade coal of Alberta has been sold in Manitoba is that the railways charge a much higher freight rate on Canadian coal coming east than on American coal going west. The preference given to American coal by the railways is a natural result of the heavy movement of grain to the east, and it may be that the rate is a reasonable one. The matter of freight rates needs investigation. Any proposal to substitute Canadian coal for American coal in Manitoba should include careful consideration of the fact that there is plenty of good coal in Alberta. We are not satisfied that Alberta coal is being properly utilized in the Prairie Provinces.

The lignites of Saskatchewan may be utilized to better advantage than at present by carbonizing and briquetting them, as will be done at Estevan; but it will be regrettable if the Government considers that this experimental work on briquetting lignites relieves it from the necessity of inquiring into the reasons why our better grade fuels are not utilized.

The Advisory Council has also interested itself in certain investigations into the use of tar fog and some time ago engaged the services of a gentleman who has been making special researches. Important results are said to have been obtained. This may prove to be an important contribution to our coal distillation and metallurgical industries.

Investigations which may prove of value to industries other than mining include: utilization of heat and light from waste straw; fog signalling; sulphite liquor waste; rust-resisting wheat, etc.

Of interest to all industries are the activities of the Council towards providing better facilities for, and greater interest in, industrial and scientific research. The chairman, Dr. A. B. Macallum, says:

"This question is one of paramount importance to Canada in view of the intensified application of science to industry which elsewhere will be fostered after the war by the State and also through private enterprise. It has been ascertained that not two per cent. of Canadian industrial concerns have research laboratories, and only about ten per cent. have routing laboratories, chiefly for the elementary testing of materials.

"The provision for research, either in pure science or in science applied to industry, has been and is utterly inadequate to our needs, and unless vigorous action be taken, and soon, to re-organize our industries on scientific lines wherever possible, Canada will face a very serious industrial crisis in the years following the war. The annual budget of the Massachusetts Institute of Technology exceeds the total of the annual expenditure of all the Faculties of Applied Science in Canada."

In connection with the proposal to establish a Central Research Institute, Dr. Macallum says:

"The work of the proposed institute would powerfully aid the development of scientific industrial research in Canada by stimulating the Canadian universities to increase their resources and facilities for research and thereby to direct into the ranks of science the ablest of their young graduates desirous of qualifying for a career, whether in pure science or in science applied to Canadian industry. It would place at the service of Canadian industry a factor which would insure its success in the strenuous international trade competition which is near at hand. It would, above all, enable the nation to direct its energy towards the economic and right utilization of its untouched stores of national wealth, in order that it may bear, with some degree of ease, in this and the next generation, the almost Atlantean financial burden it is assuming as a result of its playing its part in the present world struggle."

This statement of the work of the proposed institute should attract the attention of men in all our industries. Such an institute would undoubtedly be of great value to the mining and metallurgical industries of this country, and those engaged in these industries will do well to interest themselves in the proposals of the Advisory Council. We have not yet seen a copy of the complete report; but we understand that it is proposed to have, in connection with the Institute, laboratories at the disposal of associations which may be founded by the various industries, so that there may be co-operation in investigating problems that individual companies do not feel justified in tackling. Such laboratories would undoubtedly be an assistance in solving some of our problems.

From the report of the Advisory Council, we judge that it is recognized that we need researchers even more than we need laboratories and institutes. This is undoubtedly true. May we, however, be allowed to suggest that our industries are not yet using to advantage the research material that is available. There have been more embryo researchers turned out by Canadian institutions than have been absorbed by Canadian industries. The reason is obvious; the opportunities of making a decent living by scientific work in Canada have been too few. Our Government and our industries have now in their employ more highly qualified scientific men than they deserve to have. Inadequate salaries for scientific work are the rule in this country, and the consequence is that many, though, fortunately, not so many as might be expected, scientifically trained men go into other work or to other countries. In granting inadequate salaries to scientifically trained men, our Governments lead the way. Is it to be wondered at that researchers are scarce in this country, when we

find the Civil Service Commission advertising, as it did recently, for a scientifically trained man for the Mines Department at a salary of $1,600 per year? Are the policies of the Government as exemplified by the Civil Service Commission and the Advisory Council in harmony? Is a Government that is unwilling to pay adequate salaries to technical men justified in encouraging young men to spend years and money in acquiring advanced technical education, if they intend to live and work in Canada?

VIEWS ON ORIENTAL LABOR FOR COAL MINES.

In official, political and Labor circles throughout British Columbia, the recent declaration of Hon. Frank Carvell, Canadian Minister of Public Works, that Asiatic labor must be imported for Canadian coal mines, if the fuel required for the absolute necessities of Canada cannot otherwise be produced, has occasioned much comment. The suggestion that Orientals should be given access to Western Canada without restriction meets with general opposition and any step having in view their employment in mines in larger numbers than at present would meet with vigorous opposition, not only on the part of the miners' unions, but by every branch of organized labor. The Press also opposes the idea, with the single qualification that it might be forced by famine. One of the leading journals of the province refers to the matter in the following terms:—

"The Minister of Public Works may not understand all the objections to the policy he proposes. His conditional plan would find the strongest opposition in the province which is best acquainted with Oriental problems. Nevertheless the statement of Mr. Carvell will have strong support among the people, if they find a coal famine upon them. Fuel must be provided, and in the last emergency the Government would undoubtedly call on Asia or any other country for help. But the last emergency has not yet arrived and it should not be too late to avert it by other means."

THE SEARCH FOR PLATINUM IN BRITISH COLUMBIA.

Mr. G. C. Mackenzie, of the Canadian Department of Mines, has made an interesting statement of the work under way in British Columbia in the line of prospecting for and developing minerals urgently needed by the Munition Resources Commission of Canada for war purposes.

The opening up of platinum ground was first undertaken. Mr. Mackenzie took a light prospecting outfit into the Tulameen River district, this consisting chiefly of three Empire drills. While no holes have been driven as yet, some gravel has been washed and it has been established that platinum can be obtained. The party traveled up and down the river, visiting many claims being operated by individuals, all of whom were taking out platinum and gold and all of whom appeared to be making wages. Promises were secured in every instance that clean-ups from these claims would be taken either to the Bank of Montreal or the Bank of Commerce at Princton, B.C., whence the mineral will be forwarded to the Dominion Assay Office, Vancouver, B.C., for treatment.

Mr. Mackenzie says, in this connection, that the refinery for the handling of platinum and gold, which is being installed at the Vancouver Assay Office, is about complete and that it will be prepared to take all the platinum, with or without gold, that may be offered, paying the market price for the latter and $105 an ounce for the former. The prices offered for paladium, iridium and osmiridium have not yet been decided, but quotations have been cabled for and will be known in a short time.

On behalf of the Dominion Government, Mr. Tomlinson is touring British Columbia, at present being in the Kootenay districts. He is sampling all ground reported to contain platinum and, in brief, carrying out a thorough investigation in order that no other real source of supply may be overlooked.

Rich Molybdenite Ore From Taylor Mine.

Some time ago there was shipped from the Taylor molybdenite mine, near Renfrew, what is perhaps the richest car of molybdenite ore ever treated in Canada. Sampling and concentration results on this shipment show that it averaged over 6 per cent. MoS_2. According to Mr. Taylor, who owns and operates the mine, only a small part of the shipment was hand-picked ore.

The market for molybdenite has recently been poor, as the United States dealers have not shown any anxiety to obtain supplies. Most of the molybdenite produced in North America is manufactured into ferro-molybdenum in the United States and exported to Europe.

The detailed report on the sampling and concentration of the carload of Taylor mine ore recently treated at Ottawa, show that it contained 141.5 lb. flake, containing 89.2% MoS_2, and 49,937 lb. ore and fines containing 6% MoS_2, or a total of 3,122.4 lb. MoS_2. The recovery was 92%, or 2,872.65 lb. MoS_2.

DEVELOPING COPPER MOUNTAIN.

The Canada Copper Corporation is making very satisfactory progress in the development of its immense deposits of low-grade copper at Copper Mountain, and should be in a position to commence production on a large scale at an early date. It is estimated that before work starts in the actual taking out of ore, the company will have expended $3,000,000. Miles of road for the use of wagons and automobile trucks have been built to the mill site, situated four miles from Princeton, B.C., and a saw-mill, capable of cutting between 16,000 and 18,000 feet a day has been installed. Some excavating has been done for foundations to sustain the concentrating plant, capacity 2,000 tons daily, and some of the timber that will enter into its construction has been prepared. The company has been engaged in the opening up of its Copper Mountain properties for seven or eight years.

DIRECTOR OF COAL OPERATIONS.

Ottawa, Sept. 13.—Charles A. Magrath, Fuel Controller, has been appointed Director of Coal Operations for Nova Scotia and New Brunswick. The powers given him are wide. He has power to make all necessary investigation and enquiries respecting wages, holidays, hours of labor, the utilization of labor to the best advantage, and respecting all other matters necessary to, and connected with, the cost of and production of coal and "the increase and continuance of such production in Nova Scotia and New Brunswick during the present war and for three months after the end of the war."

The Manufacture of Silica Brick*

By H. Le Chatelier and B. Bogitch

Silica brick are indispensable in the manufacture of steel because they alone are able to withstand the high temperature of regenerative furnaces. All attempts to replace silica brick by other refractory materials for this purpose have failed.

Before the war, silica brick employed in France came principally from abroad, for which reason, since the beginning of hostilities, certain French steel works have been seriously handicapped. Our attention was first directed to the question by Mr. Bied, Engineer of the Teil Works. With him, we began certain investigations, at first using our laboratory and the furnaces of neighboring steel works. The larger part of our experiments, however, have been made in the laboratory of the Faculty of Sciences at Sorbonne. For the heating of our samples, we are deeply obliged to MM. Charpy, Yeatmann and Guerineau. In undertaking these studies, our first aim has been to render assistance to French industry, by indicating, as precisely as possible, the necessary conditions for the manufacture of high-grade brick but at the same time we have intended to give an example of the manner in which scientific methods may be put to practical application in the solution of industrial problems. Although our work has been confined to samples of only a few grams, we are nevertheless convinced that our information can be directly utilized by brick works of which the output is measured in thousands of tons.

As to what are most important and necessary qualities of silica brick, if one were to ask the steel metallurgists, they would almost unanimously reply that there was only one, namely, that the brick should permit the greatest possible number of runs without necessity for repairing the furnace roofs; they might suggest 400 runs as a satisfactory figure. Durability, however, is not the only factor. The brick have to be transported from the factory to the steel works without being injured by the jar or by freezing; many otherwise satisfactory bricks will not satisfy this last condition. It is further necessary that the brick shall not be too expensive, in order not to add unnecessarily to the price of the manufactured steel. The fundamental requirements, therefore, are the following: (1) durability of the furnace; (2) durability in transport; (3) moderate price.

