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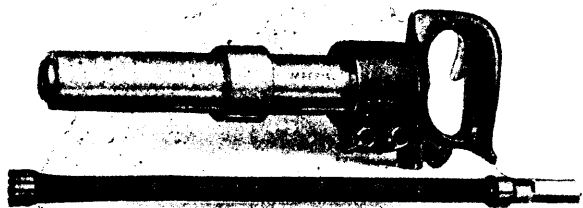
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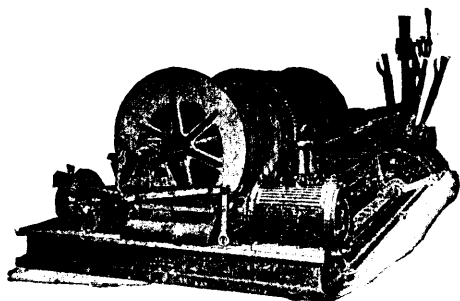
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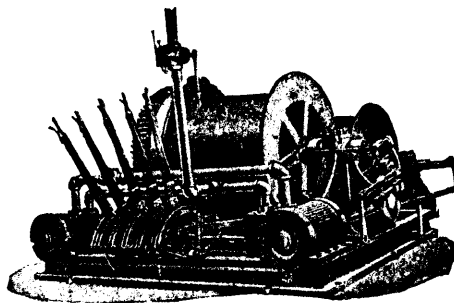


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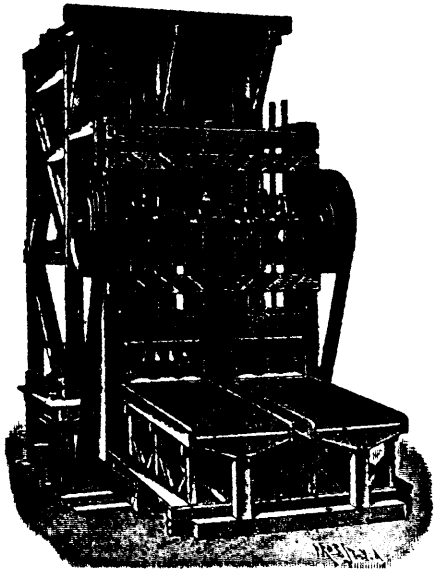
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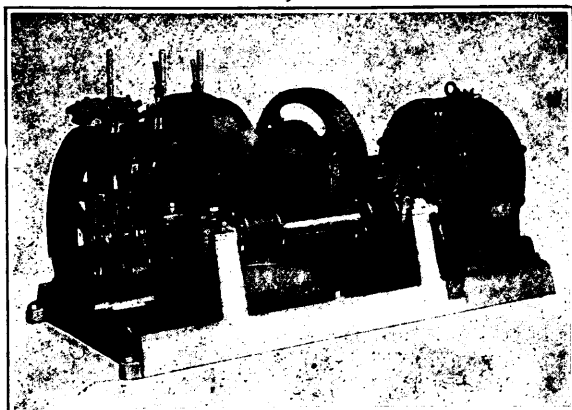
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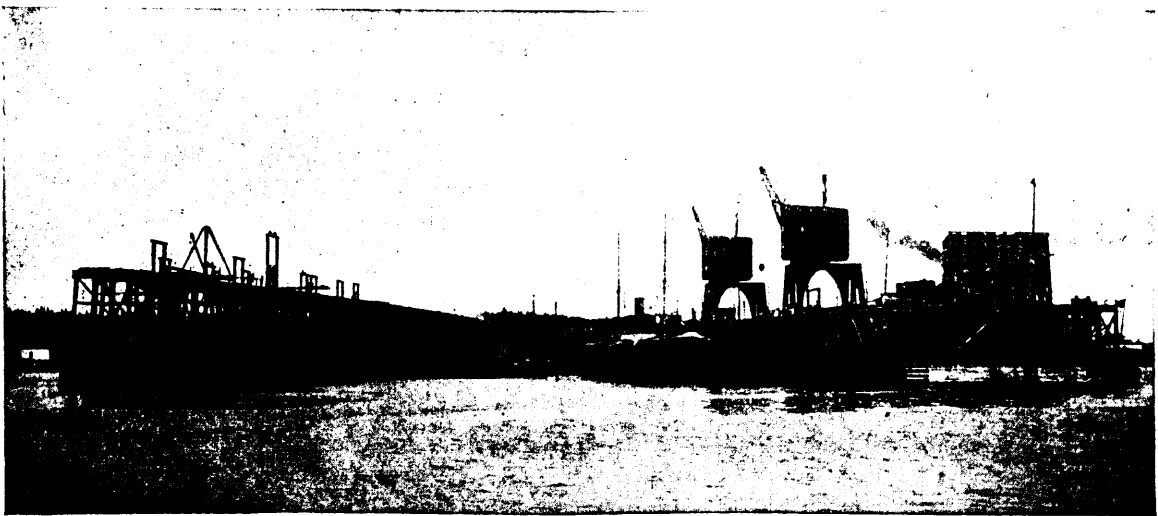
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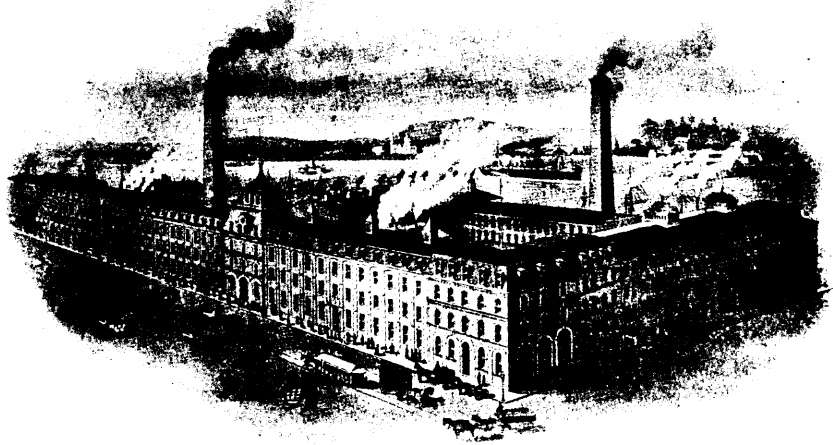
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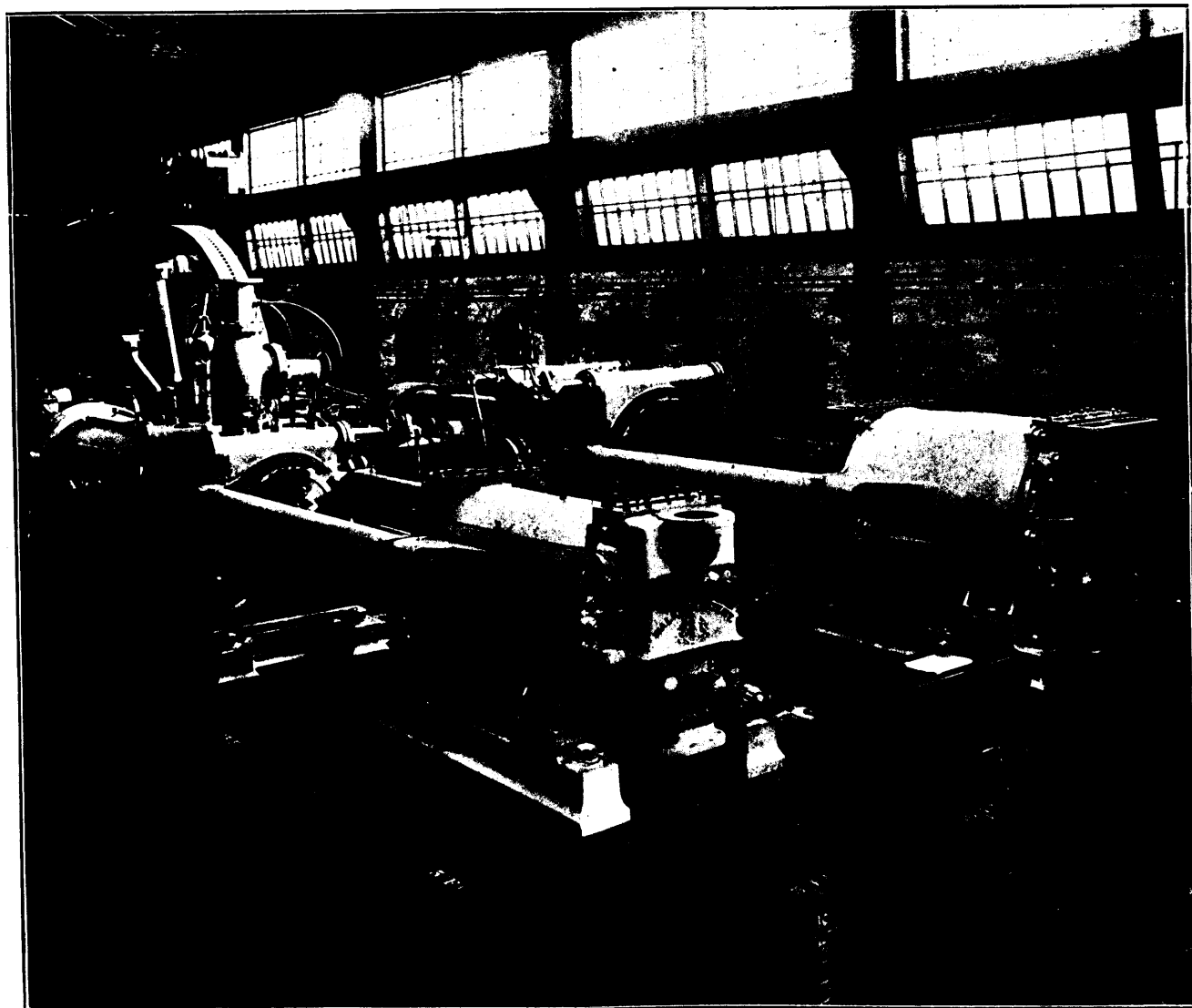
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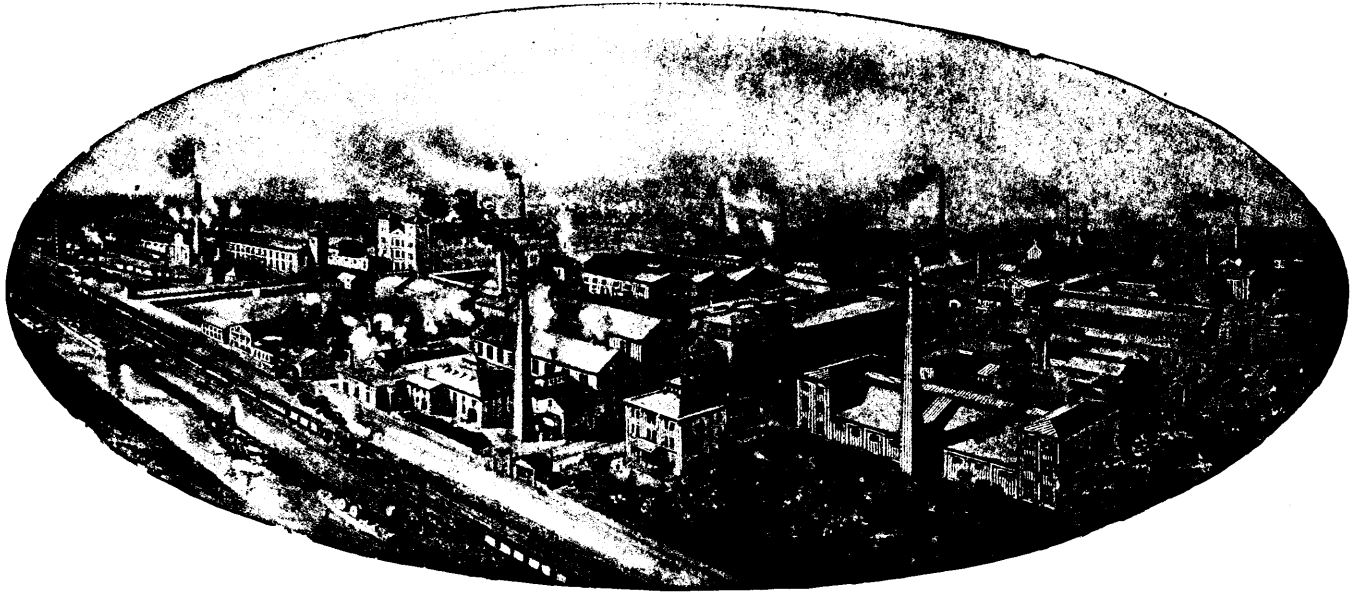
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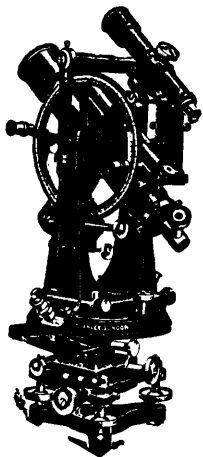
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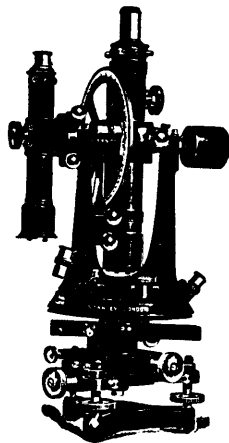
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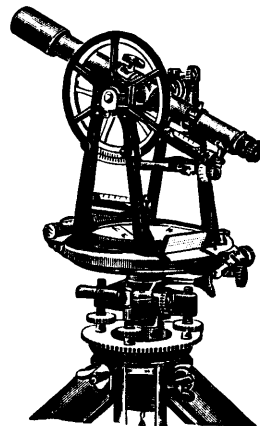
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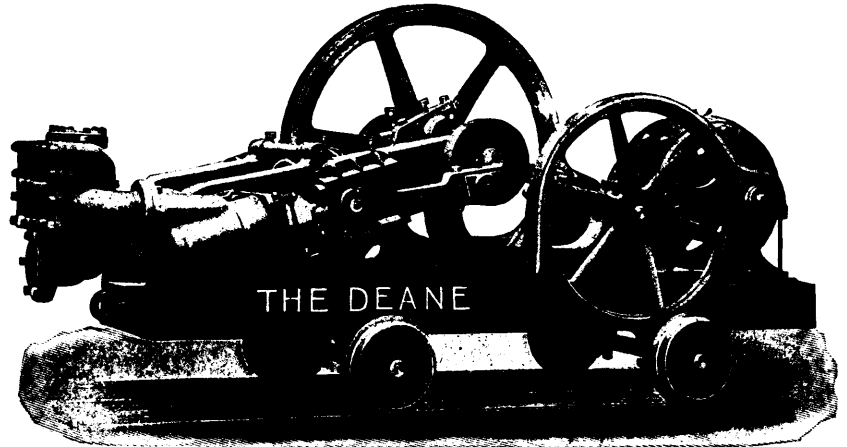
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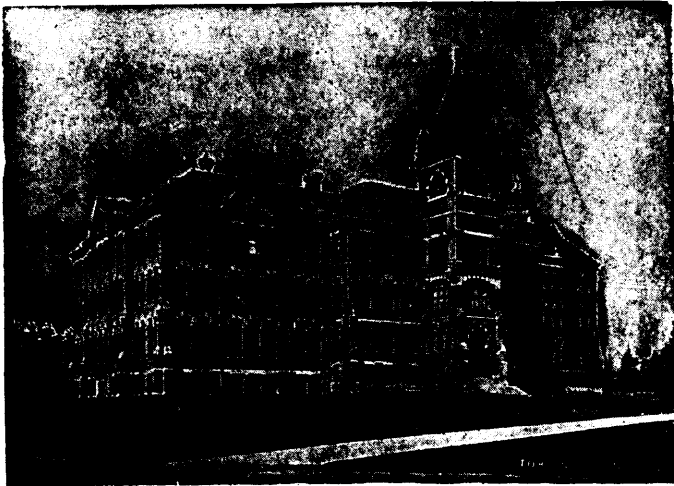


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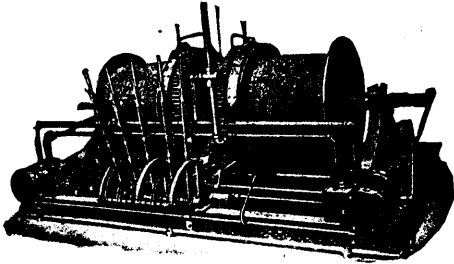
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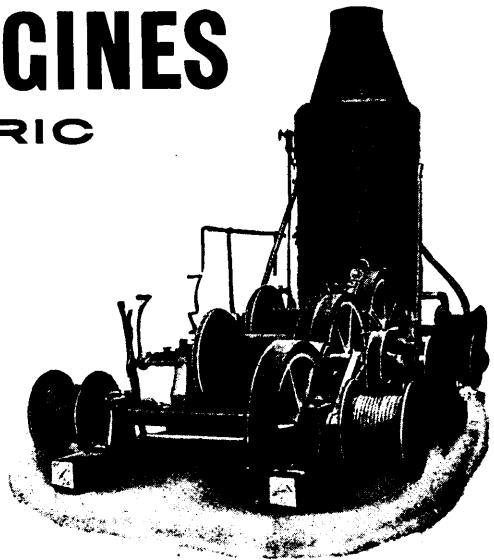


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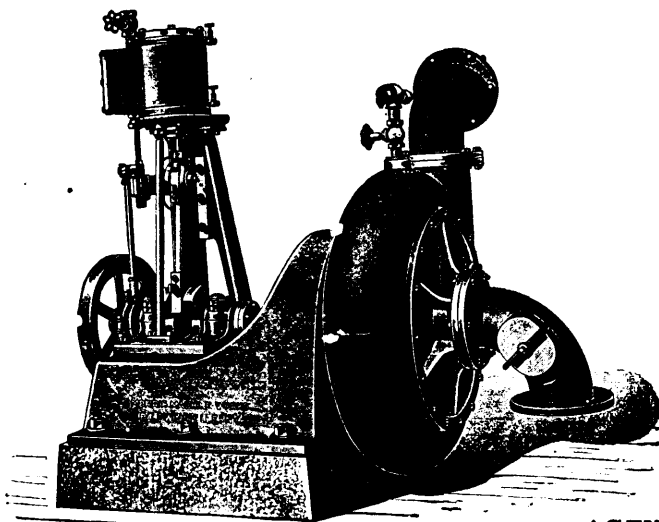
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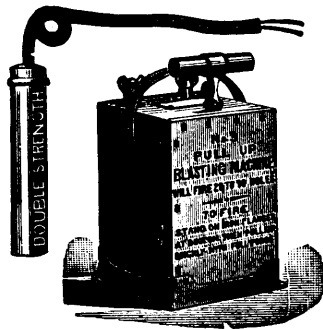
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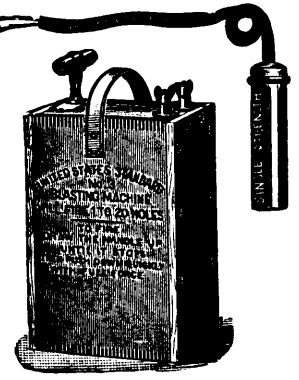
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Under the direction of J. A. McAndrew, Esquire, Official Referee, there will be sold by Messrs. Suckling & Co'y, Auctioneers, at their auction rooms, 66-68 Wellington Street West, in the City of Toronto, on Saturday, the sixteenth day of September, 1905, at the hour of twelve o'clock noon, the mines, plant, machinery and assets of Laurentian Mining Company, Limited, as follows:—

Mining locations in Manitou Lake Region, District of Rainy River, Algoma, Province of Ontario, Canada, consisting of H. P. 400, H. W. 21, H. W. 22, H. W. 207, H. W. 252, H. W. 265, H. W. 266, H. W. 267, H. W. 248, and H. P. 371, aggregating 577 acres more or less, together with buildings and machinery as per inventory, amounting to.....\$38,444.98

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The properties may be inspected on application to E. R. C. Clarkson, Esquire, 33 Scott Street, Toronto, where the Stock Sheet and detailed schedule of assets may also be inspected.

TERMS OF SALE.—10 per cent in cash at time of sale; 2 1/3 per cent. on completion of sale, and balance in two and four months, satisfactorily secured, and with interest at seven per cent. (7%).

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Pursuant to the Winding Up Order in the matter of The Volcanic Reef Mining Company, Limited, there will be offered for sale with the approbation of J. A. McAndrew, Esquire, Official Referee, by Suckling & Company, at their Auction Rooms, 66-68 Wellington Street West, in the City of Toronto, at twelve o'clock noon, on Saturday, the sixteenth day of September, A.D. 1905, the following:—

Mining locations situate in Manitou Lake Region, District of Rainy River, Algoma, Province of Ontario, Canada, consisting of the following:— H. P. 377, S. 39, S. 40, S. 41, S. 42, H. W. 206, H. W. 255, H. W. 326, H. W. 327-8-9, H. W. 330, H. W. 331, H. W. 626, H. W. 749, H. W. 750, H. W. 751, H. W. 772, H. W. 773, containing in all 1,050 acres, more or less.

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The purchasers shall pay a deposit of ten per cent. of the purchase money at the time of sale, 2 1/3 per cent. within ten days thereafter and the balance in two and four months, satisfactorily secured, with interest at 7%.

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Further particulars may be had from the Liquidator, E. R. C. Clarkson, 33 Scott Street, Toronto, or his Solicitors, Messrs. Parker & Clark, 59 Yonge Street, Toronto.