Considering first the subject of durability of furnaces, the processes by which furnace roofs are destroyed can be answered by the direct observation of those in charge of furnaces. Our inquiries along this line did not meet with great success; only two steel works, the Ruelle Foundry, and the Chaussade Works, have been able to give us precise information, but, unfortunately, contradictory. One of these works has assured us that the roofs of Martin furnaces are almost invariably destroyed by progressive decrepitation under the action of heat. The other works, on the contrary, has assured us that similar furnaces are destroyed almost exclusively by melting. The brick manufacturers, on the other hand, have given us still a third reason, the ignorance or negligence of those in charge of the construction and operation of the furnaces. The engineer may have designed the profile of the furnace badly, not placing his burners in the most desirable place, or applying the first heat of the furnace too abruptly. The builder may have erred in shaping his bricks carelessly and laying them irregularly, so as to produce local pressure sufficient to occasion rupture. Above all, the heat may melt the roof of the best furnace, sometimes in a few hours, if the gas is badly regulated or if the reversals of flame are at too long intervals. From the discussion of this contradictory information and from suggestions found in different foreign publications, we have arrived at the provisional conclusion that the destruction of the roofs of steel furnaces may arise from five possible different causes, ranking in the following order of diminishing importance:

Causes of Failure of Furnace Roofs.

1. Superficial spalling of the brick under the influence of the highest temperatures developed in the furnace. This phenomenon is often noticed in the form of a continuous rain of little fragments, the falling of which may, after a few days, lead to the entire disappearance of the brick. This phenomenon depends upon two properties of the brick: Expansion of silica under high temperatures, and lack of mechanical strength at high temperature.

2. Superficial melting of the brick. Brick always melts superficially and continuously under the action of the spattering slag; this normal destruction of brick may continue for several months before leading to an actual cavity in the roof. Often, however, the brick will melt at once for a considerable width, several centimetres at a time, by which means the normal destruction of the brick may be multiplied by ten or more. This phenomenon depends upon the fusibility of the brick itself and upon its permeability, which facilitates the absorption of slag.

3. Flaking or shelling of the brick in the less intensely heated region. This begins to occur during the warming of the masonry, and below red temperature, and continues in the more remote parts after the furnace as a whole is considerably hotter. The brick, thus fractured, may then become detached and fall from the roof. This phenomenon is caused by the excessive dilation which is shown by all crystalline silicas at their temperatures of reversible transformation. Quartzose rocks decrepitate at a temperature of about 570 deg.; cristobalite, around 230 deg., undergoes an abrupt change in dimensions, of very important character; tridymite, finally, at about 150 deg. undergoes a change of slight importance. This tendency to rupture is offset by mechanical resistance of the brick and by its structure, that is to say, by the size of its grain and its amount of porosity.

4. Dislocation of the roof by excessive expansion. In furnaces made of silica brick, the roof always rises more or less when the furnace is first put into operation; this rising often becomes excessive and very irregular from point to point, which then leads to the falling in of the roof. This dislocation results, the same as spalling, from expansion of silica. If the brick is sufficiently resistant, and is heated over a considerable width all at once, it does not spall, but causes the roof to rise.

5. Collapse of the roof. The frequency of this accident with clay, magnesia, and alumina brick, makes it impossible to use these materials for the construction of the roofs of furnaces intended to maintain very high temperatures. Collapse will also occur, but very rarely, in furnaces made of silica brick. Collapsing results

*A paper to be presented at the Milwaukee meeting, A.I.M.E. It was published in the French language in the Bulletin de le Société de l'Industrie Minerale, 1917

from the softening that precedes fusion and, therefore, depends upon the same factors as fusibility. It is very rare in silica brick, being counterbalanced by the expansion of the quartz resulting from its transformation into silica of low density.

The reasons for the destruction of furnace roofs, and the properties of the brick upon which these depend, can now be tabulated as follows:—

Causes of Destruction.

1. Spalling.
2. Fusion.
3. Flaking or shelling.
4. Dislocation of the roof.
5. Collapse.

Properties of Brick.

1. Fusibility.
2. Compressive strength at high temperatures.
3. Permeability.
4. Expansion.
5. Dilation.
6. Compressive strength at ordinary temperatures.

It would be hazardous to assert that this list is absolutely complete, but if any phenomenon has been omitted, it is for the engineers of steel works to inform us.

Quartz is the universal raw material for the manufacture of silica brick. Deposits of quartz can be grouped into four distinct classes: Quartz veins, quartzite, sandstone and sand.

Most factories employ quartzite containing not more than 3 per cent. of basic oxides, and mix with it 2 per cent. of lime. The crushing of the rock is conducted in such manner as to preserve a number of large grains, having a maximum size of between 5 and 10 mm. The firing is performed at a high temperature, much above that employed in the manufacture of clay brick, and is maintained for a much longer period. This temperature may vary from 1,350 deg. to 1,450 deg., according to the nature of the quartz and the ease of its transformation. Firing progressively reduces the density of the silica; quartz transforms first into cristobalite and finally into tridymite, as one of us has shown 25 years ago. These are the basic facts upon which our researches were conducted.

Why Silica Brick Retains Rigidity at High Temperatures.

Before attacking the problem of the manufacture of silica brick, we have sought to answer an allied problem: Is it possible to find certain measurable properties of refractory products which will explain the superiority of silica over clay, alumina, and magnesia? An exact knowledge of the reason for the superiority of silica brick would certainly be a valuable guide to determine what properties are the most important to develop in the manufacture of refractory materials.

From our experiments, it is apparent that at 1,600 deg., which is still 100 deg. below the temperature of the Siemens-Martin furnace, silica brick has a compressive strength very much higher than that of the other refractory products. Furthermore, a factor which is of no less importance, the silica brick broke abruptly at all temperatures; they did not register any progressive deformation before rupture. With clay and magnesia brick, on the other hand, the observations were entirely different.

This ability of silica brick to preserve their rigidity at the very highest temperatures explains their superiority for furnace manufacture. As a means of reducing this factor to its simplest terms, we began with an examination, under polarized light, of thin sections cut from bricks of good quality, one marked "American Star" and the other marked "Imphy," these being the two bricks which showed the highest compressive resistance at 1,600 deg., namely 30 and 40 kg. per sq. cm. They were composed of large, easily-recognizable grains of the original siliceous rock, completely transformed into cristobalite and surrounded by a magma formed of little, elongated crystals of tridymite.

The rigidity of the brick was evidently due to the crystallization of tridymite, which forms a continuous network, in the meshes of which the fusible silicates are lodged. The presence of these latter materials does not detract from the solidity of the mass any more than water in the cells of pumice stone would diminish its strength; in both cases, the solid network is unbroken.

In magnesia brick, on the contrary, and also in clay brick, at least in those manufactured under ordinary conditions, this recrystallization does not occur. The slightly fusible material, magnesia, forms isolated grains which are surrounded, at ordinary temperatures, by a magma of very solid silicates; the latter, however, melt at around 1,300 deg., if ferruginous, or at about 1,500 deg., if purely magnesian. Above these temperatures, therefore, the solid grains swim in a melted mass and can slide on one another, the more fluid the magma, the more readily they slide.

The formation of this continuous network of silica is exactly parallel to the phenomenon observed in the hardening of cement. A mixture originally consisting of isolated grains, when tempered with water, is progressively transformed by chemical reaction into a coherent mass. In the same manner, the isolated grains of quartz in a brick become set on contact with melted silicates, which operate as solvent.

Quartz is unstable at temperatures above 800 deg., but, owing to its remarkable passive resistance, it is able to remain for a long time in that condition at very high temperatures, even up to 1,600 deg. If it is then brought into contact with a solvent, melted silicates, for example, it dissolves in that with a readiness very much greater than that of the more stable forms of silica, cristobalite and tridymite. This is due to the unanswerable and thoroughly established laws of physical chemistry. The quartz thus gives rise to supersaturated solution, from which one of the more stable varieties soon begins to crystallize. The melted mass, now being no longer saturated with respect to quartz, is able to dissolve additional quantities of it. Gradually, therefore, the entire amount of quartz recrystallizes into the variety that is most stable at high temperatures, tridymite. In practice, if the firing of silica brick has not been sufficiently long, the proportion of cristobalite, and sometimes even of quartz, is greater than that of tridymite in the finished product, if of poor grade. Burning for almost a month at the highest temperature of the steel furnace is necessary to transform silica completely into tridymite. The crystals of tridymite thus formed by solution attach themselves to one another, as is always the case under similar conditions, and form the network above mentioned.

Quality of the Brick.

This explanation for the superiority of silica brick gave rise to the question whether variations in quality were not exactly parallel to the compressive strength at high temperatures. To settle this question, we re-

quested, from different steel works, samples of brick which had been used for the construction of furnaces, as to the relative quality of which they were able to advise us. The Ruelle and the Guerigny Works sent us well classified series of samples upon which we made tests giving the results shown in Table 3. The tests on compressive strength at high temperatures were made, with some samples as soon as 1,600 deg. had been reached, while with other samples only after they had been maintained at this temperature for one hour. We realized that these two methods of proceeding might give different results in some cases. At the same time, we made determinations of a number of other physical properties, such as absolute density, apparent density, weight of sulphate corresponding to basic oxides present, and finally compressive resistance at ordinary temperatures.

All of the good bricks, after being held at 1,600 deg. for one hour, showed a compressive strength greater than 10 kg. per sq. cm.; most of the good bricks exceeded 20 kg., while the poor bricks were below 5 kg. It seems evident, therefore, that rigidity at high temperatures is the most essential, if not the only important, quality of silica brick. Most of the good bricks have densities below 2.40, the very good ones being as low as 2.33. The amount of sulphate in good bricks is below 15 per cent.

Manufacturing Operations.

Selection of the Quartz.—The proportion of basic oxides should not exceed 3 per cent., which is equivalent to 10 per cent. of sulphate, if excessive fusibility is to be avoided. On the other hand, the percentage of impurity should not be below 1.5 per cent. to avoid the necessity for excessively high temperatures in order to cause complete transformation of quartz. An average of 2 per cent. of basic oxides represents good practice throughout the world.