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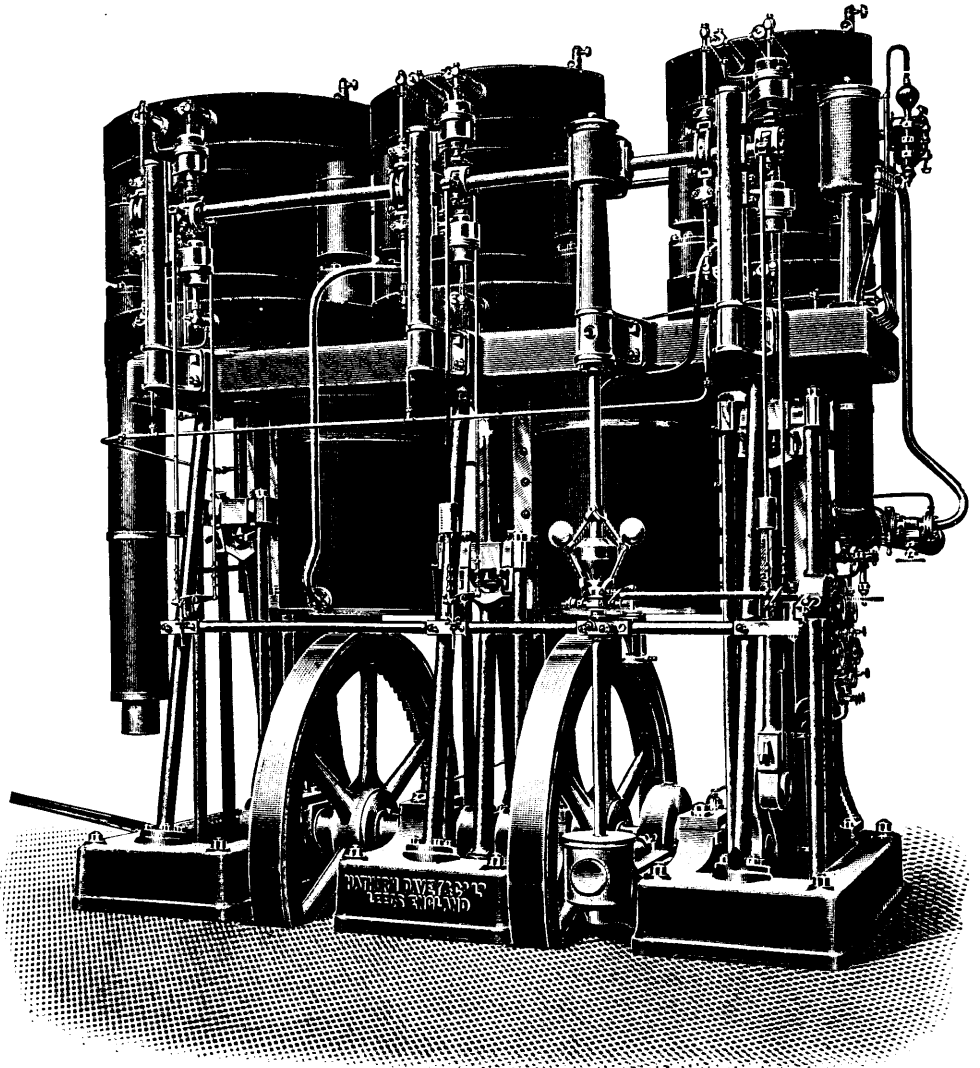
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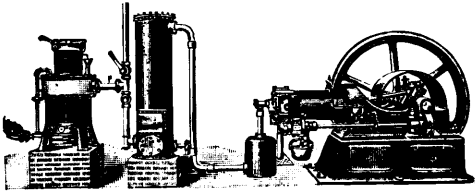
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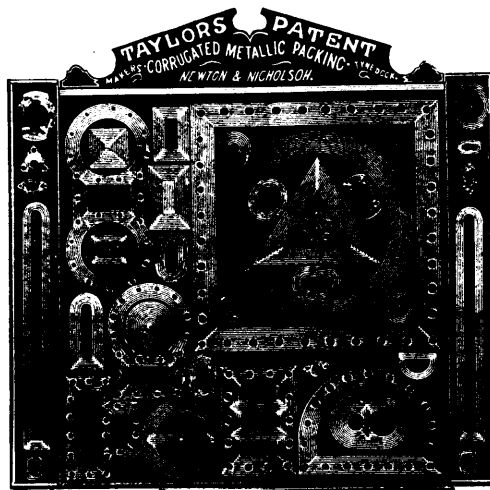
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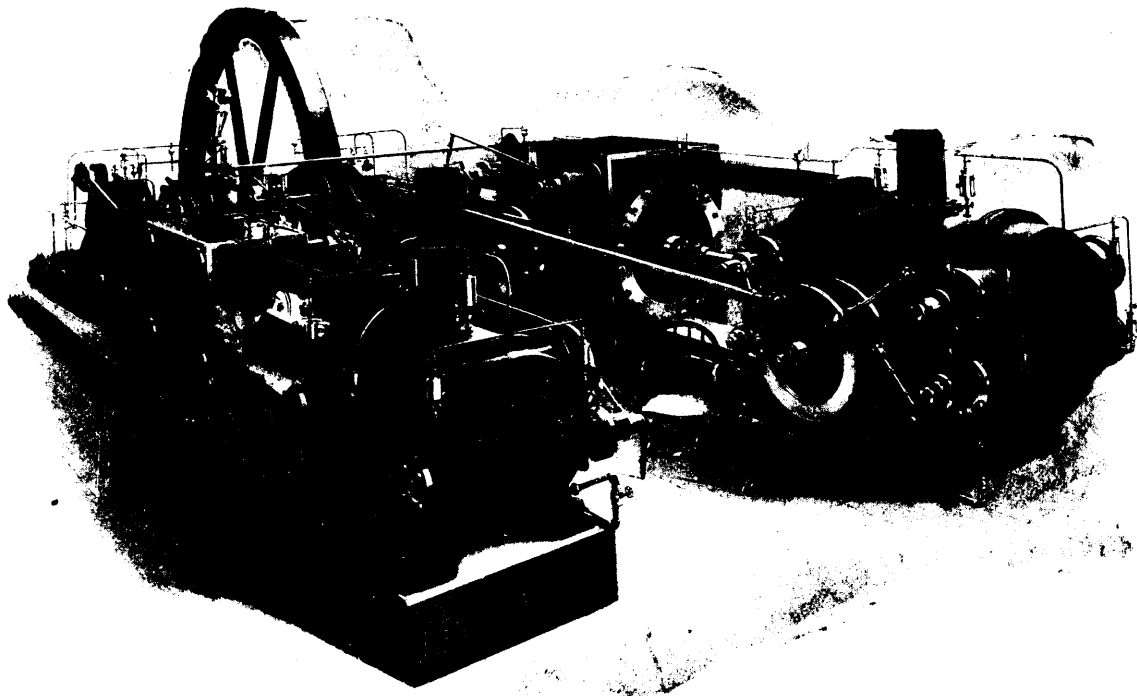
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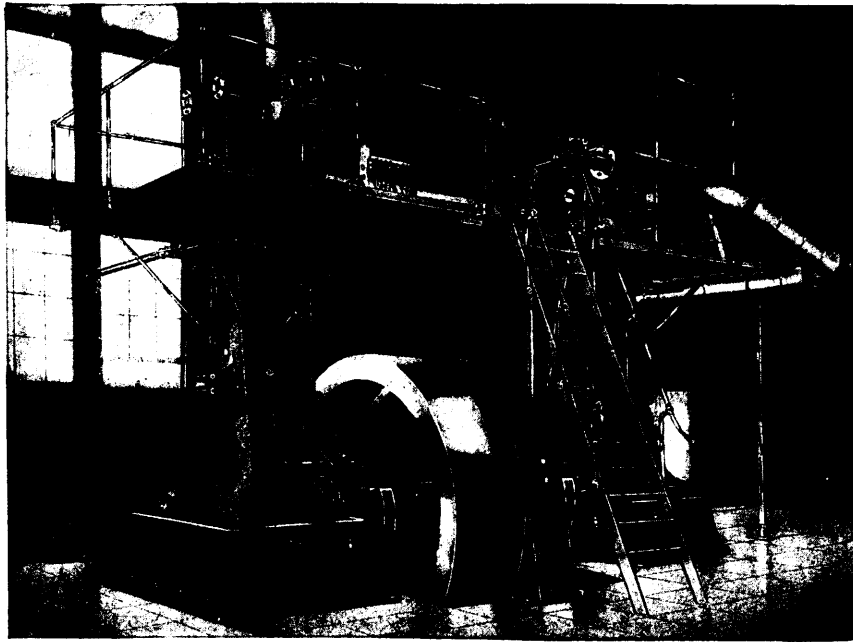
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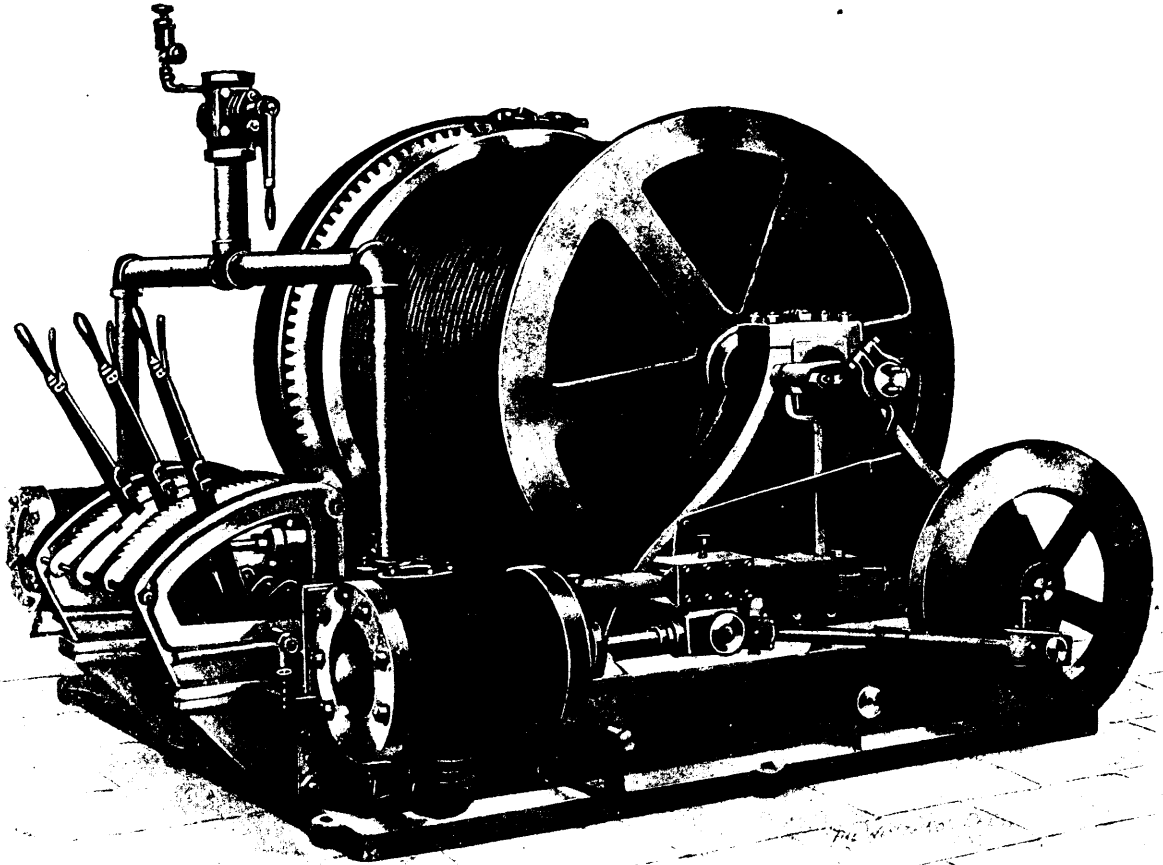
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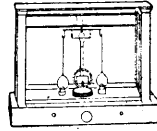
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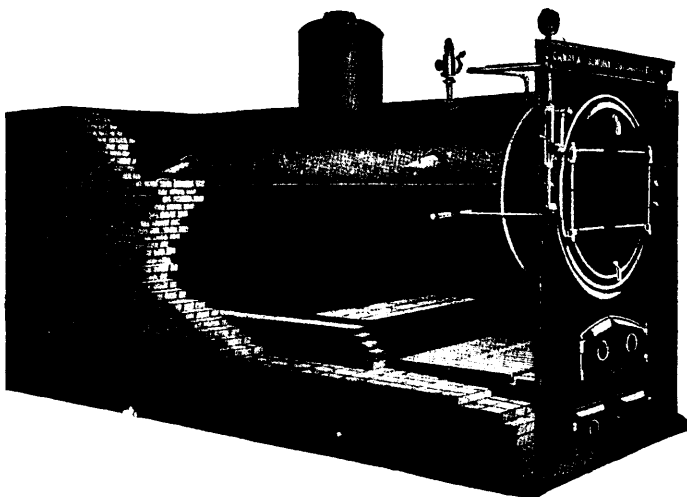
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Fort Frances, Ontario, is much delighted with the report of a Dr. Lawrence, who, in company with Mr. J. H. Hall, has recently visited the iron region north of Fort Frances and near Pipestone Lake. Dr. Lawrence is reported to have said that he considers the Pipestone range as the "greatest iron range on this continent." It is regrettable that the Doctor did not impart to the local reporter some facts as to the composition of the ores, their contents in iron, silica, sulphur, etc., and some equally important facts as to the freedom of the deposits from intercalated bands of stone. Such information might qualify the word "greatest" in the Doctor's statement.

It is stated that the gold mining areas of the Yukon are suffering this year from a shortage of water, and in consequence the output from the North this season will again show a further decrease. Meanwhile, the assistance of the Federal Government in the building of dams and reservoirs to insure in future a more constant supply of water is being sought, and as in a recent speech Mr. McInnis, the newly appointed Governor, expressed the view that aid in this direction should and probably would be accorded, the petition of the miners will doubtless meet with a favourable reception. The Yukon, it may be remarked, is, perhaps, in this regard, fortunate in being a territory and not a province.

The newspaper reports anent a Government smelter at or near North Bay should be taken only for what they are worth. In all probability such a smelter would quickly get into the hands of a few men, and would not, ultimately, be of advantage either to the Province or miners. Probably this talk of a Government smelter has arisen from the activity of various members of the Government and its employees in connection with the rumored incorporation of a million dollar company. Also there is evidence of other substantial people erecting reduction works for the treatment of nickeliferous pyrrhotites from any part of Ontario, as well as the argentiferous cobalt ores of Temiskaming. The more the merrier for the miner—but certainly not the merrier for the capitalist. Competition will evolve cheaper methods and lower costs, even though the interest earned on capital is decreased. Then by all means let there be competition, but first (it might be whispered) let there be an assured life to deposits: at present there is none.

Here is a very fine specimen of mining news as she is "writ," which, by the way, has been freely published by the London financial press, notably the *Rialto*. The suggestion of a "torrent of gold flowing to the cities of the North West" is decidedly "rich." We observe that the *Rialto* credits this startling piece of intelligence to the *Mining and Engineering Review* of San Francisco:—

"A vast field of placer gold, hidden for centuries beneath the swirling sands of the turbulent Fraser River, will this year be trodden by thousands of

eager men, many of whom have grown grey for an opportunity to delve into the submerged wealth. Not in almost half-a-century, since 1858, has the stream been so low nor the bars of golden sand so exposed, and it is predicted that the torrent of gold that will flow to the cities of the North West from Hope, B.C., the headwaters of the Fraser, 700 miles distance, will be greater in 1905 than in all the years since the memorable rush of the fifties. Hundreds of miners are rushing to the placer fields, and it is said that thousands will swarm over the bars in a few weeks. The bars, which have not been disturbed since 1858, are reported to be exceedingly rich in gold. Great excitement prevails on Puget Sound and in British Columbia."

The Canadian Copper Company having decided to build a plant for the treatment of the auriferous mispickel ores coming from the "Big Dan" and "Leckie" properties in the Temagami Lake (Nett Lake) region, have lost no time in putting this decision into practical form. A stack is now building of a capacity to treat 100 tons of ore daily, as a minimum, and the condensation chambers for recovery of the arsenic values are also under way. The framing of the building to cover the furnace is completed, and the work of putting on the iron covering is well advanced. The plant is located at Copper Cliff, and, when completed, will represent an investment of rather over \$50,000. For the gold and silver values in the mispickel the Company will pay 95 per cent. of the assay value, and will also pay for arsenic contained at the price of one cent per lb. For nickel and cobalt values no permanent scale has been made, but it is understood that the basis of Mr. E. P. Earle's offers will be adopted, viz.:—For quantities above 5 per cent., 12c per lb. for nickel, and 35c per lb. for cobalt. The connection between Mr. Earle and the International Nickel Company, which has been conjectured for more than a year, is now admitted. It is also certain that Ledoux & Co. will attempt the erection of sampling works near Cobalt if the miners give the firm encouragement.

There is a great deal of ignorant and loud clamor urging the Ontario Government to impose royalties on the rich cobalt ores of Northern Ontario. If such a course be now adopted it would be illegal and wholly unwarranted. A royalty is a form of taxation, and the Legislature not the Government is alone able to authorize taxation. It is true there was formerly in force in the Province a system of royalties, but subsequently all royalties were abolished by the Legislature, and this was done unanimously as such a system of royalties was found injurious to the public interests. The present mining laws of Ontario give to prospectors a statutory right to explore on public lands with certain exceptions and carefully define the terms on which lands found to be valuable for minerals may be acquired. Faith should be kept with prospectors and explorers, and the conditions on which they may acquire mining claims should not be arbitrar-

ily changed without due notice. It may be that changes should be made in the Ontario Mining Laws, but such changes should be made only after careful consideration and after full discussion in the Legislature. Nothing is more important than a permanent, stable mining law, and it is therefore desirable that the amendments made to the Ontario Mining Law at the next session of the Ontario Legislature should be well and carefully considered. We would recommend to those concerned a careful study of the provisions of the mining laws of Mexico.

We have received a communication from a Mr. F. G. Hartmann, of New York, calling attention to a competition that has been inaugurated by the International Association for Labour Legislation, of Basel, Switzerland, offering prizes aggregating several thousand dollars for the best treatise on the effective prevention of lead poisoning to which men employed in mining, milling, smelting and refining of lead ore are subject. Prizes are offered as follows: A prize of \$1,200 for the best treatise on the prevention of lead poisoning in the operation of mining and milling lead ores or ores containing lead. A prize of \$2,400 for the best treatise on the prevention of lead poisoning in smelting and refining works. Two prizes, viz.: One first of \$600; one second, \$360 for the best treatises on the prevention of lead poisoning in the chemical application of lead, as in white lead works, manufacture of other lead paints, of electric accumulators (storage batteries), etc. Four prizes, viz.: One of \$360; one of \$240; two of \$180 each, for the best treatises on the prevention of lead poisoning in the trades of house, ship, coach-painting, interior decoration, varnishing, and the like. Four prizes, viz.: One of \$360, one of \$240, two of \$180 each for the best treatises on the prevention of lead poisoning in those trades where raw and manufactured lead are consumed or handled on a large scale, as in type foundries or printing offices. The competition closes on the 31st of December, 1905. Any of our readers desiring fuller particulars would do well to apply to either Mr. Hartmann, whose address is 327 Central Park West, New York, or to the International Labour Office, Basel, Switzerland. The present object of the Association is to be commended, and we trust that the competition will be productive of suggestions of real value.

The London correspondent of the *Engineering and Mining Journal*, writing recently in reference to the affairs of the Tyee Copper Company, remarks that after the rosy reports of a year ago, the present position of affairs, by which it is stated that the ore body is showing signs of exhaustion, has caused considerable surprise. The writer continues, that up till quite recently it was supposed that the company's affairs were on an excellent footing: that the ore bodies were extensive and developing well, and the smelter in full operation, making an excellent profit. If these were really the impressions obtaining until recently in London, it was certainly not

the fault of the mine management, as Mr. Edward Musgrave, in his report of 1903 and 1904, emphatically points out that the future of the mine depended on the successful exploitations at depth, while it was mentioned last year that the indications were none too promising. The correspondent proceeds to say that as the control of the company has now changed hands and Mr. Livingston's friends are in the minority on the Board, the policy and methods in the management of the mine will be changed to some extent. It is difficult to see how the mine and smelter management of the last two or three years, which has been conservative and sound in every particular, can be greatly improved on; in fact, had every British owned mine in British Columbia been operated as efficiently and economically as has the Tyee since (say) 1902, the British public would have little to complain of in this respect, and the percentage of failures would have been materially lessened. After all, the original Tyee shareholders have not done very badly, and have really no very serious ground for complaint, since they have already received a fair return on their investment. Meanwhile, there is, of course, still hope that new ore bodies will be encountered.

It is some time since metal market conditions, more especially in respect to the prices of copper, silver and lead, were so satisfactory to the miner as at present, and British Columbia in particular has great cause for rejoicing with copper in the neighbourhood of sixteen cents, silver at over sixty, spelter at nearer \$5.75 than \$5.50 and lead on the London market at over £14 10s—though in the latter respect the advance in market prices will exert a lesser influence on production in this country, since there will be a corresponding decrease in bounties paid under the conditions of the Act. But British Columbia is first and foremost a copper producing country, or, rather, its reputation and future importance as a mineral region will largely rest on the successful development of copper mines. The average price of copper in 1904 was, and on this basis the value of the province's copper output was \$4,578,037. Had the average price of copper been fifteen cents last year the value of this production would have been available for distribution in the form of dividends to investors. The case might perhaps, however, be put more plainly by assuming that (say) the Granby Company is mining 1 1-2 per cent. copper ore, which with copper at eleven cents is equal to \$3.30 per ton; with copper at sixteen cents this same ore (for this purpose, not taking into account gold or silver values) is worth \$4.80 per ton. As the Granby Company is now mining in the neighbourhood of 12,500 tons a week, an advance therefore of \$1.50 per ton in copper values is equivalent to a gain of \$18,750 on the weekly output of ore, or roughly \$950,000 per annum. Other copper companies operating on a large scale in the Boundary district of British Columbia and the Ontario nickel-copper and copper producing properties will, of course, benefit in a proportionate degree. Present

copper prices are, perhaps, somewhat abnormally high, though taking into consideration the enormously increased consumption even this is questionable. The conditions to-day, in short, are very different to those obtaining in 1901 when high prices were the result of manipulation. The steady upward tendency of values which has taken place this year is evidently in obedience to the law of supply and demand, for if production is now greater than it has ever been, consumption shows a still larger ratio of gain, and has absorbed all the accumulation of recent years.

It is not often that we have occasion to commend the utterances of the daily press of Ontario when mining affairs are the subject of discussion, and it is, therefore, a pleasant duty to endorse the opinions as expressed by the *Toronto Mail and Empire* in a recent leading article on the subject of "Americans in Temiskaming." Much frothy boomistic and inexpensible nonsense has been published of late in the columns of the *Toronto Globe*, which seems to have profited nothing by the history of the last few years of Canadian mining, either east or west; and this important newspaper has had scores of imitators who have repeated the silly cry on the danger of allowing aliens to obtain control of valuable properties in the new district. Demands for the imposition of a big royalty, for the reduction of the size of claims "in the interest of the poor citizen" (save the mark!), and for the exclusion of foreigners are but a few of the ill-considered proposals set forward. When, therefore, the *Mail and Empire*, in a calm and dispassionate manner, discusses the desirability of permitting aliens to develop the mines of the province, it is a matter worthy of remark and congratulation. Our contemporary thus adequately comments on the situation:

"In some quarters concern is expressed at the interest taken by Americans in the ore deposits of Temiskaming district. Attracted by the remarkable discoveries made there, hundreds of mining men from the other side of the line have gone into the district to locate and acquire claims. When a promising claim is offered for sale these newcomers are usually keen bidders for it. This activity excites apprehension in the minds of sane Ontario people, and moves them to suggest that measures be taken to prevent aliens getting possession of the district. It is highly desirable that Canadians or other British subjects should take the lead in developing the mineral wealth of the Temiskaming country, and that they should receive the fair fruits of their enterprise. But the working of the mines and the rendering of their contents into merchantable products are of more public importance than is the pecuniary advantage of any individual, whether citizen or alien. The minerals are in the earth, and can be of no use to the country until they are taken out and utilized. If in our own country the enterprise required for their conversion into wealth is lacking, then it ought to be welcomed when it comes forward from some other country. Citizens of the

United States could be debarred from the right to hold mining lands in Ontario. To place them under such a disability would be no more than is done in several of the States with regard to aliens generally. But it would be illiberal, and would retard the development of the province's mineral resources. The fewer restrictions there are on the buying and selling of mining rights the less is development likely to be checked by the speculative holder. It is indispensable that our mines be opened, whether by foreign capital or by Canadian. But it is desirable that the series of manufacturing processes to which the ores are to be subjected should be carried on as far as possible in Canada."

All of which is both timely and logical.

Dalhousie University is to be very heartily congratulated on the energetic and commendable steps that are now being taken in the direction of establishing classes for miners in the important centres of industry, such as Springhill, Stellatron, and, it is hoped, Sydney Mines. Prof. McKay, in an interview with the Sydney Mines Star, points out that these classes are especially intended to help men who have already passed through the government mining schools to continue their work; and in order not to duplicate the teaching of a grade of work for which provision is already made in local mining schools and in night schools, it is intended that there shall be a certain scholarship requirement for admission to the classes. The requirement for admission is such as can be readily met by students who have passed through the schools. The college proposes to offer three classes in Mathematics, and two in coal mining, besides classes in Drawing, Mechanics, Surveying, Chemistry, and Geology and possibly also in first aid to the injured. The classes in Mathematics, Drawing and Mechanics will extend over about six months of the autumn and winter, while the class in surveying and probably also those in Chemistry and Geology will be conducted in the spring and summer months. In Sydney Mines, where steel-making is a great industry as well as coal mining, the necessity of providing classes in the chemistry and metallurgy of iron and steel will be kept in view.

The scholarship requirements for admission will, it is hoped, give a healthy stimulus to local night and mining schools. The lowest requirements for any class is that a student shall have a knowledge of the ordinary rules of Arithmetic, including common and decimal fractions. Where there are no night schools enabling men to come up to this requirement, the college will undertake to conduct a preliminary class for the purpose, if other satisfactory arrangements cannot be made.

The class fees will be made as moderate as possible. The fee for any one class will not be more than five dollars at most, and in case two or more classes are taken at the same time, a substantial reduction in fee will be made. A student will be free to take only one class at a time or if he chooses as many classes as he is found fit to enter. By this

arrangement a man or boy with very little time to spare and very little money will be able to gain an education such as is now costly and in many cases wholly out of his reach.

GOVERNMENT BY ORDER-IN-COUNCIL IN ONTARIO.

It is, perhaps, not too much to say that unwise legislation is responsible for nine-tenths of the misfortunes which have befallen the mining industries of Canada during recent years. For example, the very ill-advised anti-alien act exercised the most disastrous effect in retarding the development of the Atlin gold fields; British Columbia's mischievous eight-hour law played havoc in the silver-lead districts, while recent legislation along similar lines is largely responsible for the strike and consequent suspension of operations at an important Vancouver Island colliery; industry in the province of Quebec at one time suffered from the attempt to impose a special tax upon mine equipment; while but for the prompt action of the Canadian Mining Institute the Sudbury nickel industry in Ontario would have been heavily handicapped by ill-considered legislation. There is now grave cause to fear that in consequence of crassly ignorant and foolish departmental interference the development of the new silver-cobalt areas in this province will be checked if it be not strangled. While the Ontario mining law itself is defective in many respects, the special regulations recently enacted by Order-in-Council to govern in the Temiskaming division are unjust, inequitable, and, we believe, illegal. On April 5th of this year the Regulations for Mining Divisions already in force in Michipicoten were amended, approved, and made to apply to Temiskaming by Order-in-Council. According to sections 15 and 16 of these regulations the holder of a miner's license is entitled to "explore any portion of the Mining Division named in his license," and (section 16) having discovered, a "vein, lode or other deposit of ore or mineral in place" has the right to stake out a claim (section 21) not exceeding forty acres in area. In so far as here set out the conditions are reasonably clear and not ungenerous. But during the last few weeks, presumably with the commendable though quite mistaken desire of better protecting the public interests, the Provincial Government has amended these regulations by Orders-in-Council, the first of which, authorizing the appointment of inspectors to pass on the validity of locations, disregards the affidavits of applicants, and a second order more recently issued provides for the entire withdrawal of the lands in the Townships of Coleman, Bucke, Loraine, and Hudson from sale or lease, until the Government shall have had time to prepare a fresh set of regulations, which we understand contemplate the reduction of the size of claims to five acres, and the imposition of a royalty on output. It is really difficult to imagine on what grounds such entirely autocratic proceedings can be justified or excused. In no other country—we go farther, in no other pro-

vince of Canada—would they be tolerated for an instant, and we feel reasonably safe in asserting that locators who have staked ground in good faith and in compliance with the original regulations, will have little difficulty in compelling the Ontario Government to respect their unquestioned rights. It meanwhile speaks well for the law-abiding disposition of the present population of this mining section that disapproval of these preposterous orders has not gained expression in deeds of violence. Even in British Columbia, where the law is as much respected as anywhere, a mine inspector who attempted to carry out the instructions which have been given to the Cobalt officials would be right in anticipating a rough handling. In all civilized countries, and even in some which do not properly come within that category, the affidavit or oath is accepted as the only legal form of proof. In Ontario seemingly this is not now the case, for, in direct opposition to the prescribed regulations, the affidavit made by the locator of a claim is no longer accepted, but he is in addition called upon to prove to an inspector of mines that he has discovered mineral in place. It will be observed that it rests with the Inspector to say whether or not the location is a valid one. If, in the opinion of that official, a valuable discovery has not been made (the regulations, by the way, make no mention of the word "valuable"), the locator is instructed to remove his discovery stake and the ground is declared open for re-location. There are, we are informed, no less than three inspectors in the district engaged in this very extraordinary duty, and to make confusion rather worse than confounded none of these officials in question are agreed on what does or what does not constitute a "valuable discovery." Thus one inspector maintains that "shipping ore" is a *sine qua non*; another insists on "metallic silver"; and the third requires that the ore shall carry cobalt and nickel. Could any situation be more utterly farcical?

It is, however, no laughing matter for the men who have expended time, energy, and, to a greater or lesser extent, money in prospecting and exploiting this region; and the Government's line of action must necessarily, unless immediate steps are taken to provide redress, exert a very harmful effect in discouraging the investment of capital, in this, or any other mining territory in the Province. We must postpone, in recognition of the exigencies of space, a full discussion of the proposals in respect to the imposition of royalties and the reduction in the area of mineral locations to five acres. But the first is quite premature, the second is simply foolish if mining upon a commercial basis is to be conducted at all. The fact is, that the Ontario Government is confronted with a situation not previously experienced, and is being influenced by ignorant public opinion as voiced by a necessarily ignorant press. In the West, Ontario is described as the "cent belt." We do not wish to be discourteous, but is not this designation somewhat justified by the present penny-wise pound-foolish policy? A country may lay claim to a great natural wealth, but until these

resources are developed they are unreckonable factors in an estimation of the national prosperity. Ontario's new mineral area may or may not prove what is now popularly believed concerning it. If the veins are permanent and values continue in depth then it will be one of the richest silver-producing areas in the world and a great source of wealth to the province. The shipment during the past twelve months of surface ore to the value of even a million and a half dollars demonstrates very little beyond the obvious fact that the ores, as so far developed, carry extraordinarily high values. This has already proved an excellent advertisement for Ontario. Provided the Government has the good sense to allow matters to take a natural course, we may look for a large influx of capital and the beginning of an era of unexampled mining activity in the Province. By this, the desire of the public to share in the riches of this new region will be best realized in the general prosperity following its development.

A GERMAN OPINION OF THE CANADIAN EXHIBITION AT LIEGE, BELGIUM.

(Translated for the CANADIAN MINING REVIEW, from *Stahl und Eisen*, by F. Cirkel, M.E.)

It is gratifying to note the laudatory references appearing in European technical papers to Canada's mineral exhibit at Liege, Belgium. *Stahl und Eisen*, the official organ of the German Trans-Metallurgists and the most important of the German periodicals published in the iron and steel interests in its August number, speaks of the Canadian exhibit as follows:—

"Of all the foreign non-European countries the exhibition of Canada commands the highest respect and attention of the visitor both as regards its completeness and practical arrangement; indeed, it is not too much to say that Canada is the only country really adequately represented at the Liege Exhibition.

The Canadian Exhibition Building, erected in the Ionian style, is situated in the Park de la Boverie; to the right is located the building for historic art, to the left the palace of art and opposite the entrance one notices the building of the lace exhibit. It has a length of sixty meters, a width of thirty-five meters, a height of twenty meters and its entrance is overbuilt by an imposing tower, which bears the Canadian coat-of-arms.

Of special interest to metallurgists are the specimens of ores, economic minerals and metallurgical products which are exhibited in the rear of the building. Canada, as we all know, is rich in coal, iron, gold, silver, lead, copper, zinc, nickel, cobalt and manganese; quicksilver and platinum occur also, but are of minor importance. The value of the total mineral productions of the country has increased enormously in the last ten years. Of the exhibits may be mentioned the titaniferous magnetites from the Quebec & Lake St. John Railway Co., Quebec; magnetite from the Boyd Caldwell mine, Bagot,

J. P. Renfrew Co., Ontario; hematite from the Broome Company, and hematite from the St. Helen mine, Michipicoten district. Besides these there are exhibited iron ores from the Londonderry mines in Nova Scotia, owned by the Londonderry Iron & Mining Co., Ltd., and hematite and limonite from Cooper Brook, Colchester, N.B.

Some beautiful manganese ore is exhibited by the Pictou Company of Bridgeville, N.S. These specimens with their magnificent crystals would be a great acquisition to any mineralogical museum. Of chrome ores are exhibited: Chrome iron ore from Black Lake and the Megantic Mining Co., in Quebec.

The nickel, cobalt and silver ores from Haileybury, Nipissing district, Ont., represent a value of approximately 60,000 francs. Nickel and copper ores of the Victoria mines in the Algoma district, Ont., are exhibited by the Mond Nickel Co. The Canadian Copper Co. shows nickel ore from the Sudbury district, Ont., and also wire, tubes and vessels manufactured from metallic nickel. It is generally known that Canada supplies over half the world's consumption of nickel.



The Canadian Pavilion at the Liege Exposition.

Of the rarer ores may be mentioned:—Molybdenite from Harcourt township, Haliburton, and of the Victoria Co., Ontario; from the Alleyn Township, Pontiac Co., and Ashfield township, Que., from Egan township, Wright Co., Que., and from Grand Prairie, British Columbia. Wolframite from Emerald, Margerie, Inverness Co., N.B.; and Scheelite from Willow River. There is also to be seen an unmarked radium ore from Cap d'Or in Cumberland Co., N.S., Coal from Cumberland, B.C., coal oil, peat, graphite, corundum, mica, asbestos and many other economic minerals in this section of the magnificent Canadian exhibit.

Of metallurgical products, pig iron is shown of the following composition:—

Si	2.5	3.45	2.54	2.72	2.67	4.6	5.28	6.72
S	0.022	0.006	0.08	0.007	0.011	0.007	0.04	0.28
P	0.96	1.11	0.91	0.98	0.98	...	...	...

The Londonderry Iron & Mining Co. have exhibited ferrosilicum with 8.19 silicum, 0.28 per cent. sulphur and 0.78 per cent. phosphorus. The Electric Reduction Co., of Buckingham, P.Q., show beautiful specimens of ferrosilicum and ferrochrom.

PLACER MINING METHODS AND COSTS IN THE NORTHERN GOLD FIELDS.

A recent valuable addition to the already numerous and important monographs published by the United States Geological Survey bears the title "Methods and Costs of Gravel and Placer Mining in Alaska," by Chester Wells Purington. This title, however—and this is the only criticism we have to make on the publication—is somewhat misleading in that the author devotes a quite considerable proportion of his space to dealing with conditions in the Canadian territory of the Yukon and the British Columbian district of Atlin. The work, in fact, will necessarily prove of great interest to both Canadian and American readers. In passing, it may be worth noting, as bearing on the remarks contained in an article published in the last issue of the CANADIAN MINING REVIEW, on "A National Department of Mines," that although Mr. Purington did not start on his journey until May 26th of last year, his report, which comprises a volume containing upwards of three hundred closely printed pages, many statistical tables and numerous excellent maps and photographs, was transmitted to the Department of the Interior early in February last, and was distributed in the form of a bulletin in June, which, considering the circumstances, is an excellent example of the promptitude characterizing the methods of the United States Geological Survey.

In all, Mr. Purington spent five months in the field, and over a month of this period in British territory. Canada, it is pointed out, affords excellent opportunity for securing information relative to road construction applicable to the Alaska Interior, for already over three hundred miles of waggon road have been built by the Canadian Government in the Yukon territory and the Atlin district, while, in addition, over six hundred miles of sled roads have been made in the Yukon. The excellence of these roads is indicated by the fact that in the summer not only waggons and vehicles of all descriptions, but even bicycles, may be seen daily about Dawson, the Klondike creeks and Atlin. On the other hand, there are less than fifty miles of well-built waggon roads in Alaska, and these have been constructed by private enterprise.

As is more or less generally known, mining conditions in the North are dissimilar in many respects from those obtaining in other placer mining fields; thus, gravel miners from other parts of the world find that much of their previous experience is of no special benefit and methods which have been condemned or tried with ill success in other countries have given good results in Alaska, while, on the other hand, approved hydraulic and mechanical methods, which have given most satisfactory results elsewhere, have in this field afforded unsatisfactory results. Operations, of course, are rendered difficult by the shortness of the season which lasts only from June to the end of September, the lack of grade to the streams, inadequate water and timber supply, high cost of labour and transportation, concentration of gold on and in the bed-rock, the

relatively extreme thickness of barren overburden, and the frozen or half frozen condition of the gravel.

Mr. Purington obtained from his inspection of the placer gold fields of the North the following main impressions:—(1) Operations requiring the installation of expensive plants are frequently undertaken before adequate sampling of the ground has been done. (2) The methods of mining and conveying the auriferous material, while often leaving much to be desired from the standpoint of economy, are, in the main, developing along favourable lines. (3) The gold-washing and gold-saving appliances are inexcusably crude and inefficient. Speaking of the outlook for the future, it is suggested that the interior province of Alaska (and geologically considered, the Canadian deposits of the Klondike come under this heading) promises to continue for many years to be a fairly important productive area. It is, however, pointed out that the natural conditions prevailing in the Alaska Interior gold field are that, alluvial gold is almost entirely lacking where timber and water are plentiful, grades are steep and the ground unfrozen; while where gold is distributed in paying quantities, as a rule, the water supply is inadequate and the timber is poor or altogether lacking; thus, in California and Australia the geologic and topographic conditions favour the placer miner; in Alaska and the Yukon territory they are inimical to his success. Under the head of "Costs of Mining" the following table is given, showing the average capacity and cost of gold gravel mining operations in Northwest America, but it is noted in this regard that the high duty of the miner's inch in the Klondike is a large factor in bringing down the cost of No. 1 and No. 16. Dredg-

ing estimates place the cost at eighty cents per cubic yard, where gravel must be thawed by points ahead of the dredge, but, of course, in certain districts costs are less than twenty cents per cubic yard. It is interesting to learn that frozen ground cannot be attacked with success by the steam shovel, for even where it digs the gravel successfully, if men follow it to clean bed-rock by hand, the cost of operating is sometimes doubled. Mr. Purington, however, believes that the steam shovel has a field in northern placer mining, but, regarding the mechanical operations in general, the important principle should be emphasized that the main expense is getting the material into the receptacle which conveys it to the sluice or washing pan, and that tramping even for a long distance, and to a considerable elevation, adds a very small proportionate amount to the cost of working.

Regarding the cost of prospecting in the Atlin district tunnels timbered and lagged are estimated at \$3.50 per foot at the McKee Creek. On Spruce Creek the cost of posts and caps 10 inches thick and 6 feet long, is fifty cents each, and lagging ten cents each. On Gold Run 36-inch holes are said to have been drilled to a depth of thirty-two feet by a churn drill, at the rate of \$1.00 per foot. In the Klondike drifts to prospect the bench gravels cost \$7.00 to \$8.00 a foot, timbered, and shafts from \$5.00 to \$10.00 a foot. In timbering, three sets of posts, sill, cap and lagging are put in for \$6.00, and as one half cord of wood is used to set, the whole cost is \$7.00 per set. In frozen creek ground two men, working three shifts, sunk a pit five feet square, twenty-eight feet deep, using about two H.P. steam during thirty hours.

TABLE I—Average capacity and cost of gold-gravel mining operations in northwestern America ^a

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
	Hydrauliclicking, no pumping of water.	Hydrauliclicking with use of hydraulic elevator.	Open cut; shoveling into sluice boxes, including stripping top dirt; no pumping.	Open cut; horse scraping.	Open cut; shoveling; wheeling to bucket; cable tram to sluice.	Open cut; shoveling into cns; track and incline to sluice.	Open cut; shoveling into buckets or skips; skidding or tramping, and derricking to sluice.	Open cut; shoveling into sluice; tailings by hydraulic lift.	Open cut; steam-shovel excavating; track and incline to sluice.	Open cut; steam scraping; generally on stripping work or tailings.	Dredging.	Drifting partly frozen or thawed ground requiring timbering.	Drifting and thawing solidly frozen ground; little or no timbering.	Winter drifting and spring sluicing of dumps.	Mining or stripping overburden by ground sluicing.	Hydrauliclicking by means of pumped water.	Booming with self-dumping water gate.
SOUTH COAST PROVINCE																	
Number of operations considered.....	6	6	6														
Capacity, cubic yards, in 24 hours.....	833	350	54														
Thickness of deposit, feet.....	30.3	25	5.6														
Thickness of gravel worked, feet.....	30.3	25	3.7														
Cost ^b	\$0.20	\$0.31	\$2.01														
INTERIOR PROVINCE																	
Number of operations considered.....	13		20		8						6		7			4	
Capacity, cubic yards, in 24 hours.....	1,049		63	105	162	450	233	184	800	92	1,064	50	75	50	150	830	250
Thickness of deposit, feet.....	37.4		8.6	20	17.5	14	15	8	22	15	35	60	26.4	26.4	9	33	7.5
Thickness of gravel worked, feet.....	37.4		3.5	4.10	4.5	5	9	6	22	8.7	35	4	4.36	4.36	4.9	33	6.6
Cost ^b	\$0.238		\$2.39	\$0.60	\$2.14	\$2.43	\$1.75	\$1.25	\$1.46	\$0.49	\$0.49	\$4.25	\$3.38	\$5.14	\$0.17	\$0.65	\$0.07
SEWARD PENINSULA PROVINCE																	
Number of operations considered.....		4	10		5												3
Capacity, cubic yards, in 24 hours.....		658	145	200			550		1,000		700	80	20	83	173	250	
Thickness of deposit, feet.....		12	6.6	5			15		30		8	20	35	65	4	23	
Thickness of gravel worked, feet.....		12	3.3	5			11		27		8	7	4	4.3	4.4	23	
Cost ^b		\$0.89	\$1.37	\$0.46			\$0.01		\$0.52		\$0.43	\$4.49	3.66	\$4.61	\$0.10	\$0.93	

^a Lost time, the prices paid for mining property, and the cost of equipment other than that relating to actual mining (e.g., railways, wagon roads, etc.) are not taken into account, and any estimates based on these figures must make due allowance for these expenses; otherwise the costs here given will be found too low.
^b Dollars per cubic yard. ^c "Muck" and top gravel. ^d "Muck" or fine silt and ice; from 50 per cent to 75 per cent ice.

Mr. Purington states that reports from many parts of Alaska indicate that the amount of gold obtained per cubic yard from prospect shafts does not equal that extracted by subsequent actual mining. The reverse is very rarely true. It is difficult to assign a reason for this discrepancy other than that, owing to the frozen condition of the gravel, some of the gold escapes when small lots are washed in the winter. Frozen gravel does not easily disintegrate, even in hot water, and unless the residue from panning or rocking is saved and rewashed, losses very likely occur.

It is needless to urge the importance of prospecting ground in a thorough manner before expensive machinery is installed. The many failures through the long history of mining which have resulted from precipitate expenditure to exploit supposed valuable properties present an open page of admonition to him who cares to read.

Again the sampling of winter dumps as they are extracted does not appear to have received the attention which it deserves. A method used by Mr. Kelley, of Dominion Creek, in the Klondike, is as follows:—

The ordinary conical dump of frozen gravel assumes a somewhat steeper angle than that of loose material. One measured in the Klondike had a slope of forty degrees. From experience it has been found that if the ground is of uniform richness, eighty per cent. of the values are contained in the upper two-thirds of the dump, which has a contents of approximately 8,000 cubic yards. The apex of the dumps is generally thirty to forty feet above the base. Four times each day five pans are taken in sampling—one from each quadrant of the dump one-half way down from the top—and one pan from the apex. The results of the two pannings are put together before weighing, and fifty per cent. of the result is taken for the average value of what has been taken out during the day. Neglect to apply some form of sampling to the dumps has caused many lamentable failures in the Klondike.

One of the most interesting chapters in the report discusses the various methods of mining by which gravel is taken out of open cuts. Conditions throughout many of the northern placer districts favour the cheap and simple method of shovelling into sluice boxes, for in many localities the pay streaks are thin, ranging from two to four feet in thickness. When the double depth to the bottom of the pay streak does not exceed twelve feet, the overlying barren material can generally be ground-slucied off, even where the grade does not exceed one per cent. as an expense varying from twenty cents per cubic yard. Dams are generally constructed of sod walls, lined with sacks, which have been found cheaper in the Klondike than those built of sod and bush. On Hunker Creek, in the Klondike, a dam of moss, brush and gravel ninety feet long and eighteen feet high, built for the purpose of keeping the water from an open cut, cost \$500.00. Referring to the bed-rock drains, it is suggested that the ground should be cut in terraces, so that when it commences to thaw it will not run and clog the

canal. Pumping seepage water from the pit is to be condemned in general as strongly as pumping water for sluicing. In Bonanza Creek, Klondike, an operation involving the handling of several thousand yards was said to be more expensive by forty cents per cubic yard when pumping of the seepage was done than when the water was handled by drain. The pumping of seepage water by any form of pump may be estimated to add at least twenty-five cents per cubic yard to the expenses of handling the gravel. The use of overshot wheels operating China pumps is cheap where water is plentiful. A small plant, using twenty inches of water, to lift about one-third this quantity a height of ten feet, with a five feet wheel, costs in the Klondike \$100 to build. The duty of a man shovelling is variously estimated in different districts of the north, but this form of mining has been very nearly discontinued in the Klondike region.