Certain quartzes fall to powder during calcination and naturally cannot yield other than very ordinary brick; the large grains, the importance of which has been noted above, disappear during this operation. This fault is easily detected by a rapid heating to between 1,500 deg. and 1,600 deg., sufficient to cause transformation of the quartz into silica of low tensity.

Rocks of great hardness increase the expense of crushing; while, on the other hand, a rock that is too soft makes it difficult to obtain large grains, and especially those of angular shape. For this reason, true quartzites are generally preferred to sandstone, although the latter can be crushed more cheaply. In England, however, the Sheffield ganister, which has a very high reputation for the manufacture of silica brick, is a true sandstone.

Sands are the worst of all natural quartz materials for this purpose, on account of the fineness, the rounded outline, and especially the uniformity in size of their grains.

Crushing.—The crushing of quartz is always an expensive operation on account of the hardness of the material; it requires the expenditure of considerable energy and leads to a rapid wear of the crushing apparatus. Roller mills are most commonly applied, the operation being continued until the desired degree of fineness is obtained. This does not seem a rational method, because the relative proportion of the different sizes of material cannot be accurately regulated.

To obtain the larger grains, there is no reason for using roller mills, and it is preferable to use some form of cylindrical crusher, requiring much less mechanical energy, and also yielding grains having a lammelar shape, which is most advantageous for the compactness of the brick.

If roller mills must be used, however, it is necessary to give them a sufficient weight, 5 tons at least, in order to enable them easily to crush fragments of quartz of the size usually delivered by the jaw crusher. If the roller mills are too light, they roll over the grains without crushing them, increasing greatly the cost of power and repairs, while also introducing particles of iron into the mixture, which later give rise to brown stains on the brick, after firing.

Addition of Fluxes.—Lime is the only flux regularly employed by manufacturers of silica brick; the proportion is generally between 1 and 2 per cent. M. Bied has proposed to add to the lime either oxide of iron or alkali. The advantage of a flux containing oxide of iron is that silica is only slightly soluble in it at high temperatures, and, therefore, the tridymite network is less rapidly destroyed than in other fluxes. In Martin furnaces, the bricks of the roof are often impregnated with oxide of iron to a depth of 10 cm. without seriously diminishing their resistance to heat.

The chemical composition of the fluxes is not the only important point; it is necessary to reduce them to a sufficiently fine state of division to allow them to mix intimately with the silica; this is the more important in proportion to the amount of impalpable silica in the mixture.

Wetting the Mixture.—The proportion of water added for the purpose of making the mixture workable should be enough to permit the brick to be carried to the dry house without danger of deformation. The quantity may vary from 8 to 16 per cent., according to the proportion of impalpable material; obviously, the larger the proportion of extremely fine grains, the more water is required.

Mixing.—Mixing, for the purpose of distributing the flux uniformly throughout the siliceous mass, is the more necessary according to the proportions of fine material. We have not yet found a perfectly satisfactory process for controlling the distribution of lime throughout the mixture, although this is a very important factor determining the quality of the brick. Inasmuch as the mixing operation is not very expensive, it would be much better to increase the length of the mixing process, even beyond what would appear to be strictly necessary. The operation is generally conducted in light mills revolving rapidly.

Molding.—Molding of the bricks is most often performed by hand, although there is some doubt as to whether this process is better than the use of a molding press. It permits, possibly, a more regular distribution of the mixture in the molds, and yields brick which, at 1,600 deg., possess the same mechanical strength as machine-pressed brick. In the case of a badly-fired brick, the final expansion, which occurs after the bricks are in the furnace roof, has better opportunity to relieve itself in the spaces of a very porous brick and thus produces much less external pressure. On the other hand, pressed brick, which are always dense and have greater strength at ordinary temperature, are much less permeable to the slag; this is important, as this permeability is an important factor in the destruction of brick. It would seem, finally, that for careful manufacture, high molding pressures are preferable, al-

though for second-quality brick, hand molding may be perfectly suitable.

Drying.—The molded brick must be dried before they are introduced into the kiln because they would otherwise be too soft to permit them to be piled one on another the abrupt application of heat, furthermore, would cause them to burst or at least crack by too rapid expelling of excessive water vapor.

The drying operation presents no difficulties and requires no special precaution. It is possible, immediately after molding, to put the bricks into a heated stove and dry them in a few hours. In this respect, silica bricks differ from clay bricks in that drying does not produce any contraction. With bricks containing a large amount of impalpable silica, the operation may require more care, but is never difficult.

Firing.—Firing is the most important feature in the manufacture of silica brick, and also the most expensive; unfortunately, the best conditions for firing are not yet fully understood. Tests are difficult to make on account of the length of firing and the dimensions of the furnace in which firing is done; firing often lasts for twenty days and may take place in a furnace holding 200 to 300 tons of brick at once.

The maximum temperature of firing is often considerably exaggerated. We often hear of firing temperatures of 1,500 deg. and even 1,600 deg., but we do not believe that any silica brick are ever actually fired at temperatures exceeding 1,400 deg.

In addition to the temperature, it is necessary to take into account the length of time during which the maximum temperature is maintained, and also the rapidity with which the heating is conducted. In case of too rapid a heating, the brick expands enormously, the direct transformation of the grains having preceded the formation of the network. From the theoretical point of view, it would seem that the best condition of firing would be to raise the bricks as rapidly as possible to the temperature at which the large quartz grains begin to transform directly, but slowly; this would give the network of tridymite an opportunity to develop more rapidly than the isolated grains transform, which is indispensable in order to limit expansion. This temperature would then be maintained a sufficiently long time to allow the transformation of large grains to be completed.

We should mention an absolutely contrary theory maintained by certain manufacturers on account of its economical advantages. This involves firing at a very low temperature, in order to form the indispensable network, but allowing the grains of quartz to remain untransformed; the final heating is afterward finished in the steel furnace. This process has the advantage of not introducing cristobalite into the brick and thereby diminishing the danger of fracture; on the other hand, at high temperatures, brick of this character would be subject to considerable expansion, leading to a warping of the furnace roof. If, however, the proportion of impalpable silica has been sufficient, and if the firing has been sufficiently prolonged, the tridymite network may perhaps be sufficiently solid to offset the danger of expansion.

We should also mention a third theory, upheld by certain American authors; well-burned bricks are good; slightly-burned bricks are mediocre; but medium-burned bricks are composed principally of cristobalite and disintegrate into large fragments by fracturing.

WILL CONTROL STEEL OUTPUT.

Ottawa, Sept. 4.—The details of an order-in-council enlarging the powers of the War Trade Board insofar as the production, distribution and consumption of steel are concerned, made available this evening, show that this step has been taken because the Government has decided that it is impossible to sufficiently augment supplies by importation.

The order empowers the War Trade Board to make such orders as may be deemed advisable to increase the production of iron and steel and the goods and articles made from steel. In cases where such production cannot be secured without the Government placing orders and giving assistance, orders of the War Trade Board shall first be approved by the Governor-in-council.

The War Trade Board is given authority to employ engineers, steel experts, inspectors, accountants and other assistance necessary to effectively control the steel industry.

Producers and manufacturers of iron and steel who fail to carry out the orders of the War Trade Board shall be subject to a penalty of not less than $500 and not more than $5,000, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment.

The order emphasizes the fact that there is a serious shortage of steel, not only in Canada, but in the allied countries, and states that "the railways, transportation companies and other industries necessary to Canada are in danger of being greatly curtailed or seriously crippled through want of steel."

U. S. GETS TIN.

Washington, Sept. 11.—Two-thirds of the pig-tin supply of the world is to be received by the United States under a pooling arrangement made at a recent conference in London between representatives of this country, Great Britain, France and Italy.

This was announced by the War Industries Board, which said that all shipments of pig tin and tin ores to this country would be consigned to the American Iron and Steel Institute, which will distribute it at regular prices. Quotations of pig tin already have fallen 14c. a pound.

THE INSTITUTE OF METALS.

The autumn meeting of the Institute of Metals, London, was held on September 10th. The subjects discussed included:

"Effect of progressive cold work upon the tensile properties of pure copper," by N. E. Alkins (Manchester).

"The resistance of metals to penetration under impact," by C. A. Edwards (Manchester).

"Grain growth in metals," by Z. Zeffries (Cleveland, Ohio).

"Rapid recrystalization in deformed non-ferrous metals," by D. Hanson (Teddington).

"Influence of impurities on mechanical properties of Admiralty gunmetal," by F. Johnson (Birmingham).

"Rapid estimation of phosphorous in bronze," by T. E. Rooney (Teddington).

"Disintegration of a copper-aluminum alloy," by R. Sligman and P. Williams.

"Annealing cold, rolled aluminum sheet," by R. J. Anderson (Cleveland, Ohio).

"Mechanical properties of alloys of copper and zinc," by F. Johnson (Birmingham).

"Liquid fuel in the foundry," by Capt. A. E. Plant.

FERROMOLYBDENUM.*

By R. M. Keeney.

The use of ferromolybdenum in the metallurgy of steel is in its infancy. Previous to 1914, probably not over 10 tons was produced yearly in the United States, practically all of this being exported; but with the high price of tungsten, search for molybdenum ores became more active, and now several hundred tons per year are made in the United States, practically all of which is exported. The alloy has not been widely used because of the supposed scarcity of ore, and the prejudices of American steel manufacturers against it, owing to difficulties encountered in its use in steel. The scarcity of ore has been overcome, and at present Colorado is the largest producer of molybdenum in the world. The prejudices of American steel manufacturers have not, however, been overcome.

Ferromolybdenum was made from roasted molybdenite in the crucible before the introduction of the electric furnace, but can now be made directly from raw sulphide in the electric furnace. Another source of molybdenum is lead molybdate, wulfenite, which is fused with soda ash and carbon to produce lead bullion and sodium molybdate slag. The slag is then smelted in the electric furnace, with carbon as a reducing agent, and suitable fluxes, to produce ferromolybdenum.

The standard grade of ferromolybdenum is not well established. Some manufacturers make a product containing 50 to 80 per cent. molybdenum and 3 per cent. carbon and manage to sell it. Others, by different methods, make a product containing less than 1 per cent. carbon. A great deal of ferromolybdenum containing 0.25 per cent. sulphur has been sold but most consumers will not accept a product containing over 0.1 per cent. sulphur. Ferromolybdenum containing 80 per cent. molybdenum has a dull gray iron color, coarse structure, high density, and is non-magnetic. It does not break easily.