Conditions in the Klondike appear to have necessitated the adoption of the expensive method of placer mining by heavy dumping carriers. The method is adopted to work rich gravels where conditions do not permit of working by ordinary shallow open-cut methods, and where drifting is impossible or inadvisable. The average depth from eight Klondike operations, namely, 17.5 feet, is greater than that economically advisable (namely, 15 feet) for open-cut operations in general. The operator adopts this method because there are thawed streaks and channels in his deposit. If such ground is drifted, the chances are that he will increase his expense to a prohibitive amount through excessive timbering and through pumping of seepage water, whereas by the open-cut method the water is handled by drain. The cost sheets show that whereas \$2.14 is the average cost of the above-mentioned eight operations in the Klondike, seven drifting operations in similar deposits, with an average depth 25.3 feet, gave an average cost of \$1.95 per cubic yard, the depth of the pay or thickness of gravel actually sent to the sluice being almost exactly the same in both cases, and the capacity in the drifting being only 17.5 cubic yards less in twenty-four hours. Granting, however, that in a given deposit carrying three dollars to the cubic yard of pay, the depth being sixteen feet, drifting is impossible, and the rich pay, seventy-five feet in width, must be worked by open cut. Whatever method be adopted the moss must first be ploughed up and about six feet of muck ground sluiced off at a cost of seventeen cents per cubic yard. Next six feet of barren gravel or sand must be removed, either by horse scrapers at sixty cents per cubic yard, or, if the plant warrants the operation, by steam scraper at forty-nine cents per cubic yard. The four feet of pay being laid bare, what method shall be adopted to get into the sluices? On account of the necessarily short life of the operations, a plant whose first cost exceeds \$5,000 is out of the question. The greatest expense will then result from the hand shovelling in the pit. The getting of the material into the receptacle in which it is conveyed to the sluice is the principal item of expense in the opera-

tion. It is, therefore, necessary that the high-priced shovellers get as much gravel into rows or buckets as possible. The bucket, 37 inches square on top, 35 inches square on bottom, and 25 inches deep, holding two-thirds of a cubic yard, is dropped into a crib built in the bottom of the pit, to which the shovellers wheel their dirt in wheelbarrows. From four to six wheelbarrows are necessary to fill the bucket. There is no mobility to the bucket; it must always rise and fall to the same spot. Men instead of occupying all their time in shovelling are employed nearly half of it in wheeling and dumping. Five operations are necessary to get the gravel from the bank to the sluice, namely, (1) shovelling into wheelbarrows, (2) wheeling to bucket, (3) dumping to bucket, (4) raising bucket to carrier, (5) conveying and dumping to sluice.

The cost of steam shovel operations in Alaska is not evident from the cost sheet printed above, as the figures there given cover the sluicing, often with purchased water, stripping, amortization, etc. With a plant operating at Anvil Creek the actual working cost of digging the gravel, tramping and hoisting, and tripping the cars to the sluice box, including also superintendent's labour, crude oil fuel at \$3.00 a barrel, lubricants, etc., is estimated as follows:—

Cost of steam-shovel work at Anvil Creek, per cubic yard:

Digging	\$0.045
Tramming to incline. . . . .	.025
Hoisting. . . . .	.018
Dumping. . . . .	.011
Proportionate superintendence on ground, and incidentals. . . . .	.021
Cost per cubic yard. . . . .	.120

But this does not take into account the labour of shovellers, cleaning bed-rock after the shovel. The steam shovel plant at the junction of Bear Creek and Klondike River occupies the flood plain of the latter stream, a fact that influences greatly the economical excavation and disposal of material. This shovel digs in a pit twenty feet below the surface of the flat. The machine weighs thirty-five tons and has a capacity of 1,000 yards in ten hours, but cost of operating are not given.

Drift mining is carried on to some extent in the Yukon, the mines being opened up by main tunnels or runways 6 x 6 feet, which generally require timbering with logs 8 x 8 inches and 6 feet long, the sets having 5 feet centres. The cost of driving a tunnel 5 1-2 feet high, including steam thawing, excavating, tramming, timbering and laying tracks of twelve pound rails was \$6.25 per foot on Solomon Hill in the Klondike.

Drifting operations in the creek deposits of the Klondike, Birch Creek, Forty Mile, and Fairbanks districts of the interior are yearly always carried on in solidly and perpetually frozen ground. A necessary accompaniment of the work is the thawing of the ground by artificial means. Mr. Greenleaf W.

Pichard has thoroughly investigated for this report the possibilities of using any form of the electric furnace for thawing the frozen gravel, and has reached the conclusion that electric thawing is impracticable.

Artificial power, through the agency of the steam point, is only in rare cases applied in open-cut work. The Klondike district affords a few examples of this application of power, notably in connection with dredging operations on Bonanza Creek, the steam-shovel operations on Bear Creek, and in two open cuts on Upper Dominion and Hunter creeks. It is difficult to determine the efficiency in open work, as, naturally, a portion of the thawing is done by the sun. From the data collected, however, by Mr. Purington, it does not appear to be any greater than its underground efficiency. But it is stated that the method of thawing gravel under ground by wood fires is expensive, and, except under special conditions, is not practiced in districts where transportation facilities permit the bringing in of boilers. Referring to the future of hydraulic mining in the Klondike, Bird's Creek, Forty Mile, Eagle and Tamana, Mr. Purington expresses the opinion that the outlook is not promising. The gentle slopes of the mountain, the low grade of the creek valleys, and the insufficient quantity of water are, in themselves, unfavourable factors. Where hydraulic mining is possible in the Klondike the gold-saving appliances are generally adequate to the needs of the operations.

One of the most interesting chapters in the report is devoted to dredging, and the writer remarks that, notwithstanding the difficulties encountered in the northern fields, the possibility of successful dredging under certain favourable conditions is not to be denied. A small dredge for prospecting purposes, operated on the Stewart River, and digging to 30 feet, handled 750 cubic yards in 24 hours, at a cost of seven cents per cubic yard, last year. A dredge of the New Zealand type has been in operation on Bonanza Creek, the ground being thawed by means of 11 feet pieces of gas pipes, twelve in number, driven vertically into the ground. The bed-rock here is a sericite-schist, and the dredge is said to clean it well. The season for operating is from May 15th to Oct. 1st, and it is understood that this dredge was successfully operated during the season of 1904, on ground that had been previously drifted. It is estimated that in the Interior of Alaska the costs of dredging averaged forty-nine cents per cubic yard for unfrozen, and eighty cents for frozen ground.

QUEBEC'S NEW MINERAL REGION.

By John E. Hardman.

(Concluded from last month.)

The first deposit of economic interest which was investigated was a wide bed, band or "vein" of quartz carrying occasional spots and masses of pyrite and chalcopyrite, and frequently showing small particles or "sights" of free gold. This quartz body

is on "Portage Island," a body of land some three miles long (from N.E. to S.W.) by one to two miles wide, and constituted an island by reason of its occurring between the two discharges from Lake Chibogamoo to Lake Doré. The mass of the island is composed of ancient Huronian rocks, penetrated by dikes of diorite and other plutonics. The crystalline schists (chloritic, epidotic and magnesian), are associated with more or less completely metamorphosed eruptives, forcibly recalling the series previously observed to the west of Lake Temiscamingue in Ontario. The sharply angular agglom-



Gras Chute, Chigobiche River.

crates seen in the Temagami district are occasionally observed on this island, but the two prevailing types are altered schists, micaceous and chloritic in character, and an altered or "Saussuritized" gabbro. The island has two peaks or summits, rising to heights of 250 to 300 feet above the level of the lake, and near the summit of one of these peaks a development of clastic rocks was noticed, consisting of agglomerates associated with reddish or brownish felsites.



Paint Mountain, from Mt. Sorcier.

The altered gabbro is, in places, permeated with chalcopyrite, which has concentrated itself along certain lines of fracture for short distances, and has led to the hope that a workable body of copper ore will be found. The chalcopyrite itself is auriferous (samples yielding from \$2.40 to \$18 per ton), and unusually good in copper, several assays of 26 per cent. to 28 per cent. having been made. Some work had been done on one of these copper bearing frac-

tures in the belief that it was a bed or vein, and the rock was so unfamiliar to me that an unaltered specimen was sent to Prof. John A. Dresser of Montreal, for microscopic determination. Prof. Dresser has described it as composed (essentially) of zoisite, chlorite, and mica, the zoisite being the prevailing constituent, and derived from the alteration of Plagioclase; the mica and chlorite coming from alteration of other bisilicates, chiefly (probably) Pyroxene. "In its original composition," writes Prof. Dresser, "it would have been a gabbro but it has been very completely metamorphosed." The rock is coarse in texture, and greyish-green in color, with numerous dirty white spots (zoisite) distributed through the mass. It has, probably, been formed by a very slow cooling under great pressure. Its similarity to certain of the marginal rocks of the Eastern Townships belt (P.Q.) would predispose an investigator to the hope of finding both copper and lead ores; the copper has already been observed by the writer, and Indians report (in this district) a mineral which, from the description given, should be galena.



Cut A, across Gold Deposit, 42 feet in width.

The altered schists have quartz veins, large and small, cutting obliquely and also running parallel, or intercalated. Most of these quartz veins are sparsely mineralized, the prevailing species being pyrite, but in one large deposit the pyrite and chalcopyrite seem to be in equivalent proportions. This big quartz vein shows, occasionally, very considerable particles of gold, and, usually, minute colors when crushed and panned.

The determination of probable economic gold values in this vein was one of the chief reasons for my visit.

A cross-section of the island by a north-west and south-east line running through Bouleau Point, shows flat, swampy land for about one quarter of a mile, followed by a bench of approximately 30 feet in height and only 200 or 300 feet wide, which in turn is succeeded by a regular and approximately uniform slope rising to the base of the two peaks mentioned. About the middle of this slope the big quartz vein was first discovered through its outcrop having been denuded of all soil by the steepness of the slope. Its course (magnetic) is N. 83 W., and the line of strike follows down the hill and quickly reaches the bench already mentioned. Stripping on this bench is a matter of time and hard labor, as the cover is from 8 to 10 feet in depth, of which the first 3 or 4 feet is a mass of interlaced roots and large boulders.

The dip of the deposit is to the north-north-west, and near the surface the dip angle varies from 70 deg. to 75 deg. The footwall is altered schist and in two of the cross trenches the hanging wall appeared to be diorite or diabase but in another cross trench the hanging was the same schist that constituted the footwall. The approximate value of the quartz, so far as exposed, was determined from a large number of samples to range from \$8.00 to \$10.00 in gold per ton. The free gold present (average of 36 pan tests) amounted to \$3.00 per ton. When concentrated the metallic sulphurets gave a fire assay value of about \$70.00.

The gold values in this quartz deposit are not uniformly distributed, but follow the variations usual in all deposits of which I have knowledge. Yet the unusually high average of \$3.00 (in free gold), in a deposit of such large dimensions holds out an alluring promise of satisfactory realizations when transportation conditions permit its economical working.



Cut B, Showing Footwall of Big Quartz Deposit.

The smaller veins of quartz which (as observed) had widths ranging from 6 inches to 4 feet, also contained more or less gold; assays ranging from \$1.40 to \$11.00 per ton. There are many controlling conditions (of transportation, labor and climate),

which require to be determined before economic results can safely be prophesied, but the showing is of such a character that if food could be provided there is little doubt but that the prospector would soon be ubiquitous in the land. On the north side of Paint Mountain (which is the most easterly peak of the two already mentioned) occur strata very highly impregnated with pyrite (distinct lenses being sometimes visible) which also carry varying amounts of chalcopyrite. The decomposition of the sulphur mineral to the various oxyhydrates of iron, has streaked this side of the mountain with tints of yellow and red ochre and to this fact the peak owes its name. The pyrite is plentiful, but at such a distance from transportation possesses no economic value.



Asbestos Island, looking Westerly along the Ridge. Crosses (x) show location of Pits No. 5, No. 6 and No. 4.

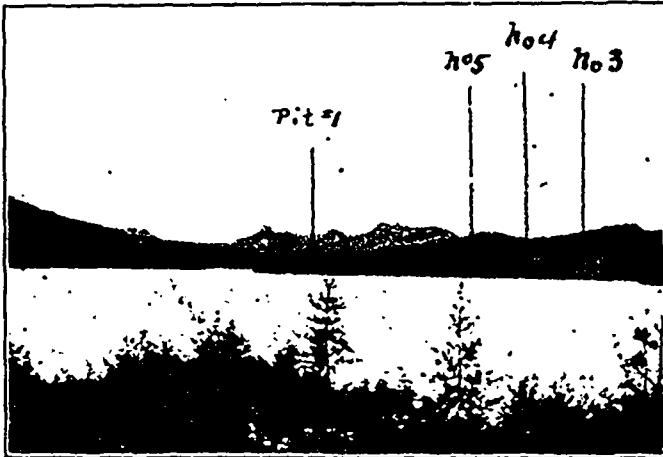
Traversing the shoreline northerly from Portage Island towards McKenzie Bay the persistence of altered members of the Huronian is everywhere noted. Near the narrows leading to McKenzie Bay an intrusive granite is noticed which is succeeded by a conglomerate of rounded pebbles for about one mile. (On the eastern end (or side) of McKenzie Bay, the schistose character of Portage Island is duplicated, even to the intrusion of dykes of diorite and diabase, but along the northern and western shores there is a development of Pyroxene and magnesian rocks which somewhat prepares one for what has been found on Asbestos Island.

Asbestos Island has a length of between three-quarter and seven-eighths of a mile in an east and west direction, with a width of one-eighth to one-quarter of a mile. It rises in the centre, to a height of about 150 feet above the lake, and is composed of serpentinous rocks with some schists, chiefly hornblendic. On the western end the color of the serpentine is black, due to an oxide of iron which also is probably the cause of its weathering to a black sand which suggests chrome iron ore. As a matter of fact the presence of chrome iron in the rock was reported to me, but none of my tests revealed its presence. At the eastern end of the island the hornblend schists are more noticeable

than at the west; they carry occasional fibrous pieces which have the appearance of amphibole, or true asbestos, but no particular attention was paid in view of the dark color, also in view of the splendid deposits of chrysotile (or Canadian asbestos) which occur in the middle and western portions of the island.

This island is the property of the Chibogamoo Mining Co., Ltd., which has been organized by Mr. McKenzie as the holding company of his numerous locations. Six different pits have been opened on the island, of which five show remarkably good

the fibre was harsher and coarser than that occurring away from them.



Asbestos Island from the South.

quarries of chrysotile, the chief asbestos of commerce. The length of fibre shown in the various seams varies from 3-4 of an inch to 5 1-2 inches. The quality of the fibre obtained is very fine, threads of an exceeding slenderness showing remarkable strength. The color in the rock is light or pale sea green, which turns to a snow white when crushed out. The percentage of water contained was quite uniform at 14.5 per cent. to 15 per cent.



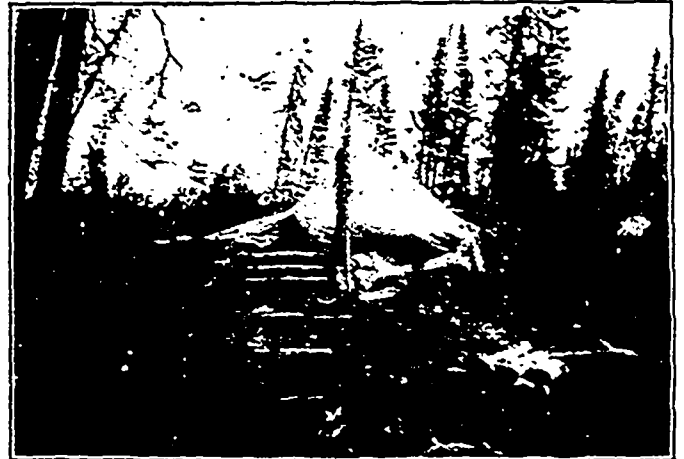
Asbestos Pit No. 3.

The containing rock is a very fine-grained, compact, light to dark green serpentine, breaking with a slight curved or conchoidal fracture. Near the top of the high land in the centre of the island this serpentine is seamed, in one or two places, by narrow bands or dykes (1 inch to 1 1-2 inches wide) of what I first took to be a siliceous dolomite, but which, on return to urban life, was proved to be an aluminate of lime and magnesia, probably a variety of nephrite. In the neighbourhood of these veinlets



Asbestos Pit No. 5, where 5½-inch fibre is abundant.

On the eastern side of Chibogamoo Lake there are small seams up to 4 inches wide, of magnetite, on the slope of Mount Sorcier, which rises to a height of 500 feet above the water, but no commercial deposit of iron ore had at that time been discovered.



Camp on Ashuapmouchouan Lake, Old Hudson Bay Post.

From Lake Wahnokichi, on the east side, came specimens of pyrrhotite, which was nickeliferous, and on Rush Lake (according to the Indians) occurs the galena which is supposed to be argentiferous. The country is unknown, except perhaps to Commander A. P. Low of the Geological Survey, who made a traverse about 1885. That gentleman is again in this field this summer, and in conversation told me he intended to pay particular attention to the belt of green stones which has been mapped as occupying the valley of the Chibogamoo River, and extends beyond the river in a west-south-west course. This band of "greenstones" (so called generically as embracing diorites, diabase, gabbros and the volcanics generally) lies, approximately, in the middle of the wide Huronian belt which forms the northern boundary of that extensive range of Laurentian rocks, known to the rail-

way maps and to tourists as "The Laurentides." The injection of these eruptives through the mass of the Huronian has, broadly speaking, occasioned



Party on return trip resting on rocky islet in Lake Chibogamoo.

islands of igneous rock in a sea of older rocks, and on the edges of these contracts metalliferous deposits may be confidently expected.

THE IRON ORES OF NOVA SCOTIA.*

(Torbrook and Nictaux.)

Judge Haliburton in 1829 wrote that iron ore had long been known to exist in Annapolis county in great abundance and that efforts had been made to manufacture it at Nictaux. In the year 1825 the Annapolis Iron Mining Company was incorporated to manufacture hollow ware and bar iron. The company purchased a valuable and extensive bed of ore situated about three miles and a half from the mouth of the Moose River, another of equal importance at Nictaux, with one or two beds in other places. They selected the eastern bank of the mouth of Moose River as the site of their buildings, erected a large smelting furnace, stock house, coal house, stores, etc., manufactured a quantity of hollow ware of very superior quality, and laid the foundation of forges for making bar iron. The quality of the ore was regarded as fully ascertained, and the only part of the experiment to be decided was whether they could compete with the English ware, or whether the cost of manufacture would not exceed the value of the article when manufactured, a result depending upon the economy and skill with which the establishment was managed.

In a paper on the Mineralogy and Geology of Nova Scotia, presented to the American Journal of Science in 1828 and 1831 by Jackson and Alger, mention is made of this ore bed seen on Nictaux Mountain. The width of the ore at the surface is said to be six feet and a few inches; increasing, apparently, as it deepens, it gives promise of an immense supply of this valuable mineral. It is covered by a stratum of ferruginous soil about two feet thick, on removing which the surface of the ore bed, being in some places quite smooth as if worn down by attrition, is seen curiously intersected by seams,

*Abstract from Summary Report of Geological Survey of Canada. (Ottawa, 1905).

some of which cross it transversely or nearly at right angles, and, when in open fissures, are filled up with a substance not unlike red ochre. They give the ore a tendency to separate into rhomboidal fragments, similar to those into which the slate itself often divides, and greatly facilitate the labour of raising it. The bed had been opened to a depth of eight or ten feet, and some hundred tons of the ore had been removed to the smelting furnace situated on the southern shore of Annapolis basin.

The character of the ore at this place differs in some respects from that of the Pictou county ore. From its very uniform slaty structure it is more easily broken up, and it abounds to a much greater extent with the casts of marine shells, the calcareous parts of which are sometimes still preserved.

Dikes and masses of granite and porphyry are described as intercepting the strata of slate and the ore bed accompanying it, but it appears again in the vicinity of Clements, a distance of thirty miles, the last place along the range of the South Mountain where it is known to appear.

Dr. Abraham Gesner, in 1836, in his Geology and Minealogy of Nova Scotia, states that the smelting furnace had at that time discontinued operations from causes not generally known, although the ore was said to yield about fifty per cent. of good cast iron.

He also adds that the bed of iron ore at Nictaux is about six feet and a half wide and being divided into cubical masses and, therefore, easily broken up, will afford an immense quantity of metal at less expense than it can be procured at many other places. It has but a shallow covering of soil, a large proportion of which is the carbonate of iron. The walls of slate are distinctly separated from the metallic compound, and are not so much intermixed with the iron as those forming the sides of the bed at Clements. The ore, though very similar, is of a superior quality, and offers every inducement for working. At that time, excellent iron, manufactured at a smelting furnace and foundry erected near Clements, several years before was in use in Cornwallis. The ore, like that at Clements abounds in marine organic remains, and the impressions they have made in the ore and slate are extremely beautiful and distinct. It is argued that because the shells at Nictaux are as abundant in the iron ore as in the slate they are of contemporaneous origin.

About a mile and a half north-west from the spot where the ore has been exposed, the Nictaux falls come foaming down a narrow and tortuous channel worn out of the strata of slate. Were an iron foundry erected at the falls, it is improbable that it would be unprofitable. Only a mile and a half from the ore, the rapid river, would supply a power more than sufficient for any machinery that might be required under the most extensive operations, and Dr. Gesner does not hesitate to declare that the mining and smelting of iron ore at Clements and Nictaux may be as profitably conducted as in any other part of the world.

In the Industrial Resources of Nova Scotia, he deplures, in 1849, the failure of an association form-

ed for the smelting, casting and manufacture of iron near Clements, although both the ore and the iron produced from it proved to be unexceptionable; he adds: "Another band of iron ore occurs in the Silurian rocks of Nictaux, which, like those of Clements, abound in the fossil shells and corals peculiar to the group. The ore at this place is six feet four inches in thickness and the outcrop is seen on the surface to the distance of half a mile. The Falls of the Nictaux River offer an admirable site for machinery, and the forests through which the stream passes would maintain a furnace for a long period of time. Excellent iron was manufactured at this place in the early settlement of the country. Silurian fossils are found at New Canaan, southward of Kentville; and the ochres that usually accompany the iron were made into pigments at that village a few years since." Dr. Gesner also foresaw that after the forests had disappeared the coal mines would offer a cheap supply of fuel; and he pointed out that the iron ores of Great Britain did not yield on an average more than thirty-five per cent. of cast metal and that many of them are taken from the clay ironstone beds of the coal fields, scarcely exceeding a foot in thickness, and from great depths; that, moreover, the iron mines of Annapolis are on lands embraced by the old grants in which the coal, iron and other minerals were not reserved to the Crown.

The excellent quality of the ore thus highly spoken of so many years ago was corroborated by subsequent observers, and it was shipped for many years to mix with the iron ore of Londonderry, to which, however, it is said by Dr. How to be inferior.

This interesting mining district is situated among blooming orchards, cultivated fields and green meadows, is intersected by roads, and is close to two railways and in the vicinity of two large water powers.

When the Nictaux works were in operation, limestone was imported from New Brunswick to a port on the Bay of Fundy and thence conveyed by land carriage some eleven miles to the furnace. Several thousand tons of iron ore were mined, chiefly from the bed of shell ore.

Sir William Dawson describes the Nictaux ore as a bed of highly fossiliferous peroxide of iron, from three to four and one-half feet in thickness, the outcrop of which appears at several places in Nictaux and at Moose River at a very high angle beneath Triassic, red, coarse sandstone and extending from Canaan and Kentville, in Kings' County, to Bear River in Digby County, a distance of seventy miles, but separated into two parts by granite. At Nictaux the ore is a peroxide of iron, containing 55.3 per cent. of iron, laminated in structure, and full of fossil shells. At Moose River it is in the state of magnetic iron, but retains its character in other respects. This ore is thus of great value. Its distance from the coal fields, and the consequent necessity of smelting with charcoal, have been obstacles in the way of its commercial application.

The Nictaux mines had been worked for many years and extensive works had, at great expense,

been erected for smelting the ore. In 1855 a company of English capitalists continued operations on the ores of the shell bed, and in 1858 exported 744 tons of iron valued at \$2,375, and in 1859, 1,125 tons valued at \$14,790. One shaft was opened close by the furnace, another about two miles to the eastward. The main supply of limestone came from St. John to Port George, ten miles away on the Bay shore. The pig iron had to be hauled to the same place for shipment. Charcoal was used instead of coal. These methods of operation proved so costly that these works, also, had to be closed.