Raw materials used in preparation of ferromolybdenum may be: for ore, the sulphide, molybdenite, or sodium molybdate slag made from wulfenite; for reducing agent, some form of carbon, or 90 per cent. silicon metal ground to pass 60 mesh; for fluxes, lime and fluorspar. There are two methods of manufacture:

1. Reduction with carbon and excess of lime, according to the reaction:

$$2MoS_2 + 2CaO + 3C = 2Mo + 2CaS + 2CO + CS_2$$

pure molybdenite contains 60 per cent. molybdenum and 40 per cent. sulphur. According to the above reaction, 100 parts of molybdenum are reduced from 170 parts of molybdenite by 18.8 parts of carbon. For every 100 parts of molybdenum, 58 parts of lime are necessary for slagging the sulphur as calcium sulphide. This reaction works out closely to the theoretical, and there is no difficulty in making a product with about 0.1 per cent. sulphur; the product will contain 1.3 to 3 per cent. carbon. If a lower-carbon alloy is desired, the crude metal is broken up and refined with an oxidizing slag of iron ore. The amount of iron in the alloy is varied as desired by the addition of iron turnings in the smelting furnace, or of iron oxide in the refining furnace.

2. Reduction with silicon metal, according to the reaction:

$$MoS_2 + Si = Mo + SiS_2.$$

This method has been used recently in the production of 50 per cent. ferromolybdenum, although when this grade is being made, ferrosilicon may be used. Lime is sometimes added to help slag the sulphur as calcium sulphide. By this method, the production of 100 parts of molybdenum requires 29 parts of silicon.

Ferromolybdenum containing 80 per cent. molybdenum and under 1 per cent. carbon cannot be regularly tapped from the electric furnace because of its high melting point, so that when this grade of alloy is to be made, the furnace must be of the knock-down variety, for removal of the button. The slag is tapped off, and when this operation is finished the metal is dug out. A 50 to 60 per cent., low-carbon product can be tapped, and a considerable quantity of this grade is made in tapping furnaces.

Molybdenum in Steel Manufacture.

Ferromolybdenum is added to steel as a fixed addition, nearly all of the molybdenum remaining in the steel. It is supposed to give the steel properties similar to those of tungsten steel, but only one-third to one-half as much molybdenum is necessary; that is, where regular high-speed steel contains 18 per cent. tungsten, 6 to 9 per cent. of molybdenum may be substituted. However, it gives these properties only when the addition is properly made and proper heat treatment follows. The regulation of these factors caused so much trouble and expense that, in this country, the manufacture of molybdenum high-speed tool steels has been practically discontinued for several years. It is used for this purpose abroad, however, to a considerable extent. At the present time, it is mainly employed in tool steel as an auxiliary rather than as a major constituent.

Various reasons have been assigned for the discontinuance of the use of molybdenum in these steels. Taylor found that molybdenum in rapid steels caused irregular performance; that steels of the same composition and having had seemingly the same treatment gave large variations in their maximum cutting speeds. One manufacturer has stated that the ingots crack in forging, the tools crack on quenching, and molybdenum appears to volatilize from the steel when heated; the latter might be due to the production of molybdenum oxide, which is much more volatile than the metal itself.

When small quantities of molydenum, say 0.25 per cent, are added, the elongation and elastic limit of the steel are greatly increased. When molybdenum is combined with nickel, the resistance to shock is increased without diminishing the elongation. Its utilization for linings of big guns was originated by the Germans with such success that the Allies are said to use it now for the same purpose. This may account for the heavy exports of molybdenum.

*Extracts from a paper presented at the Colorado meeting A.I.M.E., September, 1918.

HOOVER'S ESTIMATE FOR NEXT YEAR.

Mr. Herbert Hoover, of the American Food Administration, who visited England and France to confer with the Food Controllers of the Allies, says that this continent next year will have to supply the Allies with 4,000,000,000 pounds of fats, 900,000,000 pounds of beef products, 500,000,000 bushels of cereals, and 1,500,000 bushels of sugar. In addition to the former responsibilities overseas, next year there will be the feeding of an enormous American army in Europe.

"We have to make good," says Mr. Hoover. "We can do it, if we simply have the will to live with every economy, and waste nothing."

ONTARIO'S METALLIFEROUS PRODUCTION FIRST HALF YEAR, 1918.

Returns received by the Ontario Bureau of Mines for the six months ended June 30th, 1918.

In the table given below, for purposes of comparison, the quantities and values are given for the corresponding period in 1917:

Summary of Production, First Six Months, 1918.

Product.	Quantity.		Value.	
	1917.	1918.	1917.	1918.
Gold (ounces)	228,673	229,421	$4,586,941	$4,648,164
Silver (ounces)	10,073,787	8,736,002	7,584,439	8,267,624
Cobalt, metallic (lbs.)	162,250	118,889	237,004	249,045
Nickel, metallic (lbs.)	45,864	208,802	19,073	83,332
Nickel oxide (lbs.)	5,495	21,768	1,648	5,551
Cobalt oxide (lbs.)	153,498	259,371	175,308	339,052
Other Cobalt and Nickel Compounds (lbs.)	122,076	222,039	15,879	27,505
Nickel in matte (tons)	20,230	21,393	10,115,000	12,385,950
Copper in matte (tons)	10,381	10,708	4,152,400	4,283,040
Copper ore (tons)	1,543	16	45,688	318
Iron ore (tons)	69,209	106,196	231,937	424,259
Pig iron (tons)	347,190	341,182	6,067,050	9,256,599
Molybdenite, concentrates (lbs.)	36,777	32,656	47,942	45,845
Lead, pig (lbs.)	912,934	776,711	114,953	66,630

Copper in matte was valued at 20 cents and nickel at 25 cents per pound in 1917. For 1918 the values have been placed at 20 and 30 cents per pound respectively.

Considering the handicaps under which gold miners are operating, a small increase in production, as compared with the first half of 1917, is a creditable showing. In the Porcupine camp, the Dome, Porcupine Crown, Porcupine V. N. T. and Schumacher have ceased milling operations. The Croesus in Munro Township, the Tough-Oakes at Kirkland Lake and St. Anthony at Sturgeon Lake are in the same category. This curtailment of output is offset by the new producers of gold, Lake Shore at Kirkland Lake and Davidson at Porcupine. The 40-ton mill of the Patricia Syndicate at Boston Creek started operating the latter part of June. A promising vein carrying gold telluride has been discovered on the Miller Independence at Boston Creek. Shaft sinking is proceeding, and arrangements made to increase the milling capacity at this property. Considerable activity at Boston Creek has resulted from these developments. In the new Matachewan camp, from the claims under option to the Nipissing Mining Co., some spectacular samples of gold ore have been secured. Diamond drilling on the Otisse claims is said to be producing satisfactory results. During the period the Porcupine camp produced 207,731 ounces of gold and Kirkland Lake 17,927. A total of 515,094 tons of ore was milled with a recovery in gold and silver valued at $4,692,529.

Although shipments for the first half of 1918 were lower by 1,367,785 ounces than for the corresponding period of 1917, the value was $683,185 greater, the average price of silver per ounce for the two periods being 92.8, as against 75.4 cents. Companies shipping over one-half million ounces are given in order: Nipissing, Mining Corporation, Kerr Lake, O'Brien, Buffalo, Coniagas and Temiskaming. New shippers this year include Edwards & Wright, Ltd., operating the old Green-Meehan mine; the Silver Eagle of Silver Centre; the Keeley mine in South Lorrain, where a high-grade vein has been uncovered. There was also a clean-up by the Lumsden Mining Co. The National Mines, Ltd., recovered and treated tailings from Cross Lake that had been deposited there by the Old King Edward and Silver Cliff mines. The Mining Corporation of Canada is now treating a larger tonnage of slimes and tailings from Cobalt Lake in the new mill. Silver was recovered from gold ores to the extent of 47,427 ounces.

There were treated at Deloro, Thorold and Welland 2,659 tons of ore and concentrates, and 1,116 tons of residues with a recovery of 2,753,701 ounces of silver. In addition, cobalt and nickel were produced in metallic form, also as oxides and sulphates. The Deloro Smelting & Refining Company uses a considerable proportion of its output of metallic cobalt in the manufacture of "stellite" which contains about 55 per cent. of cobalt.

As a result of high mining costs, together with increased freight rates, except that of the nickel-copper ores, has become unprofitable. The only shipper was the Hudson Copper Co. at Havilah.

Increased Output of Nickel-Copper Matte.

Nickel-copper mining and smelting shows an increase in output. During the half year, 804,640 tons of ore was raised from the operating nickel-copper mines. Ore smelted was 717,119 tons, producing 40,178 tons of nickel-copper matte.

Pig Iron and Steel.

Pig iron produced in the half year shows little change in quantity, as compared with the corresponding period in 1917, but in value the increase is over 50 per cent. There were 75,716 tons of Ontario ore, and 601,751 tons of foreign ore smelted by the eight furnaces in blast. Steel produced in the period totaled 432,326 tons, worth $13,739,602.

Molybdenite.

The production of molybdenite concentrates for the half year shows a small decline in quantity, but the value was nearly as great as in 1917.

Lead.

There was only one producer of lead ore in the province during the half year, the James Robertson Estate. Operations, both mining and smelting, are carried on at Galetta. The pig lead product is used by the company in Montreal.

BRITISH COLUMBIA COAL PRODUCTION.

The July tonnages for British Columbia collieries are most encouraging, as the figures show that the production is holding with the pace set at the beginning of the year and indicate that there is a good chance that the province will, when the statistics are compiled at the end of the twelvemonth, be found to have outstripped all previous records.

Following is the production of the various collieries for July:—

	Tons.
Crows Nest Pass Coal Co., Coal Creek	37,922
Crows Nest Pass Coal Co., Michel, B.C.	19,407
Corbin Coke & Coal Co., Corbin, B.C.	13,454
Middlesboro Collieries, Merritt, B.C.	7,988
Fleming Coal Co., Merritt, B.C.	3,504
Coalmont Colliery, Coalmont, B.C.	347
Princeton Colliery, Princeton, B.C.	3,145
Canadian Western Fuel Co., Nanaimo, B.C.	61,563
Canadian Collieries (D), Ltd., Comox, B.C.	46,698
Canadian Collieries (D), Ltd., Extension	18,650
Canadian Collieries (D), Ltd., South Wellington, B.C.	2,122
Pacific Coast Coal Mines, South Wellington, B.C.	6,775
Nanoose Colliery, South Wellington, B.C.	2,285
Granby Colliery, Cassidy's, B.C.	2,718

It will be noted that there are three mines on the producers' list which have not been there for some time. Two newly opened mines are the Canadian Collieries' mine at South Wellington, which has 2,122 tons to its credit, and the Granby Mine at Cassidy's, B.C., with a production of 2,718 tons. These, while comparatively small at present, will grow and, no doubt, will become a material factor in British Columbia's coal output. The Coalmont Colliery is the other new name on the list. Although it starts with the modest tonnage of 347 tons for the month, more may be expected of it in the near future.

COAL NOW $9.50 PER TON AT VANCOUVER.

The price of domestic lump coal has been raised in Vancouver, B.C., from $8.80 a ton to $9.50 by most of the retail dealers. This increase, it is assumed, is the result of the recent action of the Canadian Fuel Controller in permitting certain of the Vancouver Island Collieries to raise their selling prices. The view taken by the Controller on the occasion in question was considered rather unusual, inasmuch as he authorized a maximum selling rate of $6.55 a ton to all the Island mining companies, with the exception of the Canadian Western Fuel Co., which was not sanctioned to raise its quotations beyond the maximum which had previously prevailed, namely, $5.80 a ton. The explanation given was that investigation had proved that, owing to circumstances over which they had no control, all other collieries were subject to greater production charges than the C. W. F. Co., and that the latter was the only one which was making what might be considered a fair profit on the capital investment. The Vancouver public, however, take the position that dealers handling C. W. F. coal, as well as others, have raised prices and that some must have gone beyond the power given them by the Controller when he set their maximum profits at 50 cents a ton. It is suggested that an investigation is in order.

MANGANESE ORE FROM KASLO, B.C.

Returns have been received from the Mines Branch, Ottawa, on several samples of manganese ore sent from the Kaslo, B.C., property for assay.

They follow:—

Sample No. 1.	
Loss on ignition	17.15
Manganese	51.45
Iron	6.17
Silica	7.32
Phosphorus	0.07
Sulphur	0.06
Sample No. 2.	
Loss on ignition	15.45
Manganese	52.42
Iron	5.22
Silica	7.30
Phosphorus	0.11
Sulphur	0.09
Sample No. 3.	
Loss on ignition	13.88
Manganese	59.97
Iron	0.88
Silica	2.30
Phosphorus	0.15
Sulphur	0.45

THE MANGANESE DISCOVERY IN COWICHAN DISTRICT, B.C.

With regard to the recent manganese discoveries in the Cowichan district, Vancouver Island, Mr. Geo. C. Mackenzie, who has just been to Victoria, returned from an inspection of one of these properties, which is situated on the summit of the Divide between the Chemainus and Cowichan Rivers and within easy reach by aerial tramway of the Esquimalt & Nanaimo Railway, speaks very enthusiastically of its possibilities. Although no development work has been done, Mr. Mackenzie took samples from the surface which ran high in values. He states that there is a surface exposure 100 by 20 ft., which, allowing for a depth of 10 ft., a very conservative estimate, and figuring manganese at its present price of $70 a ton f.o.b. Chicago, Ill., means that there is $140,000 worth of ore immediately available. "I saw all the best manganese of Nova Scotia and New Brunswick last summer," Mr. Mackenzie declared, in giving his impression of this claim, "and I never saw anything better."

As it had been proposed importing ferro-manganese from India for use in the manufacture of munitions in Canada, Mr. Mackenzie thought that the location of these properties on Vancouver Island was of first importance. He thought it likely that the War Trade Board of Canada, in co-operation with the locators and owners, would arrange for their early development, in which event, owing to their accessibility, it would not be long before ore was being shipped.

How Manganese Was Found at Cowichan.

There is an interesting sidelight to the discovery of the manganese, the situation of which has been described. Its locator is Pte. Tom Service, who fought with an Engineers' Corps in France, and who had a part in the mining of Hill 60, which, as will be recalled by all who have followed the course of the war, was blown up by means of what was the greatest mine in history up to that time, a strong German fortress being literally obliterated. Service returned to Canada only a few weeks ago. He saw manganese samples from

another part of the Cowichan district and exclaimed that he knew where there was more of the same ore, and could find it without trouble. He went out, staked and recorded the claim in question and has named it "Hill 60." So there now is a "Hill 60" on Vancouver Island which gives promise of supplying quantities of the raw material for the production of munitions necessary to drive the Hun out of the fair lands he has invaded and devastated.

In the new bulletin K-303 issued by the Canadian Ingersoll-Rand Company, Limited, the class EL-2 two-stage, straight line air compressor is described. The bulletin indicates the advantages of the tandem arrangement for certain classes of work where economy of space is to be combined with the advantages of two-stage compression, and goes on to give details of construction, including the leaf valves and other features. The bulletin concludes with a note on the short-belt drive, with which this type of compressor can be furnished, and which has distinct advantages where space is at a premium.

The value of gold bullion deposited at the Dominion of Canada Assay Office, Vancouver, B.C., during the month of August, 1918, was $608,838.43, which is an increase of $253,845.88 over the same month of 1917. Most of this gold came from the Yukon.

B.C. Department of Mines Will Drill Iron Ore Deposits.

The establishment of an iron and steel industry in British Columbia is earnestly desired by the Provincial Government and, although no action of a definite character has followed the enactment at the last session of the Legislature granting a bounty of $3 a ton on pig manufactured from local ore in British Columbia and $1.50 a ton on pig manufactured from foreign ore in the province, Hon. Wm. Sloan, Minister of Mines, still looks forward confidently to the development of the country's magnetite deposits.

In a recent statement, the Minister said that the bounty did not seem, so far at any rate, to have had the desired effect. There had been enquiries regarding the iron ore resources of the province, it was true. Capitalists had shown some interest and still were doing so. Properties were being investigated by private interests, but, in spite of these gratifying indications, he was not satisfied.

In his opinion, there was an opportunity offering now for the establishment of an industry on the Pacific coast which would lead to the utilization of the magnetite of the province, as well as the material advancement of its commercial interests. convinced that no time should be lost, and firmly of the belief that, with a proper realization of the resources of the country, capitalists would not hesitate to undertake development, Mr. Sloan declared that he had decided to diamond drill a number of the most promising properties for the purpose of gaining a definite idea of the tonnage available and also to give those interested a practical demonstration of the possibilities of the industry in question. His engineers had been carrying out investigations with this work in mind and properties had been selected. He, therefore, was able to announce that tenders would be called for at an early date for the diamond drilling of iron properties, and the work thereon would be proceeded with as expeditiously as possible in order that the desired information might be put before those who might be interested in the iron ore deposits of the province without loss of time.

PERSONAL

Mr. H. E. T. Haultain was large responsible for the excellent exhibit of Vocational Training for Returned Soldiers at the Toronto Exhibition. It was one of the most attractive and instructive exhibits on the grounds.

Mr. Mark Workman, president of the Dominion Steel Corporation, who has spent several days between Montreal and Ottawa, has returned to Sydney, where he will remain this month.

Mr. D. H. McDougall, president of the Nova Scotia Steel and Coal Company, is said to be identified with the development of mining areas at Beersville, Kent County, N.B.

Mr. C. A. Magrath, Fuel Controller, has been appointed Director of Coal Operations in Nova Scotia and New Brunswick.

Prof. S. F. Kirkpatrick, head of the Department of Metallurgy, at School of Mining, Kingston, is resigning. He is metallurgist for the Deloro Mining & Smelting Co.

Mr. J. B. Tyrrell is in Newfoundland. He is expected to return to Toronto in the latter part of September.

Mr. E. Jacobs is in Phoenix, Arizona.

Mr. W. R. Burge, of the Canadian Allis Chalmers, Ltd., has been promoted to the managership of the Ontario district office.

Mr. R. T. Regnall, formerly of the Dome Lake, has succeeded R. N. Palmer as underground superintendent at the Hollinger Consolidated.

Mr. R. Home Smith will be Ontario's new Fuel Commissioner, according to information received by The Globe recently. He will succeed Mr. R. C. Harris, City Works Commissioner. Assisting Mr. Smith, either as adviser to the Commissioner or as Deputy Fuel Controller, will be Mr. E. L. Cousins, Chief Engineer and Manager of the Toronto Harbor Commission, who has been long associated with Mr. Smith on the Harbor Commission.

Mr. J. C. Nichols and Mr. J. W. Rawlins, of Copper Cliff, are inspecting copper concentrating plants in Arizona.

Burnett & Crampton is a new firm of engineers and iron founders which has recently been established at Rigaud, Que. They have a very well equipped shop, capable of handling eight tons per day with a machine shop, pattern shop and blacksmith's outfit. Mr. Burnett was the electrical engineer for the Canada Cement Co., Ltd., and also has had considerable mechanical and foundry experience. Mr. P. P. Crampton is very well known to the mining industry through his previous connection with the Hull Iron & Steel Foundries, Ltd.

Mr. Oscar Lachmund has resigned his position as general manager of the Canada Copper Corporation, and will leave its employ this month. He is to be succeeded by Mr. H. R. Van Wagenen, of Denver, Colorado, who has been in British Columbia looking over the situation and is to return to take up his new duties in a few weeks.

The reinforced concrete cargo steamship "Faith," which left a California port some weeks ago for a west coast South American port, was, a few days ago, reported as having arrived safely and in first-class condition. The "Faith" is discharging her cargo of lumber and is expected to reload for an American port, which she will reach via the Panama Canal.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Cobalt Silver-Ore Shipments.

During the month of August twenty-eight car-loads of ore were shipped from the Cobalt camp. Thirteen mines were represented in the shipments, the aggregate weight of which was 2,063,554. The details of the month's shipments were as follows:—

Mine.	Lbs.
Buffalo	328,959
McKinley-Darragh	313,393
Nipissing	234,120
Dominion Reduction	231,400
LaRose	210,366
Coniagas	170,370
O'Brien	128,110
Kerr Lake	118,545
Trethewey	77,165
Hudson Bay	65,772
Penn-Canadian	64,688
National	60,665
Aladdin	60,000
Total	2,063,554

Hattie Gold.

According to advices received from Matheson, the development work under way at the Hattie Gold Mines is progressing favorably and giving satisfactory results. The new vein recently discovered has been sunk on for a depth of 25 feet, at which point it was found to be four feet in width. On the No. 2 vein, considerable trenching has been done and good ore and tellurides, as well as free gold, is in evidence for some distance. The company expect to have their new plant, which consists of an 80-h.p. boiler, with six-drill compressor and hoist, installed at an early date.

Gold Discovered in Bristol Township.