About 1870 Messrs. Stearns and Page, the promoters of the railway from Middleton to Bridgewater, turned their attention to the magnetic ores of Cleveland on the west side of Nictaux River, from which a bed about eight feet thick was followed at intervals as far as Lawrencetown, six miles west of the river, where the strata are finally cut off by the granite.

They took out leases of an extensive territory, intending to re-open the mines on the completion of their railway, which was projected to run along the deep valley of the Nictaux River, and by facilitating transportation would remove one of the chief obstacles to the success of the earlier blast furnaces. But their first plans miscarried, and it was not until many years later that the Nictaux and Atlantic was formally opened as the Nova Scotia Central Railway, which is now called the Halifax and South-western.

In the autumn of 1890, R. G. Leckie, manager of the Londonderry Iron Company, revived the interest in mining in this district by securing a bed of excellent red hematite at Torbrook, about three and a half miles east of the Cleveland mines, and in the spring of 1891 a steam hoisting plant was erected, shafts opened and a railway laid to Wilmot, three miles distant, to join the Windsor and Annapolis, now the Dominion Atlantic Railway. The ore was transported to Londonderry to mix with other ores, and the owner of the land having the right to the iron ore by the terms of the grant made to the original settlers by the British Government, Messrs. Barss and Burns, S. Barteaux and John Banks drew large amounts of royalty.

As enumerated by Mr. R. G. E. Leckie, for some time manager of the mines, in his paper on the iron deposits at Torbrook, the ore beds are four in number. No. 1 is that which has been worked at Torbrook mines, and is locally known as the Leckie bed. Its general strike is N. forty degrees E. and its dip, S. forty degrees E. 70 degrees—80 degrees. It has an average thickness of six feet and is perfectly clean, there being no slate or stone between the north and south walls. These walls consist of two feet and eighteen inches respectively of a variegated talcose slate, white, bluish and pink in colour, the white and bluish slate predominating, interstratified among dark blue slates spotted with red iron stains.

It is noticeable that this bed of ore is entirely free from shells, while the overlying No. 2 bed, between sixty and a hundred feet south, and several

beds of the surrounding slate are highly fossiliferous.

No. 2 or the shell-ore bed, as it is called, is that which was worked by open cut for many years to supply the old furnace at Nictaux Falls. It is, perhaps, identical with the shell bed worked at Moose River, although the connection has not been traced, on account of the disturbed condition of the intervening ground. The ore is a red hematite, metamorphosed at the western end into magnetite by its proximity to the igneous rocks.

The outcrop of No. 3 bed appears halfway up the side of South Mountain about a mile south of No. 2. It is the same in width and structure as No. 1, the only difference being that it is somewhat magnetic in character and has a darker or reddish brown streak. The dip is almost vertical or slightly inclined to the north-west, so that it has reasonably been assumed to be a repetition of No. 1 on the southern outcrop of a syncline, although as yet no bed corresponding to the shell-ore has been found north of it.

No. 4 bed of Mr. Leckie's report has been opened on Messenger's property, almost on the Kings' County line, and following the strike it would be farther up the mountain than No. 3, although the walls are composed of talcose slate like those of No. 1. It was opened and found to be of the following dimensions: Ore 2 feet; Slate 3 feet; Ore 1 foot.

Active operations began, as already stated, in the spring of 1891, when ore was raised from two shafts (called No. 2 and No. 4), one of them worked by back-stoping the ore, while the other was worked underhand. In the autumn two more shafts were opened (No. 3 and No. 5). No. 3 was worked underhand and No. 5 shaft by back-stoping. Four levels were driven in the ore cut by these shafts. The lower levels were still in good ore when the work was discontinued; in the two upper levels going east the ore is said to have been cut off by a small fault.

The output was increased from twenty tons a day in the spring of '91 to seventy tons in the spring of '92, and in the fall to 130 tons.

In 1895 the main shaft was 350 feet deep, and levels had been extended in the ore to a distance of 1,500 feet. The angle of inclination, about eighty degrees at the surface, had flattened to forty-five degrees, and the thickness of the bed of ore had increased from six to twelve feet. After 1896 the mines were closed for some years owing to the suspension of work at Londonderry, and because the Nova Scotia Steel Company drew its supply from Newfoundland; they were not opened again until 1903. When closed down the mine was in good working order with a large amount of valuable ore in sight.

The production of iron ore from the Torbrook mines during these years is estimated as follows: to 1891, 10,000 tons; 1892, 18,000 tons; 1893, 30,000 tons; 1894, 21,590 tons; 1895, 35,073 tons; 1896, 19,944 tons.

After operating for five years, and supplying Londonderry and Ferrona with 135,000 tons, the

Torbrook mines, as already stated, were idle from 1896 to April, 1903, when they were reopened for the Londonderry Mining Company, under the superintendence of W. F. C. Parsons and the management of Mr. H. McL. Weir. The old plant was used after being renovated. The mine was pumped out and ore was raised from the No. 2 or Woodbury shaft. Part of the work was done by contract. Fifty men were employed; in 1903 nearly 5,000 tons of ore were mined, and the present output is about seventy tons a day.

Mr. Parsons states that the ore bed in the present workings varies considerably in size, and in places runs up to twelve feet in thickness, being apparently lenticular in form, the lenses pitching westerly at a low angle.

Recent investigations of the geological structure of the Nictaux and Torbrook basin are given by Professor Bailey in his reports to the Geological Survey.

Vigorous explorations, in charge of Mr. Francis Park, Major James L. Phinney and others, were carried on during the summer of 1900 by Messrs. S. M. Brookfield, of Halifax, George E. Corbitt, of Annapolis, and others, records of which have been obtained for the Geological Survey. A bed, varying in thickness from six to ten feet, was traced westward from the Black River at the contact of the Triassic, near the county line, and passing a short distance south of the Leckie bed is believed to represent the well-known shell bed, the ore running from 33 to 55 per cent. of metallic iron. One of the Government calyx drills was used to bore through the bed at a depth of 300 feet beside the Torbrook road near the Leckie mine. At this depth the ore bed is said to be about nine feet thick. A subsequent boring at Fletcher Wheelock's farm cut three beds of iron ore; and one, No. 5, on the S. McConnell farm, cut two beds on the steep north dip of the syncline, which seem to prove a thickening of both in depth.

Sufficient work was done, according to Mr. W. F. Jennison by a series of bore-holes, test-pits and trenches to show that the ore beds are continuous as above stated, with the exception of small interruptions by faults, one of which on the east side of the Leckie workings, and another west of them, have been proved; and by dikes of diorite and granite which have partly metamorphosed the red hematite into magnetite.

The close proximity of the ores, both in the valley and on the South Mountain, renders concentration of the mines and machinery possible, and reduces the cost to a minimum. With a production of 150 tons a day the cost of mining and shipping ore to Sydney is estimated by Mr. Jennison as follows:—

Mining and putting on cars.....per ton	.75
Haulage by rail to Annapolis, 32 1-2 miles.	“ .25
Loading ship at Annapolis	“ .10
Freight to Sydney	“ 1.00
	\$2.10

Timber for all mining purposes is easily procurable. Mr. Jennison suggests the derivation of power to work the mines from the Nictaux River, which has a length of fourteen miles, is fed by several large lakes, has a fall of seventy feet in a distance of 3,750 feet and a flow during the dry season of 7,680 cubic feet per minute, which would give 500

horse power during the dry time. The cost of installing electrical plant of this power and connecting it with the mines three and a half miles distant he estimates at \$25,000.

The following analyses, collected from different sources stated in the table, will serve to show the character of the Nictaux and Torbrook iron ores:—

ANALYSES of Iron Ores of Nictaux and Torbrook, Annapolis County, N.S.

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Peroxide of iron	69.17	71.85	26.39			75.80	48.34				74.63	86.74	81.29				
Protoxide of iron							21.76										
Protoxide of manganese		0.28	12.74			0.65	0.40		0.86						3.02	Heavy trace	
Alumina		3.59				4.19	1.62		5.53						5.00		
Lime		2.30				6.30	4.01		2.70								
Magnesia		1.00					0.60		0.41								
Phosphoric acid	1.82						3.08				3.80	0.399		0.427		0.414	
Sulphuric acid															0.57	0.196	
Titanic acid																	
Insoluble matter	18.94	18.13	33.50	11.64		8.26	18.95	18.56	13.30	17.21	11.00	10.28	12.87		26.50	10.12	
Metallic iron	50.09	50.27		59.11	53.14	53.06	50.77	52.22	55.49	57.99	52.21	60.72	59.00	61.38	47.50	55.74	56.45
Phosphorus	0.05			0.17	0.172	2.65			0.23	0.18	1.66	0.17		0.18		0.18	
Sulphur	0.79			0.09		0.20	0.08		0.08	0.04					0.23	0.08	
Manganese																	

NICTAUX—1, Geological Survey Report for 1873-74, page 210; 2, Geological Survey Report, Vol. V., Part P., page 179; 3 do, page 180; 4 and 5, Gilpin's N.S. Mines and Mineral Lands, 1880, page 58; 6, "Shell ore," William Snaill in Trans. Min. Soc. of N.S., Vol. I., Part 3, page 62; 7, do, page 59, a magnetite; 8, Average of four magnetites from the Heatly, Baker and McConnell (2 samples) farms at Nictaux and Cleveland, Geological Survey Report, Vol. XIII., Part R., page 29, 1900; 9, Average of three samples of magnetite from Cleveland; 10, Average of two samples of hematite from Cleveland; 9 and 10, from Department of Mines for N. S., page 61, 1875.

TORBROOK.—11 to 17, Geological Survey Report, Vol. V., Part P., pages 179 and 180.

ANALYSES of Iron Ores of Nictaux and Torbrook.—Continued.

Sample No.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Peroxide of iron						49.52		79.42									
Protoxide of iron						27.09											
Protoxide of manganese						0.80		0.38									
Alumina				3.14		1.90		5.08									
Lime				2.16	4.50	7.00		1.90									
Magnesia						1.80		0.35									
Phosphoric acid					0.30												
Sulphuric acid				0.11													
Titanic acid											0.144						
Insoluble matter			17.21	5.93	9.50	13.48	10.22	12.00	11.56	10.39	10.87	14.16	10.35	7.97	9.41		
Metallic iron	56.00	58.05	57.93	59.86	60.00		59.76	55.60	54.71	42.30	54.84	53.10	55.40	51.28	52.40	50.76	54.87
Phosphorus		0.193	0.16		0.13	Trace		0.43	0.669	0.396	1.452	0.704	1.037	0.53	1.861		
Sulphur			0.036			Trace		0.11	0.007	0.015	0.015	0.025	0.114	0.028	0.030		
Manganese										0.52	0.41	0.24	0.26	0.28	0.23		

TORBROOK—18, Geological Survey Report, Vol. V., Part P. Pages 179 and 180; 19 and 20, Gilpin's Mines and Mineral Lands, 1880, page 58; 21 and 22, Geological Survey Report, Vol. X., Part S., page 98; 23 and 24, R. G. E. Leckie in Trans. Min. Soc. of Nova Scotia, Vol. I., Part 3, page 53; 25, do, page 61; 26 to 32, Ores from the Armstrong and other farms on the South mountain, Report by Dr. E. Gilpin, 1901; 33, average of 10 samples, ranging from 46.60 to 55 per cent of metallic iron, from the Spinney, Martin, H. P. Wheelock, F. Wheelock, Holland and Allen farms; see map also Geological Survey Report, Vol. IX., Part M., page 142; 34, McConnell farm on the southern side; 33 and 34 are also from Gilpin's Report, 1901.

Various estimates, all more or less vague, have been made of the approximate quantity of iron ore in this district. Dr. Gilpin estimates that every thousand feet longitudinal and 500 feet vertical of the northern beds worked out will produce 1,800,000 tons of ore—practically three years' supply at 2,000 tons per day. His estimate to a depth of 800 feet for the district so far developed is not less than 300,000,000 tons.

Consequently, the small extent to which, so far, the ores of Nictaux and Torbrook, those of the East River of Pictou and other localities in Nova Scotia have been used, can only be explained, as suggested by Dr. Poole, by supposing that they are harder to smelt; that they are not so high in metallic iron as foreign ores or that they cost more to mine and deliver at the furnaces.

PROPOSED AMENDMENTS TO THE ONTARIO MINING LAW.

To the Editor:—

Sir,—I would respectfully submit that the proper policy for the Ontario Government to pursue from the standpoint of those interested in the mining industry would be for the Temiscamingue & Northern Ontario Railway Company to extend its line of railway to Hudson Bay at the earliest possible date, and this line of railway with that of the Grand Trunk Pacific, together with the numerous large rivers emptying into the Hudson Bay would open up an empire of mining lands to the explorer. It would cost some \$10,000,000 to construct the railway and about \$1,500,000 to pay interest on the investment and the expense of operating the line of railway. If the company is to succeed they must adopt the policy that would be pursued by a modern railway company and erect, or secure the erection of, a refinery at some point on their line of railway.

The marvellous wealth of the silver Cobalt district and the promising mineral areas existing both in Northern Ontario and Northern Quebec, and also the attractions of Temagami and other similar attractions. If properly brought to the attention of explorers and capitalists in Great Britain and United States, should bring to Northern Ontario 10,000 explorers and \$50,000,000 of mining capital, and that, with the assistance of the agricultural interests in the Clay Belt, would secure a remunerative traffic for the provincial line of railway for all time to come. The present working conditions are somewhat similar to those imposed under the laws of the United States and British Columbia and are quite ample and satisfactory if owners were compelled to perform such development operation, *or in default have their leases cancelled*. The Temiskaming Mining Regulations should be amended requiring the explorer to commence development operations within ten days after he locates his claim and perform at least twenty days' work during each of the next succeeding three months, except during the winter season, and this would obviate the necessity

of an inspector being called upon to decide whether the licensee has made a valuable discovery or not. The United States courts hold that a valuable discovery is the finding of a vein or lode in place which an experienced miner would consider himself justified in spending his time and money on the location with the reasonable expectation of finding ore in paying quantities, and it is always preferable that a man's title should rest on his own acts than on the discretion of an official, and this is one of the cardinal principles in the United States mining law.

2. The advocates of a royalty on mineral are playing into the hands of the nickle trusts in the strongest possible manner, as they are perfectly confident that even if it became law such a tax would never be enforced; and yet, on the other hand, it is a most powerful ghost to frighten away American capitalists who have not yet invested in Ontario, as they at once come to the conclusion that, if the farmers of Old Ontario are prepared to impose a royalty on the infantile mining industry; that, if the mines did prove of great value and extent that that would be a signal for the imposition of still greater and more unjust taxation on the minority in Northern Ontario, and they come to the conclusion that they will invest their money in the States and other countries where the importance of the mining industry is appreciated by the manufacturers and farmers of such country.

The advocate of the royalty is sowing seeds of discord in Northern Ontario, and if persisted in will eventually mean the creation of Keewatin and Algoma into a separate province and the placing of Old Ontario in a third rate position among the other provinces in the near future.

3. For the convenience of the explorer it is preferable that all locations should be staked out, and a discovery post planted so that another explorer passing over these lands at a subsequent date will know that it is useless for him to spend his time in exploring same as some other licensee has acquired such location, and by examining the discovery he may secure some valuable information in assisting him to explore the adjoining lands, and it makes a better check as to whether a valuable discovery has really been made or not. Application should be made within fifteen days and then if such applicant is the first discoverer, and the first to stake out, his right thereto should be valid, *even although he may not have staked out his claim in accordance with all the regulations applicable thereto* and his application should then be the basis of his title.

The acquiring of a large agricultural and mining population for New Ontario is of supreme importance to the manufacturing, mercantile and financial interests of Old Ontario.

JOHN McKAY.

Sault Ste. Marie, Ont.

To the Editor:—

Sir,—Although we have now a Minister of Lands and Mines in Ontario, I do not expect to see

the much-needed improvements made in our mining law under the new regime. But as my friend, Mr. J. B. Hammond, and I have been foremost in trying to get three successive governments in Ontario to adopt a more liberal and progressive mining policy during the past fifteen years, we send you our views on the situation.

To begin with, there are two special difficulties in getting any government in Ontario to enact a proper mining law. First, the greater value put by the people of older Ontario upon the pine timber, or what is left of it, than upon the mineral resources of the Province. Second, party desire for political advantage in making any changes in the mining law, and especially in the administration of the law. And, unfortunately, for our mining interests, it is already quite evident that this latter evil is more likely to be aggravated than lessened by the present Ontario Government, we are sorry to say.

It would take an exhaustive article to do full justice to such an important matter, but until we know what the "proposed changes" to be made in the mining law are, we can only point out what in our opinion some of them, at least, should be.

First, then, as to the terms and conditions under which mineral lands should be opened to be explored and taken up, we have always maintained that as the poor, wandering prospector is the pioneer of the mining industry, he surely ought to be accorded the same chance as the settler on farming lands. But he has never been so treated in Ontario—far from it. For by the present exacting regulations he has to pay from \$2 to \$3.50 an acre in 60 and 90 days for any claim he takes up, or before he can find out in most cases whether it is of any actual value or not, and then expend from \$6 to \$7 an acre in development work, or including the price of the land and various other outlays for which no allowance is made, over \$10 an acre all told! Not one prospector in a thousand can comply with such onerous terms, and so the only thing he can do is to sell his discovery for little or nothing, or an interest in it, to a partner with money, and who, eventually, gets the whole claim as a rule.

Now, instead of such burdensome and complicated regulations for taking up mineral lands, and the continual patching of the present Mines Act, what is really wanted is a simple, just, well-defined and permanent mining law, brand new from first to last, and of uniform application to the whole province.

We also believe that the government would get more revenue out of mineral lands by putting the price at \$2.50 an acre in surveyed townships and \$2 an acre in unsurveyed territory, instead of the present long scale of different prices. Then the amount now required to be expended on development work should be cut down one-half or, say, to \$3 an acre, and only one year to be allowed for doing such work. At the end of that time the claim should be either paid for or cancelled. The man who cannot find out in twelve months if a claim is worth paying for is neither a prospector nor a miner. Such terms would snug up and simplify the work of the De-

partment of Mines, and keep any number of claims from being indefinitely locked up. As to the size of claims the present regulations are fair enough. The largest nickel mine in the Sudbury district does not cover ten acres.

Second, as to what you call the "taxation of mines," oh, if you love your country do not mention such a thing except to condemn it! The mere suggestion of a royalty makes the soul of a Sudbury mine owner or prospector sick, and no wonder. For the royalty that was put on the nickel mines in 1891 only produced instead of revenue two bad results, and had to be abolished in the end. It destroyed the selling value of all the nickel properties it applied to for seven long waiting years, and, worse still, it enabled one company to get a practical monopoly of our nickel mines. Those who are engaged in the mining industry are quite willing to pay their fair share of the burdens of the community in the way of taxes, but they are not willing to be singled out for a special tax from which all other industries are free. The ordinary risks of mining are enough to take. Besides, in Ontario, except a few little broken stringers of silver-cobalt ore in a very circumscribed area in the Temiscaming district, nearly all the economic minerals so far discovered, such as nickel, iron and copper, are low grade ores and expensive to treat, notwithstanding all the windy yarns published in the daily press.

Third, a good "staking law," as they have in British Columbia and some of the Western States, is the ideal mining law where there is a regular vein system. But the endless complications that have been caused around Cobalt by plastering a defective and, indeed, absurd staking law on top of the old regulations, has, we fear, made any kind of a staking law unpopular in Ontario now, as the inevitable results are already to be seen there in vexatious lawsuits, enmities, disputes and the frequent jumping of claims.

But in unsurveyed territory a man should be allowed to stake his claim and run his own lines without having to go to the expense of getting a surveyor to do it at the very start. There should also be a recording office in every mining division, not merely to collect extortionate fees from the prospectors, but to give reliable information about the district and actually record claims as in British Columbia, and at the same scale of fees.

In short, Ontario is not in a position to give any pointers on mining or mining laws to the American continent, and has in this respect a great deal to learn yet. Canada is largely a mining country in its physical character, but until our governments take an independent stand, and give more substantial encouragement for our own people to invest in mining enterprises, we are likely to continue to be mainly producers of raw materials for the United States.

Yours, etc.,

A. McCHARLES,
J. B. HAMMOND,

Sudbury, Aug. 31, 1905.

ZINC RESOURCES OF BRITISH COLUMBIA.

Dr. Eugene Haanel, Superintendent of Mines, Ottawa, kindly sends us the following information in respect to the recently appointed Commission to investigate and report on the zinc resources of British Columbia:—

"I beg to inform you that Mr. Walter Renton Ingalls, the eminent zinc expert, has been appointed chief of the investigation; the field work has been placed in charge of Mr. Philip Argall, M.E., of Denver, Colorado, with Mr. A. C. Garde, M.E., of Nelson, as his assistant. The concentration experiments, according to modern methods, will be conducted at Denver, Colorado, by Mr. Wood. The examination will begin on the 1st of September, and start from Nelson, B.C. The following are the chief points to be covered by the investigation:—

- "1st. Examination of the present development of the mines to determine approximately the tonnage of zinc ore immediately available, its occurrence and character and the future prospects, together with the cost of mining.
- "2nd. Examination of the present methods of mining.
- "3rd. Investigation of the adaptability of the ores to the new methods of concentration (magnetic, electrostatic, etc.).
- "4th. Study of the conditions affecting the marketing of the concentrate, including the question of smelting in the province or elsewhere in Canada.
- "5th. Investigation of the possibility of special utilization of the zinc ore of high silver content.

"I presume you are acquainted with Mr. Garde, who is specially fitted to act as local mining engineer for the following reasons:—

- "1st. Mining Engineer of Zurich School of Mines.
- "2nd. Former manager of the Payne mine.
- "3rd. Favourably known to and approved by Mr. W. R. Ingalls.
- "4th. Endorsed as best man for Zinc Investigation by Provincial Mineralogist, Mr. Robertson.
- "5th. Author of a paper on Zinc Resources of British Columbia, read before the Canadian Mining Institute.
- "6th. First to draw public attention to zinc ore deposits in British Columbia by the publication of comprehensive statement of locations and occurrences. Nelson Daily News regards him as best informed authority on zinc ore deposits.

"The investigation will be extensive and comprehensive. Mr. W. R. Ingalls will visit the zinc districts to obtain such personal view as will enable him to arrive at proper conclusions affecting the development of the zinc industry of British Columbia. In his report he will deal with the economic features of the enquiry and furnish an analysis and summary of the data collected under his direction by his assistants in the field and in the concentration laboratory."

AMERICAN ZINC DUTIES.

In reviewing the zinc situation the Mining Reporter of Denver, Colorado, says:

The past sixty days has witnessed a decided stir in zinc circles. Those interested in the mining and smelting of zinc, have arrayed themselves on opposing sides, and the present indications are that the contentions of both sides will be well supported in a fierce legal battle. It appears that owing to the conflicting sections of the Dingley tariff act, the United States treasury department has been undecided regarding the proper duty to collect on zinc bearing ores imported from Canada. At the time of the framing of the act zinc ores were not as important a factor as at the present time, and owing to the failure to

revise the tariff to meet the exigencies that now arise, zinc ores have been imported at only a nominal duty based on the small amount of lead contained. The attention of the secretary of the treasury was first called to the existing conditions by the Joplin Commercial Club. On its representations the secretary immediately levied a 20 per cent. duty upon British Columbia ores, instead of 1-2 cents per lb. on the lead contained, which is the rate of duty that has been in effect for some years. The ruling naturally stirred up the smelter men who have been importing British Columbia zinc, and they have arrayed themselves against the mining interests and the secretary of the treasury and propose to fight for a restoration of the original duty.