It is reported here that a rich discovery of gold has been made in Bristol Township, near the Ogden Township line. The story is to the effect that a vein 400 ft. long has been uncovered, and while the width of this vein has not been mentioned, channel assays are said to run up to $1,700 in gold to the ton. In the early days of the camp, this township was well prospected and some fair showings were found. A number of prospectors have left for the district on the news of the recent discovery, and much activity is predicted for the district.

Matachewan.

A number of prospectors returning from the Fort Matachewan district recently brought out news of a rich gold discovery having been made on the claims being developed by the Nipissing Mining Company, of Cobalt. The specimens claimed to have been seen by these men are said to have been as rich as "Croesus ore." Captain H. L. Donaldson, who is in charge of the work at the property when questioned about the find, refused to give any information beyond stating that some gold had been uncovered. So far as known, no considerable quantity of ore has been found on this property.

Giroux Claims will be Developed.

The claims of Fred Giroux, situated in Lorraine Township, near Lake Latour, are to be operated; arrangements having already been made to begin the work. Some years ago a shaft was driven to a depth of 50 ft:, and a crosscut commenced to cut the vein, which, on the surface, contained considerable native silver and a large quantity of nicolite and smaltite. However, the vein was not reached before the work was discontinued. Local men, including J. J. Anderson, Gordon Cameron and George Watts, are parties to a lease of the property for two years on a fifty-fifty basis with the owner. It is proposed to cob out the high grade and ship it to Cobalt for treatment as the work proceeds.

Mining Corporation.

The production of over two million dollars worth of silver for the eight months of the current year just ended, by the Mining Corporation of Canada, means another exceedingly prosperous year for this company. This production is only about $200,000 below the first nine months' period of 1917. This achievement is all the more remarkable when it is remembered that the company commenced the current year with estimated ore reserves of 1,500,000 ounces. This demonstrates the probability of all mines of the camp, where the ore reserves are substantial, finding their career lengthened to a considerable extent, as has been the case with the Mining Corporation. The treatment of approximately half a million tons of sands and slimes from previous operations of the company will probably add materially to the net income for the current year as a portion of the mill treating about 350 tons per day was placed in operation on this material the first week of the present month. It is proposed to gradually increase the capacity of this plant until between 650 and 700 tons per day are being handled. The slimes will be treated by cyanidation in the low-grade cyanide mill, while the sands will be re-ground and treated by oil flotation. The plant will be the largest of its kind in the Cobalt Camp when completed.

Gowganda.

Steady progress is being made at the Walsh property in Gowganda, which is being worked by the Crown Reserve Mining Company of Cobalt. Several weeks ago the announcement was made of the encountering of high-grade silver ore at the 100-ft. level of the property. Since this time the shaft has been sunk to the depth of 200 ft., a station cut, and cross-cutting is now under way to tap the vein at the 200-ft. level.

Ophir.

The announcement that the Mining Corporation of Canada has taken an option on the Ophir Mining Company's property in south-eastern Coleman Township has been the cause of considerable interest. The Ophir has been well known for years, and is one of the oldest mines in the Cobalt Camp. It is understood that under the arrangement, the Mining Corporation is to spend not less than $2,500 per month on the property. The new operators took possession this week and are continuing the work of sinking the winze to the contact, which was under way by the original company. Where the vein left this working, it was wide and heavily mineralized. As soon as the contact is reached, a crosscut will be run to encounter the vein. The strong financial position of the Mining Corporation assures the thorough exploration of the property.

Sinking a Shaft at Miller-Independence Mine.

The work of sinking the shaft at the Miller-Independence property to the 200-ft. level, and cross-cutting the vein at this depth is now under way and the next two weeks' developments at this property would appear to have a vital bearing on the future of the Boston Creek camp. The shaft is being sunk on the vein, keeping the hanging-wall side of the vein as one side of the shaft.

However, as the shaft is 7 ft. by 9 ft., the whole width of the vein is not being proven, and its exact width will not be known until the 200-ft. level is reached. From the surface to the 100-ft. level, the vein was determined to range in width from nine to twelve feet. With the shaft down 200 ft., and drifting both east and west at the 100 and 200 ft. levels, four faces will be available from which to draw ore for the enlarged mill to be placed in operation during the present month. A number of engineers have visited the property recently, and in each case where samples were taken for assaying, startling results were obtained. A large tonnage of rich ore has accumulated on the dump during the sinking of the shaft and it requires no searching whatever to pick out samples of ore containing large quantities of tellurides.

Elliott-Kirkland.

Plans are being made for the exploration of the Elliott-Kirkland property at depth by diamond drilling. The present workings have reached a depth of 500 ft., where considerable lateral work has been done. Although a characteristic mud-seam, along which ore deposition has been found to occur at other mines in the camp, is in evidence at the 500-ft. level of the Elliott-Kirkland, so far results met with have not been up to expectations. It has been discovered that the lamprophyre formation intruded from the north, where porphyry should occur, if geological conditions were ideal.

Ontario-Kirkland.

It is expected the plant of the Ontario-Kirkland mining company will be installed and ready for operation by November. In the meantime, work at the property is going ahead in a satisfactory manner. A large amount of building material is on hand, some of the buildings are up and the foundations for others are now being built. The Ontario-Kirkland was formerly known as the Hurd claim, and lies close to the producing mines of the camp. A number of large well-mineralized veins occur on the property.

Boston Creek.

The Mekks Syndicate, owning property near the Miller-Independence at Boston Creek, have made arrangements for the exploration of their property. This property is owned by Cobalt and Haileybury men. The name has been derived from the first letter of each of the owners' names.

McKinley-Darragh-Savage.

The McKinley-Darragh-Savage Mines has declared its regular dividend of three per cent., payable on October 1st to shareholders on record September 7th. This disbursement amounts to $67,431, and makes 12 per cent., or $269,724 paid during the current year. The McKinley-Darragh went on a dividend-paying basis in 1907, and since that time has paid a total of 241 per cent., or an aggregate amount of $5,349,607, to the shareholders.

Altering Mill at Hill Gold Mine.

Alterations are being made to the mill of the Hill Gold Mines, near Painkiller Lake, in the Munroe district. The mill building is also being enlarged. In the meantime, underground operations have been suspended. Only a small number of men are employed at the property.

BRITISH COLUMBIA.

May Work Platinum and Gold Placers.

There is a prospect that the Peace River country, a large expanse of territory to the extreme north-east of the province of British Columbia, will become a platinum producer. A syndicate, at the head of which are Dr. W. L. Hartman, of Detroit, and Mr. L. Bright, of Chicago, is reported to have secured control of large placer grounds in this section, to which will be shipped this fall two large Keystone drills and a modern dredge, with a capacity of 100,000 cubic yards of gravel a month. Prospecting is said to have proved the presence of both platinum and gold in paying quantities, and operations are to be carried on by a considerable force of men.

Offers Scholarships for Members of Families of Employees.

To encourage the sons of its employees to obtain technical training, the Canadian Consolidated Mining & Smelting Co. has announced, through Mr. J. J. Warren, managing director, that it will give a scholarship of $500 per annum, commencing next year, to the man standing first, among the families of its employees, the latter being restricted to those engaged at day labor, in his matriculation examination for an applied science course in the British Columbia University. The further study, which this grant will help finance, may be taken at the B.C. or any Canadian University. It is explained that the company's operations are becoming so extended that there should be, in the future, plenty of scope for the use of men of technical knowledge and, while the policy at present is in its experimental stage, it is likely, if creating the interest hoped for, to lead to development by the corporation of the brains that will be needed for the direction of its operations in coming years.

Developing a Flourspar Deposit Near Grand Forks.

When Hon. Wm. Sloan, Minister of Mines, accompanied by Mr. J. E. Thompson, member of the British Columbia Legislature for Grand Forks, was making an inspection of the plant of the Canadian Consolidated Mining & Smelting Co. at Trail just about a year ago, he was told of the problem of hydro-fluosilicic acid, it being pointed out that the fluorspar necesary in its manufacture had to be imported from Kentucky, a distance of from 1,500 to 2,000 miles, which made the costs so high that the discovery in this province of such a deposit was a matter of importance to the industry. That such, in fact, was the condition has since been shown, the company having bonded a group of claims known as the Rock Candy group, located on the north fork of the Kettle River, above the city of Grand Forks. Since then, much development work has been done, a car of ore already having been loaded for shipment to Trail. The need of the flourspar being urgent, no time was lost in putting the property on the producing list and, in view of the difficulties which had to be overcome, what had been accomplished in a short time is worthy of note. The company first had to build a trail, and over this supplies and equipment, including a diamond-drill outfit, had to be packed in on horses to the property. The horses on the return trips have been bringing out ore, so that the company could get a car for test purposes at the earliest possible moment, and the result will no doubt have material bearing on future development, although the property already is regarded as having passed the experimental stage. A right-of-way has been cut through for a new wagon road, towards the construction of which the Mines Department is extending assistance, and before winter, the mines are expected to be making regular shipments.

Some interest has been created in British Columbia by the statement, appearing in the "Financial Post of Canada," that the Canadian Consolidated Mining &

Smelting Co., or interests associated with that concern, are reported to be contemplating the establishment of a steel industry in this province. The site for the plant is said to be near Trail, B.C. Confirmation of this cannot be secured from the local officials of the company.

The Ladysmith Smelting Corporation has ceased operations at Ladysmith again; its smelter having been run for a short time, during which period an accumulation of ore was disposed of. It is understood that options it had taken on a number of British Columbia mining properties, in order to assure a constant supply of ore for the smeltery, will be allowed to lapse.

Dividends Declared by B.C. Companies.

Dividends have been declared by five of the chief mining corporations for the first eight months of the current year as follows:—

Granby Consolidated Mining, Smelting & Power Co.	$1,124,886
Canadian Consolidated Mining & Smelting Co.	523,872
Hedley Gold Mining Co.	72,000
Britannia Mining & Smelting Co.	198,415
Crow's Nest Pass Coal Co.	62,128

May Develop B.C. Iron Deposits.

If the smelter tests prove favorable, immediate developments of considerable deposits of "bog iron," situated on the mainland of British Columbia and near the Pacific Great Eastern Ry., is promised by the operators of the Irondale Foundries. The company expects that the experiments will prove satisfactory and, when that is definitely established, plans to instal the plant necessary for the handling and shipment of the ore in bulk from Mons, a P. G. E. station, close to the properties, to the Irondale furnaces. The run from Mons to Squamish, on the coast, is about forty miles long and is all down grade, and it is proposed erecting bunkers at the latter point with a capacity of 2,000 tons. It is estimated that approximately 600,000 tons of the ore is readily available, while, with proper equipment, a much greater quantity can be recovered.