Following the decision of the secretary of the treasury, the price of zinc ores rose approximately \$3 per ton. It is hardly probable that this increase was brought about directly by the secretary's ruling, inasmuch as zinc has been commanding an increased price for almost a year and unless speculation has been occasioned by the ruling, the most probable cause for the rise in the price of zinc ores would be an increase in the value of spelter.

Should the mine operators be successful in the suit which they propose bringing to force the levy of a 20 per cent. duty it is undoubtedly true that Canadian zinc will be excluded from the market. This would inflict a heavy blow on a young and promising Canadian industry, but judging from the effects of the analogous circumstances, which appertained to the development of the lead mining industry in British Columbia, the outcome of the present agitation may result in the establishment in Canada of plants for the treatment and manufacture of zinc.

AN IMPORTANT MINING DECISION.

In our last number (p. 27) we referred to an argument in a very important mining case before the Hon. Frank Cechrane, Minister of Lands and Mines for the Province of Ontario. The dispute was between Mr. Dick, representing the Edison Company, and Mr. A. H. Beath, of Sudbury, and involved the ownership of a large area of mining lands. On behalf of Mr. Beath it was claimed that the applications of the Edison Company not having been followed up by compliance with the provisions of the Mines Act, were in the nature of applications and should not be countenanced. On behalf of the Edison Company, it was claimed that as no notice of forfeiture requiring them to comply with the Act had been sent, that the applications should be treated as valid, and being the first application should be granted notwithstanding that the Act was not strictly complied with. It was also contended that Mr. Beath could not comply with the provisions of the Mines Act requiring an affidavit of discovery, inasmuch as to his knowledge mineral had been previously discovered on the property on behalf of the Edison Company.

This decision will form an important precedent, and may be taken as a notice to all concerned that the provisions of the Mines Act will hereafter be more strictly carried out.

The Edison Company were represented on the argument by the Hon. S. H. Blake, K.C., and Mr. Macdonald—Mr. A. H. Beath, in whose favour the decision was rendered, by Mr. J. M. Clark, K.C.

CANADIAN MINERALS AT LIEGE.

Our special correspondent at the Liege Exposition writes:—"Although I have nothing special to report this month, visitors to the Canadian Pavilion are still numerous, and the mineral exhibit continues to attract much attention. This week (August 18th) our exhibit of minerals was visited by the Exposition Jury, and the display received the highest award, the 'Grand Prix.'

"The Congress of Mines and Metallurgy proved very successful, and next month there will be a Congress of Geology, and the first Congress of Radiology."

THE HENDRYX PROCESS AT NELSON.

The Nelson News states that the Hendryx cyanide plant has been successfully tested at the property of the Reliance Gold Mining Company, the values saved being 95 per cent.

The ore is received in a bin at the lower terminal of the aerial tram, 1,700 feet in length. The coarse ore passes over a slanting grizzly, then to a Blake crusher, and then, with the ore that was already fine, passes between rolls, 36 x 14. From the rolls, the crushed ore falls to the feed bin, from which, still by gravity, it is passed into the Chilian mill. There it is reduced to pulp and mixed with a cyanide solution, which passes over amalgamation plates on which nearly 60 per cent. of the gold is saved.

The liquid solution then passes through a series of ten storage settlers, and thence conveyed by launders to the Hendryx agitator. After from six to eight hours in the agitator the remaining gold values are on the plates that are contained in it. In the agitator the solution is continually exposed to the air by the revolution of the propeller, which hastens the separating process.

The solution and the tailings pass from the agitator to a decanter, from the bottom of which the tailings are drawn away to the creek. The then clear solution of cyanide passes to a sump tank, from which by centrifugal pumps, it is returned to the storage settlers, and from there to the original storage tank, so that the same solution is available for use again.

The amount of cyanide required for the process is never more than a pound to a ton of ore, and averages two-fifths of a pound. As the same solution may be used repeatedly, with small additions, and as the cost of cyanide is 23 cents a pound, it may readily be seen that the process is a decided success, economically as well as mechanically.

Mr. S. Lay, the company's superintendent and metallurgist, has increased the sensitiveness of the plates in the agitator by using galvanized plates for the purpose. Dr. Hendryx is making a further improvement by enclosing the plates in a vacuum, covered with a filtering envelope. The vacuum will then draw only the clear solution to the plates and precipitate the gold.

COPPER MARKET SITUATION.

Messrs Henry R. Merton & Co., of London, report:—

The upward movement has again made considerable progress and the price of refined copper stands to-day higher than it did during the rise in 1901. The reason for this is to be found in the unexampled state of the consumption of the metal. When copper was at its high level four years ago, the market was manipulated to a great extent by American operators, who controlled a fairly large stock of unsold material.

At present the market is free from manipulation, and there are no surplus stocks of metal—indeed there is a scarcity of good brands and but a small supply of the cheaper qualities. Production is very large and growing, but consumption is outstripping it, and has absorbed all the accumulations of recent years. There is every prospect of further expansion, especially in the electrical industries, where the electrification of railways and the transmission of power have become potent factors which must be reckoned with in the future.

The enquiry throughout the week has again been very large, and important contracts have been entered into by consumers for forward delivery, whilst fancy prices were paid for metal available between now and October. The Amalgamated Co. have repeatedly raised their price, which is now 15½ cents for November and December delivery: they have but little copper left for these two months and none for earlier delivery. The Calumet & Hecla Co. having sold very largely to home consumers are now in a similar position, whilst the other American producers command scarcely anything more for this year. In Europe the situation is similar.

Messrs. Morrison, Kekewich & Co., of London, write under recent date: Bi-monthly statistics show an increase of 112 tons in stocks and 612 tons in total visible supplies. The position of the market at the moment is one of exceptional strength. Consumption continues at an enormous rate and has completely overtaken production. Consumers have been obliged to buy freely against future requirements, with the result that in most cases producers are sold out until the end of the year. Prevailing conditions point to the employment of immense quantities of copper for years to come, and the scarceness from which we are now suffering can easily develop into a famine.

Messrs. James Lewis & Sons report: Consumers both in the United States and in Europe have at last begun to realize the exceptionally strong position of copper, and the great curtailment of supplies to Europe is now acutely felt. This has resulted in very large transactions for delivery not only over this year, but up to May of 1906.

THE INTRODUCTION OF STEAM SHOVELS IN THE ATLIN DISTRICT.

One of the companies operating in the Atlin district, in British Columbia, The Northern Mines, Limited, recently completed the installation of a steam shovel plant, for placer mining purposes. The plant includes a "Little Giant Special" shovel, with a capacity of 1,000 yards in 10 hours, manufactured by the Vulcan Iron Works, Toledo, Ohio; an auxiliary hoisting plant; 2,000 feet of flume, and 200 feet of sluices. The Atlin "Claim" states that operations have already been successfully initiated.

The shovel has been placed on a stratum of clay cement in a pit excavated for the purpose. The dirt is deposited by the shovel into skips holding 1-4 yards, which are hoisted by the auxiliary plant on a cableway conveyor some 40 feet to the dump box. At the end of the dump box there is a grizzly which cuts out all rock over three inches, from there the gravel travels over 60 feet of block riffles, at the end of this sluice there is another grizzly which cuts out all material over 3-8 of an inch, and the remaining gravel then passes over another 40 feet of sluice to the dump. From the height of the sluices, some 40 feet, there has been provided an ample dump, and the possibility of a block by tailings has been greatly minimized.

During subsequent tests for a 3-hour run some 95 buckets were handled and it is estimated that 800 yards per day can be handled with ease.

OUR LONDON LETTER.

(From a Special Correspondent.)

The London mining market is still in an apathetic condition. Prices, especially in the South African section—which section governs practically every other department—have been falling month by month with monotonous regularity, and although there have been occasional recoveries, prices are very much below the levels current during the last two months of last year. The regrettable part of the whole business is that no matter how low prices fall, the public does not seem to show the slightest inclination to pick up, what are undoubtedly in many cases, on intrinsic merits, really bargains. The political atmosphere throughout the year has been so highly charged that the public are apparently unwilling to venture into such a disturbed area. Canadian mining shares known and dealt in on the London market, are, as your readers are aware, chiefly confined to the remnant of those British Columbian concerns, which were floated in such reckless haste in 1896-8. It is a very attenuated list indeed, and its record since the eclipse of the ill-fated Whitaker-Wright has been a dismal one. Now and again one of the Le Rois moves 1-16 or so, but it can safely be said at the present moment that Canadian mining descriptions generally are very much under a cloud—and the latest developments in question with the Tye Copper Company are likely to

discredit the market still more in the eyes of the English investor. For some time past these shares have been freely offered at material concessions, and the quotation which at one time stood in the neighbourhood of £3, has recently been as low as 15s. Recent events have of course been of an exceedingly disappointing nature, and at the meeting held on the 18th ult. it was speedily apparent that in addition to discouraging mining developments there was dissension on the board. The meeting, in fact, resolved itself into a prolonged squabble between the Loeffler and the Livingston interests. In the end, Mr. Ludwig Loeffler and his friends carried the day, and as a result Messrs. E. B. Livingston and Hodges were not re-elected, Mr. Ludwig Loeffler and Mr. Nicol Brown taking their places. No doubt Mr. Loeffler, by his timely financial assistances, was entitled to ample representation on the board, but his interests are now, of course, paramount, and it will be interesting to see what will happen. Incidentally it may be mentioned that the real trouble seems to have arisen in connection with the formation of a company to acquire the deep level area of the Tyee formation [This supposition is absurd.—Editor C. M. R.]—a concern in which Mr. Livingston and his friends (including Mr. Gardner, the secretary of the Tyee Copper Company) were primarily interested. The formation of this company seems to have deeply offended Mr. Loeffler and his group, and brought the matter to a head. As to the ethical side of the question, it is vain to speculate; the shareholders as a body seem quite unconcerned. Lugubrious as was Mr. Loeffler's attitude at the meeting, it will not be surprising if there is presently a sharp recovery in the price of the shares. Under Teutonic control it may be taken for granted that everything possible will be done to justify such a movement. In the doings of the Colorado and other properties dealt in in the British Columbia market, such as Camp Bird, Stratton's Independence, etc., you will have little or no real interest, but it may be worth stating en passant that these have been well supported of late, whilst special attention is being paid to Mexican and Argentine mining propositions, and it is expected that there is likely to be lively times ahead for both sections.

With regard to the Rossland amalgamation scheme, little has been divulged here, even the shareholders of Le Roi being kept absolutely in the dark as to the developments. The remarks in your editorial columns, from the pen of an evidently well-informed writer, have aroused a good deal of attention, but keen as is the interest taken in the proposal, the effect upon the quotations of the two Le Rois has been practically nil, all one can say is that Le Roi has at times shown a hardening tendency. The days of wild fluctuations in these shares apparently ended with the downfall of the once all-powerful financier who was the medium for introducing the property to the British investor. Ontario properties have dropped out of the lists, and the erstwhile active Klondyke companies are never mentioned now. British Columbia, Ontario, Klondyke, are all out of favour, and until a few of the companies still struggling on can show some return upon the capital invested in them by the public here, there is little chance of any revival in this market. You will remember the recent flotation of the Western Canada Pulp & Paper Co., Limited. This concern has been singularly ill-fated. Its inception was exceedingly prolonged, and it was actually floated at such an inauspicious moment, that the underwriters are said to have had to take up over 50 per cent. of the amount they underwrote. Immediately following upon the allotment of shares legal trouble commenced, "owing to the company having failed"—in the words of the chairman at the recent statutory meeting—"to obey the letter of the law in accending cheques in payment of allotment money." The whole question resolves itself into a fine legal point, and the company was beaten. I am told that a number of shareholders intend to avail themselves of this quibble to get out of the company. On the other hand, the chairman, Mr. W. C. Ward, said that "the large shareholders had come to the rescue," and that by their assistance the company might yet be saved. Apparently, however, the fate of the company—

brought out under excellent auspices, and possessing all the elements of a successful concern—will not be known the beginning of next month. Herewith I send you full particulars and diagrams of the "Phoenix indicating gauge," which is being shortly placed on the market, and concerning which you may care to deal more fully in your columns. I understand that a valuable reference book, the "Mines of the Transvaal," is now in course of revision, and that the new edition will shortly be ready. The British Columbia Development Association seems to be struggling on, but it is, of course, quite a negligible quantity from the market point of view. The Canadian business men have been having a good time here and on the Continent, and it is hoped that good results will follow their visit. In mining circles keen interest still centres in the results attending the use of tube mills in South Africa. Those responsible for their introduction to the stand predict very large economies from their adoption.

MINING MEN AND AFFAIRS.

Mr. W. C. Thomas has been appointed smelter superintendent of the Dominion Copper Company's works at Boundary Falls, B.C.

Mr. F. W. Rolt, of Rossland, has been appointed, it is announced, a director of the Le Roi Mining Company, in place of Mr. Jewel, who has resigned from the board.

Mr. J. L. Stamford, president and managing director of the Northwest Coal & Coke Co., has returned to Nelson, B.C., from a four months' visit to England.

Much regret is expressed at the death of Mr. D. McLaren, which occurred in Montreal on August 25th. Mr. McLaren was president of the J. C. McLaren Belting Company, which was founded by his father in 1856.

According to a report recently published in the Rossland Miner, Mr. A. J. MacMillan retired from the general managership of the Le Roi Mining Company on the 1st September, at the request of the London Board.

Mr. Herman Bellinger, the well-known American metallurgist, who was associated with Mr. James Breen in the erection and operation of the Crofton smelter, V.I., has been retained by the American Smelting & Refining Company as consulting metallurgist.

A Boston financial paper originates the rumor that Mr. Graham Fraser, director of works of the Dominion Iron & Steel Co., at Sydney, is to assume his old position as general manager of the Nova Scotia Steel & Coal Co. We shall be much surprised if this report proves to be true.

Mr. B. C. Wilson, the well-known gold miner of Nova Scotia, and for many years superintendent of the Acadia Powder Company, died suddenly on Saturday, September 1st, at his home in Waverley. Mr. Wilson's first mining experience was gained in California in 1850.

Prof. J. C. Gwillim, of Kingston University, spent the greater part of July and August visiting the mining districts of the Kootenays, British Columbia. Referring to the general conditions there, Prof. Gwillim states that a marked improvement had taken place in the last three or four years.

The new Minister, for the Province of Quebec, of Colonization, Mines and Fisheries, the Hon. J. B. Prevost, recently returned from visiting what is now described as "New Quebec." He is convinced that this region will ere long prove quite as valuable as the new areas opening up in Ontario.

F. H. Sherman, of Frank, Alberta, president of the District Union of the Union Mine Workers of America, has been nominated as the Labour candidate for the Provincial Parliament, from that section. Before Mr. Sherman may accept the nomination, he must first seek the permission of this alien labour organization. Truly a remarkable state of affairs!

Mr. S. Herbert Cox, A.R.S.M., has been appointed Professor of Mining at the Royal School of Mines, South Kensington, London, vacated on the death of Sir Clement

le Neve Foster. Mr. Cox was president of the Institution of Mining & Metallurgy in 1899-1900, and has had a large and varied mining experience in England, France, Spain, Egypt, United States and Canada.

The death occurred at St. John, on August 15th, of Mr. William C. Dick, at one time mechanical superintendent of the Cumberland Railway & Coal Co. The deceased was also for many years prominently identified with the coal mining industry of Nova Scotia. He leaves a widow, two daughters, and three sons, one of whom is Mr. Alex. Dick, general sales agent of the Dominion Coal Co.

Mr. G. O. Buchanan, Inspector under the Lead Bounties Act, was recently interviewed by the Trout Lake Mining Review, and expressed the opinion that more actual mining development was now in progress in British Columbia than has been the case at any previous time. He further remarked that there was now much capital available for mining investment, provided claim owners would show a reasonable disposition in dealing with capitalists.

The Britannia Syndicate is to be congratulated on having secured the services, as smelter manager, of Mr. Thos. Kiddie, who has resigned his position with the Tyece Copper Co., at Ladysmith, to take charge of the Croston works. Mr. Kiddie has established for himself a remarkable record in connection with the operation of the Tyece Copper Co.'s smelter, where a difficult and refractory ore has been treated at a cost which a few years ago would have been deemed impossibly low.

The following firms have expressed their desire to purchase Canadian ores and minerals direct. The demand is chiefly for zinc, chrome, nickel, cobalt, asbestos, mica, phosphate, coal and corundum: Messrs Armand & Co., Paris, desire to purchase copper; M. de Rosenorn, Bordeaux, Canadian phosphate; Edmond Gersenberger, Liege, ferro-silicon, containing 35 per cent. of silica; F. Pradez, Liege, zinc and lead ores; Leon Deugmond, Brussels, mica; D. Carnegie, Hadfield Steel Foundry Co., Sheffield, corundum.

Mr. J. D. Kendall, the well-known mining engineer, London, arrived at Slough Creek, in the Cariboo district, B.C., in August, on a visit of inspection. Shortly after his arrival he cabled the London office that the property is now in first-rate order, the water gradually decreasing, and the difficulty in this respect appears to have been overcome. The average value of the samples taken from the mine are, approximately, \$500 to the square yard. Before returning to England, Mr. Kendall will visit and report on properties in the Kootenays.

Mr. Henry Harris, of the Hall Mining & Smelting Co., Nelson, B.C., received last month a Mexican patent on an improved device for effecting the separation and distribution, through separate outlets, of the matte and slag of a smelting furnace. The advantage of Mr. Harris' invention lies in the fact that the separation which has been effected in the furnace under favorable conditions of heat and quiescence is maintained during the outflow, and that the molten material is maintained at a constant height in the furnace in relation to the tuyeres.

A convention of the Canadian Forestry Association is to be held in Ottawa in January of next year, and it is hoped that delegates representing the mining industry will attend. The matter of the destruction of our forests by the periodical and destructive bush fires is of great moment to the mining interests. During the recent summer, for example, some very destructive fires are reported to have occurred in the Kootenay mining camps, and especially in the Ymir district, where not only much valuable timber, but also mine plant and equipment was destroyed.

Col. G. Porter, R.E., master of the Calcutta Mint, India, paid an official visit to Sudbury during August, in order to ascertain whether arrangements could be made to utilize nickel from these mines for coinage purposes in India. Col. Porter, accompanied by Mr. A. P. Turner, of the Canadian Copper Co., Professor Brown, Major Leckie and others, visited the Gertrude mine, and afterwards the

Creighton property. On returning to Copper Cliff, Col. Porter and the party were entertained at lunch by Mr. Turner. Before leaving for Toronto he also visited the Victoria mines, got over the plant there in company with the manager, Mr. Hickson.

Dr. Goodwin, of Kingston, who has recently spent some weeks in the Temiskaming silver region, like many of his confreres, is most enthusiastic regarding the prospects of this new territory, which has already made a most extraordinarily good showing. In an interview, he is reported to have said:—"The best feature of the Temiskaming silver district is that most of the discoveries have been made by Canadians, and they have retained possession of the property. Very few sales are recorded. The men who discover the mineral find that they need no capital to develop their properties. Already prospectors are looking with longing eyes at the timber limits to the south of the district, and where prospecting is forbidden. It is believed that the Government may arrange to throw the northern triangle of these limits open.

At a recent meeting of the Transvaal Chamber of Mines, a Mr. Chaplin gave some interesting figures as to the comparative costs of coolie versus Kafir labour. The non-recoverable cost of the importation of each coolie is given at \$85, of which \$55 was already charged, while \$30 would be required for repatriation, against which the cost of recruiting a Kafir is about \$20. Reckoning the Kafir to stay on an average of 15 months, and the irrecoverable cost to be \$16 per native per annum, the cost for three years would be \$47 per Kafir, as against \$85 per coolie. Fortunately, there appears to be good reason to believe that the continuity of employment ensured by the three years' contract, and the gradually increasing efficiency of the coolie would in the end compensate the companies for the extra expenditure incurred at the time of importation—an expense which was obviously impossible for all companies to face.

At the Sixteenth International Congress of Miners, which began its sittings at Liege, on August 18th, a resolution was passed in favour of limiting work in mines to eight hours. This resolution, which included surface workers in the eight hour restriction, was carried, the Northumberland and Durham delegates alone voting against it. The following resolution was carried unanimously:—"The Sixteenth International Congress of Miners, assembled at Liege, unanimously resolves that, in the interests of the workers of the world, all international questions should be settled by arbitration." A further resolution was also adopted to the effect that the Congress expressed its warmest sympathy with the Russian workers in their struggles for industrial freedom, and wished them complete success. Other resolutions dealt with the establishment of a minimum wage by law, and frequent mines inspections by workmen inspectors, elected by the workers and paid by the state.

Mr. J. W. Broomhead, a well known mining authority, writing in the London Financial Times, refers as follows to dredging operations in British Columbia: "Dredging for gold in British Columbia has not been a commercial success, notwithstanding all the efforts to overcome difficulties. Many of the propositions started have had ground of payable value, free from snags or embedded trees, boulders or hard clay cement, a good bed for dredging and gold not too fine to be easily recovered. The difficulty has mainly been mechanical, and in cases the dredges have been of too weak construction to stand the work, necessitating frequent stoppages for repairs. An occasional boulder in dredging is easily overcome if there is sufficient room for the dredge to work below, so as to undermine it, when it can be toppled over and the ground dredged over the site of the boulder, when more gold may be expected; but the difficulty comes in when boulders lie too closely together for the dredge to work between them."

Mr. H. E. T. Haultain recently arrived from Arizona to assume the managership of the Canada Corundum Co.'s works at Craigmount, Renfrew County, Ont. Mr. Haultain

graduated from the School of Practical Science, Toronto, as a gold medallist, in 1889, and after two years of post-graduate work at Frieberg, Germany, where he specialized in mining engineering, he became manager of the St. Mauritius tin mines, of Bohemia, where he built and operated a second plant for the company. Thence he went to the Rand, where he designed three stamp mills. On the outbreak of the war he returned to Canada and was appointed manager of the Yellowstone mine in British Columbia, and afterwards of the Arlington. In 1903, on the formation of the Federal Mining and Smelting Company, he was employed to take general charge of the different mills of this corporation, the aggregate capacity of whose mills is nearly 3,000 tons daily. Since then he has been travelling in Idaho, South Dakota, Colorado, Nevada and Arizona, studying the methods of concentration in these states.

NEW BOOKS AND PUBLICATIONS.

The Copper Handbook. Vol. v, 1905. Royal octavo, 882 pp. \$5; in full library morocco, \$7.50; Horace J. Stevens, Houghton, Michigan, U.S.A.

The fifth annual edition of the Copper Handbook contains 16 chapters, devoted to the history, uses, terminology, geology, geography, chemistry, mineralogy, finances and statistics of copper. The major part of the book is occupied by the chapter devoted to detailed descriptions of the copper mines of the world, 3,849 in number. These descriptions range from two lines to twelve pages each, according to importance of the property. In the five years of its issue, the Copper Handbook has grown from a strictly local publication, the first issue having been devoted exclusively to Lake Superior mines, to a standard reference book on copper production.