The Magnesium Sulphate Deposits at Maple Creek.

The announcement that the immense deposit of sodium sulphate and epsom salts, thirty miles north of Maple Creek, near Swift Current, Saskatchewan, contains much potash, has created much interest in British Columbia as, no doubt, it has throughout Canada and America. For several years there has been considerable prospecting for potash in this province, it being the opinion of many that in some sections conditions are in every way favorable for such deposits. The bottoms of a number of lakes in different interior districts have been found crusted with what, in most instances, has proved to be carbonate of soda. The most notable case of this is a lake near Ashcroft, B.C.

Mrs. A. E. Jowett of Trout Lake, B.C., who was the only lady prospector in attendance at the recent mining convention at Revelstoke, B.C., has been able to demonstrate that, even in a rugged country such as the Kootenays of British Columbia, a member of the fair sex can successfully locate, record, and arrange for the development of mineral. Mrs. Jowett has been prospecting in the neighborhood of Trout Lake for a number of years and is the owner of a number of promising properties. One of these is known as the Foggy Day Claim. It has shipped nine tons of ore, giving returns of 4.29 ounces in gold; sixteen ounces in silver; and 4.6 per cent. lead, with an assay value of $100 a ton.

VANCOUVER ISLAND MINE SAFETY ASSOCIATION.

The coal-mining communities of Nanaimo, Ladysmith, Extension, Wellington and Comox were well represented at the annual meeting of the Vancouver Island Mine Safety Association, which was held at Cumberland on the afternoon of Monday, September 2nd (Labor Day), and the competitions, both in mine rescue and first-aid work, were keen and of high standard.

Hon. Wm. Sloan, Minister of Mines, who attended in person, expressed gratification at the interest manifested by the large attendance from the Island mining district, stating that the members of the various teams demonstrated a gratifying intimacy with the knowledge of their work. He congratulated the programme committee on their arrangements, which were admirable.

In the chief event, the honors were carried off by Nanaimo teams (Canadian Western Fuel Co.), although those from neighboring centres gave them a close run.

In mine rescue competitions, there were six teams entered, and in the first-aid contests, eight teams competed. No. 1 Team (Captain David Brown, of Nanaimo) won the main contest in the mine-rescue contest, the Draeger apparatus being used, its score being 96 points. Second place was taken by the team representing the Reserve Mine (C. W. F. Co.) with 94.4 points. Its captain was Robert Laird. The judges were Mr. H. H. Sanderson, mine safety engineer, Seattle, Wash.; Mr. George Wilkinson, Chief Isnpector of Mines for British Columbia; and Mr. J. G. Daniels, mining engineer of the Pacific Coast Coal Mines. Chief Inspector Bagley, of the State of Washington, who had consented to act as a judge, was unable to be present owing to the recent explosion at Burnett, Wash., work in connection with which demanded his attention.

The first-aid contest for the Coulson Cup was won by Mr. J. W. Jemson's team, Nanaimo, the other members of which were Messrs. J. M. McGuckir, R. Shields, G. Langham and James West, while second place was taken by a Cumberland team, the personnel of which follows: Messrs. A. R. Stacey (captain), N. Bevis, J. Quinn, Wm. Beveridge and John Williams. The contest for the Department of Mines' cup and medals was won by No. 1 Team, Canadian Western Fuel Co., which was captained by Mr. Joseph Barton, with whom were Messrs. John Thompson, R. Charnock, James Brown and D. Stobbart. Second place was won by an Extension team, captained by Mr. Alex. Wright, the other members being Messrs. John Wright, Robert Houston, Allan McDonald and Alec. Brown. In the three-men event (first aid), a Nanaimo team, made up of Messrs. George Carson, J. A. Challinor and W. Carson, were successful. The two-men event went to Bevon, Cumberland, the winners being Messrs. J. G. Quinn and J. L. Brown.

Mr. Sloan, in distributing the prizes, referred to the importance of such meets from the standpoint of mining, and spoke of the importance of the competitions, which had just been held, as a means of perfecting the instructions of those taking part. He announced that the next year's contests would take place at Nanaimo, and preparations already were under way to make them the most important ever held in Western Canada: in fact, it was proposed that their scope should be enlarged to take in other sections of the Pacific coast. As the representative of the Nanaimo district in the local Legislature, a position of which he was proud, he intended taking an active part in seeing that it was made an outstanding event.

SMELTER CHARGES INCREASED.

The announcement by the Canadian Consolidated Mining & Smelting Co. of further increases in smelting charges has again somewhat stirred the mine operators of British Columbia and promises to bring prominently to the fore the agitation for a Royal Commission to investigate the affairs of the company, with special reference to the fairness or otherwise of its smelting rates. This matter is before the Dominion Government still, and it is expected that something will be known as to its policy at an early date.

Following is the company's latest statement:—

"Trail, B.C., July 31st, 1918.

"To Lead Ore Shippers:

"Since Schedule B lead-ore rates was published, we have been obliged to pay 40 cents per ton more for coke to the collieries, which under that schedule amounts to an increase of 10 cents per ton of ore. In addition to this, there may be an increase of freight on coke; but we are not certain yet of this, and there will be a further increase in price effective August 1st.

"We have been obliged to increase the wages at the smelter by 30 cents a shift, so that there is an increase of 45 cents per ton under Schedule B on this account.

"Effective August 1st, we will, therefore, increase the base rate under Schedule B by 55 cents per ton, plus 25 per cent. of the further increase in coke price and freight.

"Effective August 12th, rates on lead from Tadnac have been increased to $14.30 to Toronto, and $16.50 per ton to Montreal. The increase in freight rate from that which prevailed at February 1st is, therefore, $2.30 per ton on shipments to Toronto, and common points and $4.50 per ton to Montreal and common points. Commencing with shipments received here in August, we shall be obliged to make an adjustment on account of this freight increase.

"As there is considerable difference now between the Montreal and Toronto freight rates and it is impossible to forecast the distribution owing to variations in munition demand, we, therefore, as the simplest plan, to make this adjustment commencing with the ore received in August, by reducing the lead settlement price by the actual increase in the lead freight rates.

"We will advise you as soon as possible of the amount of the further increases in coke price and freight.

"Yours truly, "(Sgd.) S. G. BLAYLOCK,
"Assistant General Manager."

U.S. Navy Using British Columbia Coal.

Vancouver Island coal is being utilized by the United States Navy Department on a large scale, the Canadian Collieries (Dunsmuir), Ltd., having entered into a contract to supply as much as can be mined for export. One of the company's officials, in confirming the report, stated that there was no limit to the amount, it being understood that the Naval Department would take as much as could be delivered. Some weeks ago, the first cargo of coal under the new arrangement was loaded by a vessel of the U.S. Shipping Board's fleet at Comox for delivery at the Pearl Harbor Naval Station, Hawaiian Islands. Others have made calls for coal having a similar destination and all ships making their base at the Bremerton Navy Yard will burn Comox coal. This coal, some years ago, was subjected to exhaustive tests as to its suitability for use on American warships and, as a result, the British Columbia production was declared to be almost as good in steaming qualities as the American Navy standard.

DR. RUTTAN ON POTASH PRODUCTION.

"We are unable to state that there is any process going on in Canada at present where potash is being obtained economically from feldspar, in spite of announcements to the contrary," stated Dr. R. F. Ruttan, at a recent meeting of the Associate Committee on Chemistry of the Honorary Advisory Council for Scientific and Industrial Research. "There is one process that is commercially a success as far as it has gone, and that is hydrolysis of potash feldspar by means of lime and steam at a high pressure. This is being worked in New Jersey and on the Hudson River. The valuable product is a very high grade of brick for exteriors of high buildings, as its crushing strength, resistance to heat and hardness are better than other bricks, and about 6 or 7 per cent. potash is a by-product.

"It has been found that glauconite gives a better yield of the brick-making material and a better yield of potash than can be obtained from feldspar. This company is now utilizing the green sands of New Jersey for the manufacture of these bricks and potash. A report from British Columbia is that a bed of glauconite has been found there. If true, this can be utilized for obtaining potash. The same thing was found in connection with the ash from straw. In each case, the combustion is so rapid that the draught carried away most of the ashes. Condensation of potash salt from vapors of cement works has been a source in the United States, and one firm in Canada has introduced a few condensation pipes for experiments. Analysis of the material used in this plant justified the expenditure necessary to install a Cottrell system. There is no reason why analysis should not be made of the cement dust of all our large cement works through the country, and many, I am sure, could produce sufficient potash to justify the Cottrell process.

"A good deal of potash is now coming in Canada from hardwood ashes. The old industry of collecting these ashes and leaching them for their potash has been renewed in some of the cities, but how much is resulting from this source cannot be estimated. Glauconite is worked in England simply for its potash.

"Some investigations are being carried on in the Kingston School for Mining regarding the use of the nepheline syenite. This rock contained four or five per cent. potash. Progress is now being made in preparing a fertilizer from this rock. I am not sure whether it is a commercial success or not. Every encouragement has been offered those who are investigating methods for obtaining potash from feldspar. So far, there is no absolute proof that any of these processes are commercial."

TEMISKAMING.

The directorate of the Temiskaming Mining Company, Limited, has issued a special report to the shareholders. Production for the five months ending May was 391,367 ounces, while the ore reserves are estimated by the manager at 101,498 ounces. During the six months ending June last considerable development work was carried on, the footage in drifting, cross-cutting, winzing and raising totalling 1,496.2. There are still on the property three unexplored areas in which there are said to be reasonable possibilities of finding commercial ore bodies. It is ten years since the mine began shipping silver, while the total shipping production up to the end of 1917 was 10,837,021 ounces.

GRANBY PLANTS AT PHOENIX AND GRAND FORKS CLOSED DOWN.

From a mining standpoint, what is known as the Boundary District of British Columbia has suffered a blow in the recent closing down of the Phoenix Mines of the Granby Consolidated Mining & Smelting Co., with the consequent discontinuance of operation of the Grand Forks B.C. smelter. The absence of this industry, apart from the general indirect effect, means a serious loss to the West Kootenay Power & Light Co., which for years has supplied power for this plant, and to the small mine operators accustomed to make shipments of ore to the smelter for treatment, besides throwing many employees out of work. The explanation given by the company is that it is no longer profitable to handle the low-grade ore of the Phoenix mines, because of increased costs, among those things, instances being the increase in the cost of hydro-electric power, increased price of coke and increased railway freight rates.