Digest of Evidence Given Before the Royal Commission on Coal Supplies, 1901-1905. (in three volumes). Vol. I. London: The Chichester Press, 30 and 31 Furnival Street, Holborn, E.C.

This comprehensive work, as the title implies, is a digest of the evidence given before the British Royal Commission on Coal Supplies, reprinted from the Colliery Guardian, the matter being re-arranged and classified under separate heads, thus rendering the evidence more readily accessible. The present volume deals with the working of the seams, limit of depth in mining, waste in working and coal-cutting by machinery.

The Copper Mines of Lake Superior, written by the late editor of the Engineering & Mining Journal, Mr. T. A. Rickard, is a fresh presentation, in admirable form, of many facts concerning the most wonderful copper-producing district in the world. Mr. Rickard is blessed with a facile pen, and his natural wealth of expression leads one to believe that had he chosen Belles Lettres for his profession instead of mining, he would have reached in literature a position equivalently high to that which he occupies in mining. The book, which contains 164 pages, details the history, methods of exploitation, geological conditions and methods of ore treatment of the copper mines of the Keweenaw peninsula.

While figures are apt to create an exceeding weariness, the recital of Mr. Rickard's figures is accompanied with no such feeling. The "style" is good, and we can recall no similar amount of instruction which was imparted so pleasantly. The second chapter, on "Geology," is a brief epitome of the works of Van Hise, Pumpelly, Irving, et al., and is a clear exposition of the subject. The third, fourth and fifth chapters are historical, and the fourth, which somewhat details the history of the Calumet and Hecla property, is not only instructive but most entertaining.

The chapter on mining methods suffers from condensation, and could very profitably have occupied three times the space, while Mr. Rickard's criticism that the lodes are not subject to accurate sampling methods, is attached to a chapter on "Exploration."

Chapter four deals with milling methods, and is a fair criticism of the existing forms, whether the new Champion mill will remedy the error of the older mills, and its methods be applicable to some of the Calumet rock, is problematical. Mr. Rickard might have said more of the loss in the tailings of the Calumet and Tamarack had he been permitted access to these properties.

The book is strongly recommended to all who are interested in copper, or who enjoy reading good English, clearly expressed.

Cements, Limes and Plasters: Their Materials, Manufacture and Properties. By Edwin C. Eckel, C.E. First edition, 8vo, cloth. New York: John Wiley & Sons. London: Chapman & Hall, Limited, 1905. Price \$6.00.

PIG IRON PRODUCTION IN CANADA.

Statistics of the production of pig iron in Canada during the first six months of 1905 show a large increase as compared with corresponding periods during 1904. This is shown by the following table:—

	1904.		1905.
	First Half.	Second Half.	First Half.
Coke	111,840	139,831	188,541
Charcoal	8,803	10,468	21,665
Total	120,643	150,299	210,206

The Canadian production of pig iron in the first half of 1905 was the greatest in any half year in the history of the Dominion, exceeding by 48,453 tons that of the last half of 1902, the next highest half year, when 161,753 tons were made. It was also greater than the production of any whole year prior to 1901. Down to that year the production of pig iron in Canada never amounted to 100,000 tons in any calendar year.

The production of Bessemer pig iron in the first half of 1905 amounted to 63,785 tons. There was no production of Bessemer pig iron in the first half of 1904, and only 26,016 tons were made in the second half of that year. The production of basic pig iron in the first half of 1905 amounted to 68,378 tons, against 28,981 tons in the first half of 1904 and 41,152 tons in the second half.

The unsold pig iron held by Canadian manufacturers on June 30, 1905, none of which was intended for their own consumption, amounted to 35,629 gross tons, as compared with 35,119 tons on December 31, 1904, and 36,868 tons on June 30, 1904. Of the unsold stocks on June 30, 1905, a little less than 6,500 tons were made with charcoal, the remainder being coke iron.

On June 30, 1905, Canada had 16 completed blast furnaces, of which 11 were in blast and five were idle. Of this total, 11 were equipped to use coke and five to use charcoal.

During the first half of 1905 the total number of furnaces in Canada actually in blast for the whole or a part of the period was 13, of which eight used coke and five used charcoal.

The Dominion Iron & Steel Co., Limited, of Sydney, N.S., had two of its four coke furnaces in blast on June 30. One of the idle furnaces is to resume about October 1.

The Nova Scotia Steel & Coal Co., Limited, of New Glasgow, N.S., operated its new furnaces at Sydney Mines, Cape Breton, for 180 days during the first half of 1905 and was running it on June 30. The company has virtually abandoned its Ferrona Furnace, at Ferrona.

Messrs. John McDougall & Co., of Montreal, had one of their two charcoal furnaces at Drummondville in operation on June 30. During the first half of the year both furnaces were running, one for 112 and the other for 49 days. The idle furnace may resume next winter.

The Algoma Steel Co., Limited, of Sault Ste. Marie, Ont., blew in its No. 1 furnace (charcoal) for the first time on March 1, 1905, and it was running on June 30. Its No. 2 furnace (coke) was in operation during the whole

of the first half of 1905. The construction of furnaces Nos. 3 and 4 (coke) was not resumed in 1905.

The Deseronto Iron Co., Limited, of Deseronto, Ont., operated its furnace on charcoal for 181 days during the first half of 1905, and it was running on June 30.

The Hamilton Steel & Iron Co., Limited, of Hamilton, Ont., was operating its furnace on June 30. It ran for 150 days in the first half of 1905 on basic and foundry pig iron.

The Canada Iron Furnace Co., Limited, of Montreal, had its Radnor and Midland furnaces in operation on June 30. Radnor (charcoal) ran for 113 days and Midland (coke) for 167 days during the first half of the year. Bessemer pig iron was chiefly made at Midland.

The Northern Iron & Steel Co., Limited, of Collingwood, Ont., did no work whatever in the first half of 1905 on the furnace for which excavations were made in 1902, but upon which work was suspended in 1903.

The Atikokan Iron Co., Limited, of Port Arthur, Ont., broke ground early in August for its new blast furnace at Port Arthur. It will be 75 by 15 feet, will be equipped with 3 Roberts stoves, will use magnetic iron ore from the Atikokan range, which is located about 130 miles west of Port Arthur, and will have an annual capacity of about 30,000 tons of foundry and Bessemer pig iron. Coke will be made in ovens near the furnace. The officers are: Mr. D. D. Mann, president; Mr. J. C. Hunter, vice-president; Mr. Hugh Sutherland, secretary and treasurer; and Mr. Robert R. Jones, general manager.

CANADIAN MINING STATISTICS.

Lead production in British Columbia for the fiscal year 1904-5, ending June 30th, upon which the Government bounty was paid, aggregated 55,704,534 lbs., \$336,886 having been paid thereon in the form of bounties to producers.

Preliminary reports received by the Department of Mines, Victoria, B.C., from Atlin, are to the effect that the output from this district for the season will exceed the returns of 1904. The estimated yield for the year is valued at between \$600,000 and \$700,000.

The returns of the Hall Mine smelter, Nelson, B.C., for the month of July, were:—

Ore	6,177,107 lbs.
Lead	2,647,740 lbs.
Of the Trail smelter:—	
Ore (net weight)	2,517,821 lbs.
Lead	1,320,090 lbs.

Intelligence from Atlin, B.C., is to the effect that the output made, so far, from that district is valued approximately at \$300,000, while the season will probably not close for another 10 weeks.

The tonnage of ore produced from the Rossland mines, to the end of August, is, in round figures, placed at 220,000 tons. Of this, the Le Roi has output 80,000 tons, the Centre Star 65,000 tons, and the War Eagle 45,000 tons.

The Ontario Bureau of Mines has issued a bulletin showing the total value of the output of the metalliferous mines and works of the province for the first six months of the present year, as follows:—

	Quantity.	Value.
Gold, oz.	2,931	\$ 25,093
Silver, oz.	1,128,212	595,974
Nickel, tons	4,671	1,638,040
Copper, tons	2,256	335,637
Cobalt, tons	65	80,560
Iron ore, tons	113,583	274,224
Pig iron, tons	116,794	1,510,197
Steel, tons	64,527	2,070,003
		<u>\$6,529,728</u>

Practically all the silver, all the cobalt and thirty-two tons of the nickel was produced from the mines in Cole-

man Township. The metals produced from these mines were:—

	Quantity.	Value.
Silver, oz.	1,121,762	\$592,749
Cobalt, tons	65	80,500
Nickel, tons	32	8,987
Arsenic, tons	281	2,583
		<u>\$684,819</u>

The quantity of ore shipped from these deposits during the half-year was 891 tons, so that the average value realized for the ore as shipped was \$768.66 per ton. The average contents of the shipments were 31 per cent. arsenic, 3.6 per cent. nickel, 7.3 per cent. cobalt, and 1,257 ounces of silver per ton.

Shipments from the Boundary district, B.C., for the seven months ending July 31st, were as follows:—

	Tons.
January	68,074
February	72,671
March	90,047
April	80,102
May	80,044
June	67,255
July	69,681

Seven months 527,874

The chief producers in this district are: The Granby, which contributed over 300,000 tons; the B. C. Copper Co., about 90,000 tons; and the Montreal & Boston, 43,000 tons to the total result for the period mentioned.

NEWFOUNDLAND COAL.

Commenting on the Seventh Annual Report of the Geological Survey of Newfoundland, which was noted somewhat extensively in the Review some months ago, the Colliery Guardian remarks:

"There are in Newfoundland, as well as in Cape Breton, such rich mines that, if the Crown would but grant leave to work them, their produce would be sufficient to supply all Europe and America abundantly with this commodity, and some are even so commodiously situated that coals might be thrown directly from the coalworks themselves into the ships as they lie close to the shore."

"I had this intelligence," wrote Dr John Reinhold Foster in 1786, "from my late friend, the great circumnavigator, Captain Cook, who for several years successively explored the shores of Newfoundland."

It is a remarkable fact that, although Captain Cook's statement has been corroborated on many occasions since that time, to-day the position of Newfoundland as a coal producer marks a striking contrast to Cape Breton, with its flourishing collieries and important iron and steel industries. Last year Newfoundland exported no coal, importing about 165,000 tons.

THE SAN FRANCISCO COAL MARKET.

Mr. Bennett H.M. Consul-General at San Francisco, transmits the following statistics of coal imports into San Francisco for the last four years:—

	1904.	1903.	1902.	1901.
	Tons.	Tons.	Tons.	Tons.
British Columbia	335,137	289,890	469,385	438,800
Australia	148,409	276,186	190,859	159,200
United Kingdom	66,330	65,075	77,113	89,200
Other countries	54,245	102,219	7,350	8,400
Total	<u>604,121</u>	<u>733,370</u>	<u>744,707</u>	<u>695,600</u>

The above figures show a heavy decrease in the imports from Australia, caused mainly by coal carriers being unable to find profitable employment on arrival. This has naturally forced shippers to pay higher freight rates on coal from Newcastle, New South Wales, and caused a

marked shrinkage in the quantity delivered. The amount received from British Columbia shows an increase, while the trade with the United Kingdom is about stationary. In addition to the above, 446,951 tons of United States coal were received by sea and rail against 482,184 tons in 1903, showing a decrease in the total receipts at the port of 164,482 tons as compared with the previous year.

THE MONTH IN NOVA SCOTIA.

(From Our Special Correspondent.)

Cumberland County.—The Standard Coal & Railway Co. held an important meeting at Parrsboro this month, at which Mr. Lynn, C.E., submitted a report regarding the company's proposed railway, which was followed by a discussion as to location and routes. Of these, the most favourable appears to be from Maccan to a point about two miles north of Parrsboro, with a branch line to Parrsboro. It is understood that the company will apply for the service of one of the Government core drills.

Inverness County.—Mr. Ira Taylor, of New York, passed through Halifax this month, and left for Margaree in the interests of the Chimney Corner coal areas, and it is probable that the working of those areas will shortly begin. In connection with the mines, it is also proposed to build a line of railway for shipment of coal to the coast.

Cape Breton County.—Work on the I.C.R. extension to Sydney Mines is being pushed forward. The rails are meanwhile laid, and ballasting is now in progress.

Very little work has been done at the gold mines of the province during the month.

The Pictou Development Co., at Renfrew, are carrying on development operations from which good results are to be shortly expected.

Mr Rickard, mining engineer, has arrived in the province, and in company with Mr. Fairabuet, of the Geological Survey, Ottawa, and Mr. D'Arcy Weatherbe, left Halifax on the 15th of June on a visit to the gold districts in the eastern part of the province.

The latest mill returns show the following crushings and yield of gold:—

	Tons.	Oz.	Dwt.	Gr.
Modstock Mill, Stormont	459	89	0	0
Dickson Mill, Stormont	436	151	10	9
Anderson Mill, Lake Catcha.....	10	5	13	9
Mahon Mill, Vogler's Cove.....	200	43	7	19

Some 600 areas have been taken up during August, the larger portion of which have been renewals.

The areas, by districts, are as follows:—

Halifax County.

Cow Bay district	16 areas.
Harrigan Cove district	43 "
Tangier district	39 "
Caribou district	21 "
Montague district	9 "
Ragged Falls district	30 "
Oldham district	24 "
Seraggy Lake district	6 "
Salmon River district	9 "

Guysboro' County.

Stormont district	154 areas.
Miller's Lake district	60 "
Liscomb Mills district	25 "

Lunenburg County.

Blockhouse district	27 areas.
Ovens district	22 "
Leipsigate district	12 "
Gold River district	25 "

Queens County.

Mill Village district	19 areas.
Pleasant River Barriers district	2 "
Fifteen Mile Brook district	12 "
Whiteburn district	20 "

Yarmouth County.

Carleton district
 6 areas. |

Hants County.

Renfrew district
 25 areas. |

ONTARIO MINING INTELLIGENCE.

(From Our Special Correspondent.)

An exhibit of carborundum from the Carborundum Co., of Niagara Falls, was on view at the establishment of Messrs. Rice, Lewis & Co., of Toronto, and attracted much interest.

I am informed that mining operations have been commenced on the iron ore deposits recently acquired by Messrs. Mackenzie & Mann on the line of the Canadian Northern Railway, west of Port Arthur.

The American Smelting and Refining Co. has sent an expert to Northern Ontario to investigate the situation as regards the establishment of a refinery, and Parry Sound, Sudbury, Sault Ste. Marie and other mining centres have been visited.

The Sultana gold mine, on Lake of the Woods, is again producing bullion regularly, which is being shipped through the Imperial Bank. This mine is controlled by Messrs. J. S. Caldwell, of Winnipeg, and D. C. Cameron, of Rat Portage.

The Hon. J. P. Whitney, Premier of Ontario, recently left on a tour through New Ontario, which district he had not previously visited. It is hoped that the Premier will, as a result of his visit, be in a better position to judge as to the policy which the Government should pursue in dealing with the mineral interests of the region.

Corundum Refiners, Limited, had on exhibition at the Toronto National Fair a number of specimens of corundum from their mines at Jewelville, Renfrew County. The company has a force of men at work making roads, cutting timber, etc., but no mining is at present being carried on. When more has been learned of the most economical methods of manufacture, a mill will be erected.

The following mining licenses have been cancelled by the Ontario Department of Lands and Mines for non-payment of dues: License granted May, 1901, to Frederick Baptz. of Sault Ste. Marie, Ontario, and transferred to the Algoma Commercial Co., of lands in the township of Snider; license granted February, 1905, to John E. Hughes, Ernest C. Cotter and George H. Chadeayne, of Buffalo, N.Y., of lands in the township of Faraday; license granted December, 1901, to John McKay and Thos. John Kennedy, of Sault Ste. Marie, and transferred to the Algoma Commercial Co., of lands in the township of Waters.

A large block of land has been purchased at North Bay for the erection of a smelter to treat the cobalt ores, though it is the intention to develop it into one for the treatment of ores in general. North Bay is regarded as a good centre, the more so because there is a prospect of the French River navigation scheme being carried out.

A Mr. Peter, an American millionaire lumber merchant, who owns a large saw mill at Parry Sound and extensive limits in Ontario, as well as in the United States, has acquired a property in the Parry Sound district, and proposes to erect a large refinery and smelter if the Government will extend the Temiskaming and Northern Ontario Railway to Parry Sound. The Government has not announced its intention yet, but Lt.-Col. Matheson, the Provincial Treasurer, is about to proceed to Great Britain to make financial arrangements in connection with the railway, and it may be that provision for extension south as well as north will then be arranged for.

The Hon. Frank Cochrane, Minister of Lands and Mines for Ontario, has given his decision in the dispute between A. H. Beath and the Edison Company respecting the rights to certain nickel lands in Morgan Township, disallowing the claim of the latter. The claim was originally the property, by discovery, of H. Dick, who

transferred to the Edison Co. The regulations require payment within sixty days of one-fourth of the purchase money, and the balance within ninety days. This had not been done, and Mr. Beath, having understood that the property had reverted to the Crown, applied for it and obtained a lease. The Edison Co. put in their claim, holding that they should have received notice of forfeiture. The Hon. Mr. Cochrane holds that this is not required. He also decided against the system of blanketing. The decision, which is an important one, agrees with that formerly given by the Hon. J. J. Foy, and is generally approved of. Mr. Beath therefore retains the property.

GENERAL MINING NEWS.

NOVA SCOTIA.

The following companies will probably be amalgamated at Cheticamp: The Cheticamp Copper Co., the Inverness Mining Co., the Inverness Copper Co., and the Richfield Mining Co.

Active operations are about to commence on the iron areas at Torbrook, owned by Messrs. Brookfield and Corbitt, who have granted an option to a syndicate of Montreal and Toronto capitalists.

It is reported on seemingly good authority that the Dominion Iron & Steel Co. is contemplating the erection of several more open hearth furnaces. The present plant comprises ten furnaces, nine of which are in operation, but it is found that their output is not sufficient to supply all the steel required by the blooming mill and the rail and rod mills.

Several cars of fire clay, taken from the deposits recently bonded by Mr. Graham Fraser at Coxheath, are being tested in the Dominion Iron & Steel Co.'s blast furnaces. The clay was loaded on to the cars at Sydney River siding, having been hauled from Coxheath in carts. It is said that Mr. Fraser has bonded the farm on which the deposits are located for \$12,000.—Sydney Mines Star.

The Dominion Iron & Steel Company recently completed the new plant at Wabana, Belle Isle, Newfoundland, providing for increased haulage and shipping facilities. The output at Wabana during July was the largest in the history of these mines, 75,000 tons of ore having been mined and shipped during this period. Meanwhile operations are being made to extend the development of the company's property. It may here be noted that this company has contracted to supply immediately to the Dominion Government 25,000 tons of 80-lbs. steel rails for use on the I. C. R.

Advices from Wabana state that excellent progress is also being made at the company's iron mines, where the output has been far in excess of that of former seasons. The company are now mining 1,200 tons a day, besides using the bank which was piled last winter. Of this, about 20,000 tons have been shipped to North Sydney for use at the blast furnaces at Sydney Mines, the balance being sent to Rotterdam, six large steamers being constantly employed in this trade. The company's output has been doubled since the instalment of the new mechanical device at the plant. Shipments for winter use at Sydney Mines commenced on September 1st.

The Mines Exhibit at the Provincial Exhibition, which promises to be an exceptionally interesting one, will be housed in a new building. The Nova Scotia Government will have a large display and in the centre of the building will be exhibits by the Dominion Iron and Steel Company, Nova Scotia Steel and Coal Company (showing both steel and coal), Londonderry Iron Company, the Montreal Pipe Foundry Company, Dominion Coal Company, Intercolonial Coal Mining Company, Acadia Coal Company, Dominion Tar and Chemical Company, Sydney Cement Company, Sydney Coal Company, Cumberland Coal and Railway Company. The dimensions of the mines building are 40 x 80 feet.

The Nova Scotia Steel & Coal Co.'s open hearth plant consists of a battery of three furnaces each with a capacity of forty tons. Provisions have been made for the installation of two additional furnaces, the whole plant, comprising, apart from the furnaces, a fifty-ton mixer, a ladle drying apparatus, gas producing battery, electric cranes, and such accessories, was erected by the company's own employees, and is of the most modern type obtainable. The blast furnace has a capacity of 180 tons, but its entire product will now be utilized in the manufacture of steel. Its type is similar to that of the furnaces of the Dominion Steel Co. The coke plant comprises 150 ovens. This plant is conveniently located near the furnaces as well as the electric power-house and different shops.

QUEBEC.

Messrs. Curtney & Brown, of Ottawa, creditors of the Anglo-Canadian Graphite Syndicate, Ltd., are petitioning for a winding-up order, and in consequence the sale of the Company's property advertised was postponed.

Much interest is taken in a reported discovery of natural gas at Yamachiche, where boring for oil is in progress under the auspices of two different companies. A flow of gas started in one well when drills had reached a depth of 280 feet. Natural gas is used for fuel at St. Genevieve, in this district.

ONTARIO.

The Wabigoon "Star" reports that a cyanide plant has been installed at the Redemer mine.

During August, the office at the Laurentian mine, Gold Rock, was destroyed by fire, the loss being estimated at \$4,000.

The Lake Superior Corporation is again opening up the Josephine iron mines at Michipicoten, under the direction of Prof. A. B. Wilmott.

At the Massey mine about 35 tons of 4½ per cent. copper is being treated by the Elmore plant every 24 hours. The mill is producing from 7½ to 8 tons of concentrates daily, averaging 21 per cent. of copper.

The Coleman & Bucke Consolidated Cobalt-Silver Mining Co., Limited, and the Windsor and Cobalt Mining Co., with capitals of, respectively, \$1,150,000, were incorporated during August to operate in the Temiskaming mining division.

The Government diamond drills are now being employed, one on the iron ore outcroppings in Temagami, the property of Mr. T. B. Caldwell, M.P. and others; drilling is also in progress at Port Colborne on a limestone property.

The Sickerton Oil Company, drilling in Moore Township, near the River St. Clair, recently struck a good flow of oil. This is the second oil well sunk in this new district. It is estimated that the flow is equal to 30 barrels a day.

Work is progressing satisfactorily on the installation of the new plant of the International Graphite Co., at Niagara Falls, and it is expected that operations will be commenced this autumn. As artificial or manufactured graphite is meeting with a very large sale, and the foreign market can be supplied from this new Canadian plant, the prospects of the business are exceedingly good.

At the Big Master mine, in the Manitou district, good progress is being made with development, while the aerial tramway conveying the ore from the shaft to the mill is being put in working order. A new discovery is reported to have been made on the property of the Gold Rock Mining and Milling Co., the ore outcropping near Selby Lake.

One of the questions awaiting settlement on the return of the miner now absent in the Temagami district is the opening of the forest reserves and timber limits for mineral prospecting. The miners as a body are opposed to the imposition of any royalty on lands already opened or held, but suggest that new districts might be opened up and offered to the public on a royalty basis.

The Petrolia Advertiser states that the territory discovered in Moore Township last year was regarded somewhat sceptically by experience operators, but it has since proved very promising. The extent of the oil deposits is not by any means defined, and there is every reason for asserting that oil will be got over a very wide area. The strike near Mooretown, within three miles of the river, must have the effect of stimulating the drilling. The large production of some of the Leamington wells was a strong magnet, and the Detroit papers in particular do much to boom that territory, but the expenses of operating in Moore are so much lighter that it should be found equally as attractive now that its staying powers have been so fully proved.