These mines, it is pointed out, have been operated for some time on an exceedingly narrow margin, it taking 22½ cents per pound to produce a pound of copper from the ores because of the high costs. With the old U.S. Government price of 23½ cents per pound, there was a margin of profit of one cent. The subsequent increase to 26 cents per pound did not make the difference that might have been looked for, owing to the almost simultaneous rise in freight charges, etc.

The operation of the Phoenix Mines began in 1901, when, under the management of the Granby Company, they produced 169,087 tons. In that year the first smelting furnace of 300 tons capacity was completed and produced 8,871 ounces of gold, 34,990 ounces of silver and 5,435,955 pounds of copper. Additions to the smelter were made from time to time until its daily capacity attained 4,500 tons a day. The converter plant was established at Grand Forks in 1902, and its capacity increased in 1909.

The Phoenix Mines have produced up to the end of the last financial year, according to conservative estimates, ore to the value, approximately, of $55,550,000, or nearly 10 per cent. of the total mineral production of British Columbia up to June 30th, 1917.

Hope has not been abandoned of persuading the Granby company to continue its operations in this district and, in this connection, Mr. J. E. Thompson, member of the local Legislature for Grand Forks, states that the company's plans must not be accepted as contemplating the abandonment of the camp, even temporarily. He asserts that it is most probable that, after affecting some repairs to plant, the industry will be re-established.

The main operations of the Granby company are on the coast. The Hidden Creek mine being a very large producer. The company's smelter at Anyox is making a large output.

NEW ISSUES.

The Department of Finance is circulating a memorandum respecting the regulation of issues of securities and shares under the order in Council of December 22, 1917. It is again pointed out that the provisions of the order apply to the issue of securities and shares under all circumstances, whether offerings are to be made to the public or not, and that no issue can legally be made until the consent of the Minister of Finance has been obtained. Details are to be furnished both as to how the proceeds of the issue will be used and as to how it is proposed to dispose of the securities or shares.

NIPISSING.

In his report to the President and directors of the Nipissing Mining Company Manager Hugh Park says that during the month of August the company mined ore of an estimated value of $250,737 and shipped products from Nipissing and customs ore of an estimated net value of $484,978.

"Underground work," says Mr. Park, "continued as heretofore, and some small veins were encountered at 73 shaft and at 96 tunnel. They are sufficiently encouraging to warrant further development. Development on all the 'town' veins was somewhat hampered during the month on account of the aerial tramway line connecting 73 shaft with the low-grade mill being partly destroyed. Several stores situated underneath the tram line were consumed by fire. The line was out of commission for ten days. During that time it was impossible to hoist any ore from 73 shaft, and it was necessary to provide the low-grade mill with tonnage from the township side of the lake. Most of that tonnage was low-grade material. Consequently, the production from both the washing plant and the low-grade mill for the month was decreased. The high-grade mill treated 98 tons and shipped 462,965 fine ounces of silver. The low-grade mill treated 6,890 tons."

KERR LAKE.

During the month of August the Kerr Lake Mining Company produced upwards of one-quarter of a million ounces of silver. This compares with 231,000 ounces in July. With the exception of the month of May, the August record was the highest in the Kerr Lake's history. The company's fiscal year ended August 31st, with a total output for the year of upwards of 2,575,000 ounces.

SHIPPING COPPER ORE FROM TIDEWATER

An extensive programme of development is being carried out on the property of the Tidewater Copper Company, Sidney Inlet, Vancouver Island, according to Mr. W. G. Tanner, vice-president of the company, who has returned from the mines. At present, the old workings are being opened up, and to facilitate shipments a tunnel is being driven through the mountain, while a small railroad is under construction connecting with the bunkers and the wharf. Mr. Tanner reports that a shipment, valued at $20,000, was made recently to the Tacoma Smeltery.

The Tidewater is an old and well-known British Columbia mining property, having been operated first by the late Lieut.-Governor Dwedney and associates. They shipped some 10,000 tons of 4 per cent. copper ore and development carried to the point of uncovering a considerable body of good ore. At that time, however, the price of copper was not high enough to make the property profitable, and it was closed down. Since the outbreak of the war and the consequent increased demand for copper, together with the advance in prices, it again, in common with other mines of similar condition in this province and elsewhere, attracted attention and finally was taken over by its present operators.

The demonstration float arranged by the Hull Iron & Foundries, Ltd., for the Labor Day parade, which showed men actually engaged in pattern-making, moulding, core making and pouring metal, won the cup awarded for the best exhibit in the Ottawa-Hull parade.

BRITISH COLUMBIA INTERESTED IN GOLD CONFERENCE AT SPOKANE.

An invitation was extended Hon. Wm. Sloan, Minister of Mines of British Columbia, to attend an international conference to be held at Spokane, Wash., on the 5th and 6th of September, for the purpose of discussing the world's supply of gold and the best means of stimulating the production of the precious metal in the Northwest. Mr. Sloan expressed his appreciation of the importance of the matter and gave his pledge that the province would be represented at the conference. While the question is one of general interest to the mining fraternity, it perhaps is of special interest to British Columbia, because the Rossland Camp, in years past one of the most stirring of the province, has been practically closed down owing to the steadily declining purchasing power of the dollar and the ever stationary value of gold. The reasons given by the Canadian Consolidated Mining & Smelting Co. for the discontinuance of work at Rossland have been given already in these columns. It may be said, by way of explanation, that the company takes the simple position that the cost of mining—material, labor, etc.—has made the operation of the mines in question unprofitable.

MARKETS

TORONTO MARKETS.

Cobalt oxide, black, $1.50 per lb.
Cobalt oxide, grey, $1.65 per lb.
Cobalt metal, $2.50 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 12 cents per lb.

Sept. 12, 1918—(Quotations from Canada Metal Co., Toronto).
Spelter, 11 cents per lb.
Lead, 10¼ cents to 10½ cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 30 cents per lb.
Electrolytic, 29½ cents per lb.
Ingot brass, yellow, 21 cents; red, 26 cents per lb.

Sept. 12, 1918—(Quotations from Elias Rogers Co., Toronto).
Coal, anthracite, $11.00 per ton.
Coal, bituminous, nominal, $9.25 per ton.

NEW YORK MARKETS.

Copper—Fixed for the period August 7 to Nov. 1, 1918, at 26 cents per lb.

Tin—Prices are nominal. Supply is controlled by the American Iron and Steel Institute.

Silver—The U.S. Treasury announced on Aug. 15 that the maximum price was fixed at $1.01½ per ounce.

Lead—The producers' price is 8.05 cents per lb.

Zinc—The U.S. Government price for Grade A spelter until the end of 1918 is fixed at 12 cents per lb.

SILVER PRICES.

	New York cents.	London pence.
September 12	101⅛	49½

Nipissing Mines Company, Ltd., has declared a dividend of 5 per cent., and bonus of 5 per cent., payable October 21 to shareholders of record of September 13.

STANDARD MINING EXCHANGE.

(Messrs. J. P. Bickell & Co., report the following quotations on the Standard Stock & Mining Exchange, Sept. 12, 1918.)

Gold.

	Ask.	Bid.
Apex	.03½	.03¼
Boston Creek Mines	.20	...
Davidson Gold Mines	.34	.32
Dome Cons. Mines	.03	...
Dome Extension	.15	.14½
Dome Lake	.14	...
Dome Mines	9.45	9.25
Eldorado	...	.½
Elliott Kirkland	.38	...
Gold Reef	.02	...
Hattie Gold Mines	.75	...
Hollinger Cons.	5.10	4.95
Keora	.07½	.04
Kirkland Lake	...	.37
Lake Shore Mines, Ltd.	.70	.68
McIntyre	1.49	1.48
Moneta	.07½	.07
Newray Mines, Ltd.	.16	.15
Porcupine Crown	.14	.13¼
Porcupine Imperial	.02	.01½
Porcupine Tisdale	.01½	.01¼
Vipond	.14	.13¾
Preston East Dome	.03½	.03¼
Schumacher	.21	.19
Teck-Hughes	.25	.22
Porcupine V. N. T. Gold Mines	...	.13
Thompson Krist	.05	.04⅞
West Dome	.09¾	.09½
Wasapika Gold Mines, Ltd.	.30	.25

Silver.

	Ask.	Bid.
Adanac	.07½	.07
Bailey	.03¾	.03½
Beaver Consolidated	.30	.29½
Chambers-Ferland	.11	.09¾
Crown Reserve	.22	.17
Foster	.03	.02
Gifford	.02¾	.02½
Great Northern	.05	.03½
Hargraves	.04¼	.04⅛
Hudson Bay	22.00	20.00
Kerr Lake	...	5.50
La Rose	.54	.52
Lorrain Con. M. Ltd.	.02	...
McKinley-Darragh-Savage	.42½	.41
Mining Corp. of Canada	2.70	...
Nipissing	9.00	8.80
Ophir	.06	.05¾
Peterson Lake	.09¾	.09½
Right of Way	.04	.03
Seneca-Superior	.01½	...
Silver Leaf	.01	.⅞
Temiskaming	.31	.30¾
Trethewey	.28	.27
Wettlaufer	.07½	.04½
York Ont.	.02	.01⅛

MINING ACTIVITY IN WESTERN BRITISH COLUMBIA.

Mr. W. M. Brewer, Resident Mining Engineer for the Western District of British Columbia, speaks most enthusiastically regarding present conditions in regard to the mining industry in this section of the province. He says that in over twenty years he has never seen the prospect more encouraging. Some of the activities that have come to his attention are thus summarized: The Phelps-Dodge interests have taken bonds on the Fraser Group (East Sooke); the Ladysmith Smelting Corporation has bonded the Willow Grouse, Cowichan Lake; the Ralph Properties are under charge of Mr. Aldrich, New York, ex-manager of the Trail Smelter; and the Sunlock Mines, Jordan River, are being run by Mr. Pat. Stewart for an all-Vancouver Company. In the Alberni Canal region Mr. Samuel Ryder, of St. Albans, England, has installed new bunkers and a compressor plant at the old Monitor mine, which was sold three years ago for taxes. It is reported that a large body of ore has been blocked out. At Quatsino Sound, also Vancouver Island, the Coast Copper Co. is working the Old Sport Group on Elk Lake and plans are said to be under way for a sixteen-mile railroad from the mines to the coast. At Sidney Inlet, the Tidewater Copper Co., of New York, is working on the Indian Chief Group, a former Dwedney holding, and at Knights Inlet the Princess and Union Groups are being operated. Work is proceeding on the Texada Island properties and prospecting forces are working everywhere, particularly on Hervis Inlet.