It is reported that the Carborundum Co., at Niagara Falls, will rebuild the plant which was destroyed by fire some time ago at Niagara Falls, in Canada. Carborundum has grown to be one of the most popular abrasives. With the exception of one year, 1902, there has been a continuous increase from year to year in the production and use of carborundum. In that year the decrease was due to a scarcity of supplies used in the manufacture. Last year the total production was 7,060,380 pounds, which was an increase of 2,300,490 pounds over 1903, when the production was 4,759,890 pounds. To have Ontario once more take part in the manufacture and in supplying the market with such a popular product of the electric furnace will be good industrial progress.

The Petrolia Advertiser makes the following pertinent comment:—"There are those who show a disposition to croak and belittle the chances of striking oil in any new quarters out of the ordinary, and it is this class of people who do a community like ours harm. The nature of the oil business is such as to require the advent of new operators constantly to liven matters up and keep up the search actively, and we have heard it said that there are croakers in these parts who do much harm in discouraging those who otherwise would take a hand in the business. In slang parlance they are called 'knockers,' because of the peculiar satisfaction they seem to take out of the practice of knocking the enthusiasm and optimism out of the newcomer. The business is one possessing the element of chance in a high degree, but every passing year demonstrates that there is virgin territory awaiting the work of the operator, and whenever he appears and wants to try his luck he should not be unnecessarily discouraged."

The Copper Mining and Smelting Company of Ontario was incorporated during August with a capital of a million dollars, the following provisional directors being appointed:—Messrs. T. Hayes Sheen and J. Carnegie Williams, of England; R. A. Lyon and F. M. Perry, of Toronto; and J. McPhail, of Sault Ste. Marie. A meeting was immediately held for the purpose of arranging for the transfer of the Bruce Copper Mines, Ltd., to the newly formed company. No stock will be issued in America, as it has all been taken up in England, and the syndicate has decided not to take advantage of the right to issue stock at a discount, as allowed by the Ontario Mining Company's Incorporation Act. An advisory board will be formed in Toronto representing the various interests concerned in the successful operation of the company, who will from time to time advise with the officers and staff in Toronto and the directors in London. The mines have a fairly complete equipment for the handling of 500 tons per day; meanwhile development work will be at once resumed under the charge of the mining engineer, M. Williams. The ore is of a higher grade than that usually found on the north shore. The mines were discovered in 1846, and worked until 1876 by the John Taylor Co., of London, and for a number of years paid satisfactory dividends until the decline in the price of copper.

ALBERTA.

Rapid progress is being made in the construction of the new smelter plant of the Canadian Metals Company, at Frank. The walls of the furnace and main buildings are completed, and the carpenters are placing on the roof.

The boilers and most of the machinery for the powerhouse have arrived, and will be placed in position at once, in order to have them running when the plant is completed. The electric building will be ready for the dynamos by the last of this week. It is the intention of the management to have the plant in running order within a month's time.

A London, Eng., report states that authority has been granted to the Western Canada Cement & Coal Co. to receive applications for £225,000 first-mortgage bonds at par, to be applied in acquiring cement, clay and anthracite coal lands at Kananaski, Alberta, in erecting a Portland cement factory, and for working capital. They besides contemplate the building of 300 to 500 elevators throughout the Northwest, with the latest appliances. Their capital will be \$10,000,000 to \$12,000,000.

BRITISH COLUMBIA.

Coast.—The seventy concentrating tables in the concentrator building at the Britannia mines were given a thorough test on the 28th of August, the results being most satisfactory. The Australian "jig," a concentrating machine of a new type in this country but long used successfully at the Broken Hill mines in Australia, passed through the test in a most satisfactory manner. The capacity of this appliance is three hundred and fifty tons per day.

In addition to the Copper Queen Mine, which is about to be re-opened by Mr. H. Wilde, M.E., of New York, development operations have been resumed on the Loyal; meanwhile the Marble Bay is making regular shipments to the Tacoma smelter.

Mr. W. F. Borland, of Montreal, recently concluded negotiations in Victoria for the purchase of an extensive coal property on Graham Island of the Queen Charlotte group.

Mr. Robinson, managing director of the Britannia Copper Mines, has recently secured an option on the Mount Andrews mineral properties on Prince of Wales Island. The ore is said to be red hematite, carrying copper and gold in relatively small values, but the ores are likely to be useful for fluxing purposes in the treatment of the Britannia ores at Crofton.

Similkameen.—The B.C. Copper Company recently purchased the Apex group of claims, at the head of Keremeos and 16 Mile Creek in this district.

Prospecting has lately been active on One and Five-Mile Creeks, Similkameen. Twenty miles up One-Mile a new strike of gold-bearing rock has been made, and at Five-Mile the Gladstone claim, recently located, has a vein over eight feet wide without either wall being encountered so far, which assays 16.6 per cent. copper and whose total values are \$47.86.

Cariboo.—The Forest Rose Mining Company, owning bench claims and leases on Williams Creek near Barkerville, is being reorganized. The properties have been worked almost continuously since 1864, and have produced over a million and a half dollars in gold. The company declared a dividend this year. The present equipment of the property consists of a 7-inch hydraulic plant and a No. 1 Giant. The Vancouver investors, who are securing the controlling interest, propose equipping the property with a modern hydraulic plant, in readiness for operations next season.

Atlin.—Promising new placer discoveries are reported to have been made in this district on a creek which has been named Lincoln. At a depth of three feet on the discovery claim panning yields from 3 to 4 cents. Bed-rock, it is expected, will be found at a depth of about 20 feet. The creek is situated some 45 miles in a northeasterly direction from Atlin.

The dredge of the Northern Mines, Ltd., on Spruce Creek and the Switzer dredge on Gold Run are both operating with good results, and it is expected that dredging at Blue Canyon, on Spruce, will be started this autumn. Water is plentiful on Pine, Spruce and McKee, but scarce at Birch, and on Boulder. Not only is hydraulic mining

active but there is considerable activity in quartz mining. Many prospectors are doing assessment work, waiting for the enlistment of capital, and their properties are showing up encouragingly.

Lardeau.—A promising strike is reported to have been made on the Crescent, one of the claims of the Mammoth group, in this district, a cross-cut in No. 1 tunnel having exposed 18 inches of exceptionally high grade ore, from which a return of 2,446 oz. of silver was obtained. The Sirdar claim is also showing well. The ore shipped from this property during the winter averaged \$100 to the ton.

The annual general meeting of the Great Northern Mines, Limited, was held at Nelson during August. The following directors were elected: Messrs. W. F. Cochrane, W. B. Pool, W. E. Gosnell, B. Crilly, W. A. Jowett, R. G. Matthews, and F. W. Godsall. Mr. R. Hodge was appointed secretary of the company. In consequence of a change of plant the proposal to promote a subsidiary company to operate the Swede and Lucky Jack claims has been abandoned. Meanwhile, the promoters of this company have offered to relinquish all claim to the shares issued to them over and above the actual cash paid by them for the properties, in shares of 30 cents each, provided such shares are sold and the proceeds used to pay the debts of the company. The shareholders present at the meeting last week have decided to pool all outstanding shares until October 1st, 1906, and request all holders of stock to join in the pool and send in their certificates to the company's secretary.

Developments of the Silver Cup at Ferguson seem to be affording most satisfactory results, another promising strike having recently been made which is said to have uncovered the richest ore ever found on the property, assays giving 300 ozs. in silver and 70 per cent. lead. This find was made at a depth of 700 feet.

Boundary District.—In an interview with the Phoenix Pioneer, Mr. Sam'l Newhouse, managing director of the Dominion Copper Company, Limited, is reported to have said that the company anticipates erecting a new smelter in the Boundary district in the near future, as the plant at Boundary Falls, recently acquired from the Montreal & Boston Co., is not capable of being economically operated. Mr. Newhouse stated that the location of the new works has not yet been decided, but that probably Greenwood or Midway will be selected. Systematic development work has meanwhile been resumed at the Brooklyn, Stemwinder and Rawhide mines, and the company hope ere long to maintain a daily output of 1,000 tons.

A plant, consisting of boiler, hoist and steam drills, has been installed at Helen mine, near Greenwood, and a new two-compartment shaft is being sunk on the property. A new compressor plant is also being installed at the Providence, which is making regular shipments of high-grade oil.

By the recent purchase of adjoining properties, the area of the Granby Co.'s holding at Phoenix has been approximately quadrupled. These properties include the Gold Drop, Gold Drop Addition Fraction, Phillipsburg and Nugget. The properties have been optioned for some months at \$250,000, during which period explorations were carried on by diamond drilling, which are said to have disclosed deposits similar to those already developed on the Knob Hill and Old Ironsides. The company has also bought from the prospectors, Vaughan and McInnes, the No. 13 claim, which is situated between the Granby and Gold Drop groups, for \$14,000.

The British Columbia Copper Co. recently bonded another promising copper prospect on Copper Mountain, east of Cheshaw, Wash. The group includes a number of claims which will be developed under the superintendence of Mr. Harry Johns, who has been identified with mining in the Boundary district for several years past.

It is stated that the new three-compartment shaft at the Granby mines will be completed in about six months, in time for the installation of the extensive head works equipment, for which specifications are now being prepared and tenders invited. Meanwhile the exploration of the 400-foot level is steadily going on with crosscuts and

drifts, and the winze from the 300-foot to the 400-foot level is also being steadily sunk to the 500-foot level, some distance of this incline being already attained.

Rossland.—Arrangements are being made to resume operations at the O. K., the owner, Mr. Jno. Harryman, of Baltimore, having recently visited Rossland with this end in view. The mine is entitled to 100 inches of water in Little Sheep Creek, which is more than the flow during four months of the year. Little Sheep Creek is the main source of the water supply of the Le Roi, Le Roi No. 2, White Bear and Jumbo mines, and consequently, should the O. K. resume operations on a large scale, it is feared more important property will be seriously inconvenienced.

Last month the Cascade Bonanza mines joined the productive class after a lengthy suspension of operations. The properties are now owned by a Philadelphia syndicate.

The lessee of the Crown Point mine has already commenced the shipment of ore from this property.

At a special meeting of the board of directors of the Le Roi Mining Company, held on September 5th, a contract was arranged by which the entire shipping product of the Le Roi mine will be sent to the smelter of the Canadian Smelting Works at Trail.

The Le Roi Company's concentrating mill was closed down during August to admit of the installation of additional machinery, including a set of larger rolls and a Chilean mill.

An extraordinary meeting of the Spitzee Gold Mines, Ltd., was held at Rossland recently to consider the question of levying an assessment of \$1.50 per share to provide funds for the prosecution of systematic development work at the property. The proposal was agreed to on the understanding that no call be made for more than 25 cents per share quarterly. The annual general meeting of the company was held in Rossland on September 7th.

Nelson.—The erection of a concentrator at the Molly Gibson mine, Kokanee Creek, is now contemplated. Prospects at the mine are said to be exceedingly promising.

Shipments are being increased from the Hunter V. mine to the Hall smelter. It is stated that the grade of ore shipped is higher than heretofore, a body of ore carrying high values in silver having recently been opened up.

The Queen mine recently purchased by Mr. W. Waldie for \$50,000, was last month bonded to Messrs. Doyle Bros., of Chicago, for double that sum.

A great deal of damage is being done in the Ymir district by bush fires. At the Dundee mine, the buildings, including the boarding-house, stables, shaft-house and boiler house, were destroyed, while the timbers in the tunnel and shaft of the Yankee Girl were burned through, which resulted in the ground caving in. In addition, of course, much valuable timber was destroyed, and several miles of corduroy.

The Hastings Exploration Syndicate recently declared a dividend of \$15,000, and in celebration of this event the manager, Mr. Leslie Hill, offered the men employed at the Arlington mine a holiday of two days and a half, with full pay, in order to allow them to visit the Nelson Fair. Those, however, who did not wish to attend the fair were allowed to continue work and receive two and a half days' extra pay.

Slocan.—The richest strike of silver ever made in British Columbia is reported to have been encountered at the Ottawa mine. This ore body averages from 3 to 5 feet in width, and the lowest assay return obtained gave 1,600 ozs. to the ton, while others ran as high as 7,480 ozs. The ore is native silver and high-grade sulphide, and was encountered in the No. 5 tunnel.

Another strike is reported to have been made in No. 3 tunnel on the Payne, an ore body assaying 120 ozs. in silver and 65 per cent. lead having been encountered.

The mill at the Jackson mine is now working two shifts and producing 15 tons of zinc concentrates per day. Here, as in the district generally, some difficulty is being experienced on account of water shortage, consequent upon the dry summer.

Two new zinc separators were received at the Kootenay Ore Company's works last month, and are to be installed immediately. These machines were manufactured by the Ding and Electric Zinc Separator Co. of Milwaukee. Shipments of zinc ore will shortly be made to these sampling works by the Jackson and Ruth mines.

Mr. John Keen of Kaslo, acting as agent for a client, purchased last month from the lessees their lease of the Bell Mine in Jackson Basin, afterwards purchasing the property outright from the owners for \$10,000. The property is said to be an exceptionally promising one, containing a good showing of silver, lead and zinc ores.

The Slocan Star continues to make a heavy production of zinc, which recently averaged about 630 tons per month. This ore carries 35 per cent. in zinc and 45 oz. silver. The mill is being operated with double shift.

The California mine, near New Denver, has been acquired by a German syndicate on a working bond covering a period of 16 months. The properties will be operated under the direction of Mr. W. Brenner, in conjunction with the adjacent Molly Hughes group.

East Kootenay.—The output from the Sullivan mine now averages about 140 tons per day, while the mine is also being systematically developed. At the North Star, in this section, prospecting work is now in progress. Shipments from the St. Eugene mine in July aggregated 2,700 tons of concentrates, from which were produced 1,060,072 pounds of lead. The new compressor plant has been successfully installed at the mine, and additional machine drills will shortly be operated. At the Lake Shore the shaft has been sunk to a further distance of 100 feet, and an extensive programme for developing the property is planned.

A group of copper claims, situated north of St. Mary's Lake, known as the Uncle Sam and High Peak, are being extensively developed, and promise well. The vein is said to have an average width of 12 feet, while copper values run from 11 to 38 per cent.

There are said to be some six properties in the Windermere district from which shipments will be made this season. At the "Paradise" development work is in active progress, while at the "Ptarmigan" active operations will be commenced as soon as transportation facilities, which, it is expected, will be afforded by the construction of the Kootenay Central Railway, shall have been provided.

A second stack was blown in last month at the Sullivan smelter at Marysville, thus affording these works a capacity equal to any at present in operation in the Kootenays.

YUKON.

The whole of the Yukon district has felt the scarcity of water this season very severely, and in consequence the gold production is expected to be less than last year. Last month there was one or two heavy rainfalls that assisted matters to some extent, but not sufficiently so to materially affect the outlook. On Gold Bottom there has been much activity recently.

On Dominion Creek many of the operators are using petroleum engines, which appear to be giving very good satisfaction, chiefly as they give less trouble than steam or gasoline, and in the Yukon at least, are found to be more economical, a 10 h.p. engine consuming 15 gallons of oil in 12 hours.

The Conrad Company, at White Horse, is now preparing to construct an aerial tramway at its property at Little Windy Arm. The company has also purchased a group of 14 additional claims, on some of which the surface showings are said to be promising.

THE TROUBLES OF A BRITISH COLUMBIA DREDGING COMPANY.

Legal action has been commenced by some of the shareholders of the Iowa-Lillooet Gold Mining Co. to obtain possession of the assets consisting of dredging leases and a dredge which have been taken over by the mortgagees. The company was formed by Iowa promoters some three or four years ago, and incorporated under the laws of the

Province, with a capital subscribed of \$125,000. The dredge at first was not successfully operated, and at considerable cost was remodelled. In consequence, the company became involved and was obliged to give a mortgage of \$10,000 to the manufacturers of the dredge. Later they got into the hands of a firm of eastern financiers, who took a second mortgage on the property of \$12,000, and then, acquiring the first, proceeded to seize the property. While there is nothing apparently unusual or suspicious in this procedure, some of the shareholders allege that they have secured evidence to prove that the eastern financial firm in question has merely acted in the matter as the agents for other shareholders in the undertaking who have taken these steps to buy in the property at a very cheap rate, and "freeze out" others jointly interested. Application has meanwhile been made for a winding-up order, which has been granted.

COAL MINING NOTES.

NOVA SCOTIA.

Coal production statistics for the first six months of the current year, from Nova Scotia, show a slight falling off as compared with the returns of the corresponding period of 1904, thus: the Dominion Coal Company shipped 1,156,586 tons, as against 1,218,525 tons; Cumberland Railway and Coal Company, 187,675 tons, as against 204,543 tons; Nova Scotia Steel and Coal Company, 196,653 tons, as against 206,376 tons; Inverness Railway and Coal Company, 74,669 tons, as against 56,081 tons; Intercolonial Coal Company, 121,368 tons, as against 88,080 tons; and Acadia Coal Company, 115,291 tons, as against 123,097 tons.

It is expected that the Nova Scotia Steel & Coal Co.'s output for 1905 will be a record achievement. Coal, meanwhile, will be taken, it is thought from the new collieries in a few weeks' time. During August a contract was made with the Montreal Sugar Refinery for 25,000 tons of picked coal as a first consignment.

Shipments from the Cumberland Railway & Coal Co.'s collieries for the month of August were 39,203 tons.

On August 28th a fire broke out at the Dominion Coal Co.'s washing plant, near Port Morien, and before it was extinguished damage to the extent of about \$5,000 had been sustained.

Mr. James Ross, president of the Dominion Coal Co., recently made a detailed inspection of the collieries, in consequence of which it was decided to abandon the south slope in the Dominion No. 6 Colliery, and to operate the Emery seam. The latter mine will be worked on the "long wall" system, which may be very largely adopted in the future working of the collieries. Sinking at Donkinsville to tap the seam was commenced on August 31st, the Emery at this point underlying the Phalen seam at a depth of about 135 feet. The recent resumption of mining on this seam at Reserve also points to the fact that the company intend a vigorous prosecution of the work. The Emery is more variable than the Phalen, running from something over three feet in thickness up to ten feet in the old workings near No. 6 Colliery. The new shaft is being sunk near the north slope of No. 6, and work will be actively prosecuted.

BRITISH COLUMBIA.

Experiments have been recently conducted in Victoria by Prof. T. S. C. Lowe, of California, to ascertain the value of Vancouver Island coal in connection with a new coking process. Prof. Lowe, it is said, is interested in securing a steady supply of coke for use in California smelting and other industries.

A strike which was threatened at the Crow's Nest Pass Coal Co.'s collieries during August was settled by the general superintendent, Mr. Drinnan, in the absence of the general manager, Mr. Lindsay, acceding to the men's demands, which, however, must be confirmed by Mr. Lindsay upon his return. The terms agreed upon were as follows:—

1. That \$3 be paid for the moving of the McGinty and its setting up as at present in use in the Coal Creek mines, with the exception of what is known as the "jig" in use at the Michel colliery, for the moving and setting up of which \$1.50 is to be allowed, and all payments which have been made for the first mentioned McGinty at the rate of \$1.50, to be made up to \$3 from the signing of the original agreement.

2. That blacksmiths (as claimed to be such by the union) be paid at the rate of \$3.50 per day, and all back pay deficient in this respect be made good.

3. That car repairers be paid at the rate of \$3 per day and all deficiencies in back pay be made up.

4. That the tippie engineer at Michel be paid at the rate of \$3 per diem and all deficiencies in back pay be made up.

5. That the erection of cogs be paid according to the length of the timber used in their construction: \$1 for three feet, and 33 1-3 cents per foot for length over that, and back pay made up.

Col. Spear, described as a wealthy coal operator of New York State, has bonded eight sections of coal and oil lands in Southeast Kootenay, immediately north of the Montana boundary, near Sage Creek. It is said that Col. Spear proposes forming a company in Montreal to exploit this property.

The Wellington Colliery Company have commenced the erection of new machine and car shops at Union Bay, Vancouver Island. The main building, which is to be 80 feet square, will be fitted up with up-to-date machinery for repairing locomotives and cars.

Residents of Rossland who are interested in coal and oil licenses in East Kootenay have prepared and signed the following memorial to the chief Commissioner of Lands and Works: We, the undersigned, prospectors and locators of coal and oil claims in south East Kootenay, in that portion thereof known as block 4593, hereby demand that licenses to prospect for coal and oil on the lands respectively located by us for the ensuing year in the ordinary form and not in the form in which certain documents, purporting to be licenses, but which from the decision of Mr. Justice Martin it would seem were not really licenses at all, were issued from your department. And whereas it appears that the issuance of the so-called licenses was ultra vires, we therefore claim that you hold as trustee for us the sum or sums which we have respectively paid to you to cover the fees necessary to procure a license to prospect for coal and oil on the said lands during the last 12 months. And whereas the claims, in respect whereof we demand licenses, were staked by us under the act in force at the time we made our respective locations, the fee payable under the said act being \$50. And whereas the amendment to the said act making the fee for prospecting licenses for coal and oil \$100 in lieu of \$50 was not made retrospective since the passing thereof, We, the undersigned, therefore demand, in addition to licenses for the ensuing 12 months, that you return to us the sum of \$50 per claim paid to you by us in excess of the fee you were legally able to charge, or in the alternative, an undertaking from you to apply the said sum of \$50 per claim in satisfaction of fees for further renewals of the licenses hereby applied for. And further, in view of the statement made by the Hon. R. McBride whilst here some time since, we quite recognize the futility of attempting to proceed against the government, and therefore have decided to contest the title of any person or persons who may stake over the ground for which we claim licenses, and we request that, if possible, you make this a matter of record on your books, by way of caveat.

The output of the Crow's Nest Pass Coal company's mines for the month of July was as follows:

Coal Creek	40,260.06
Michel	23,745.15
Carbonado	9,028.01
Total	73,043.02

ALBERTA.

The West Canadian Collieries Company, near Lille, are now shipping from the No. 1 Colliery some 600 tons of coal daily. The construction of the new tippie was recently completed, and it is said to be one of the largest and best arranged in the district, and capable of handling 2,000 tons a day. The company is now building near the coke ovens a large coal washer. Coke is being manufactured in ovens of the Belgium type, and a daily production of rather over 100 tons is being maintained.

Plans for the proposed new tippie for the Canadian-American Coal & Coke Co.'s colliery at Frank have been completed, and tenders are invited thereon. In addition to the tippie, the box-car loader is about to be installed at these mines.

The West Canadian Collieries mine at Bellevue is now producing over 200 tons of coal per day, and is gradually becoming one of the most important producing collieries in the province.

YUKON.

Three Yukon coal mines are now producing regularly, and two or three others may be opened soon. One of the largest producers is at Coal Creek, and is served by twelve miles of railway, on which the coal is hauled to the Yukon, a few miles below Forty-Mile, and there transferred by boats for Dawson. The Dawson Electric Light and Power Company consumes the greater part of this coal. On the Upper River the Tantalus mine is the most important producing property, most of whose output is consumed by the White Pass Railway on the river steamers. Several promising coal seams have also been located near by. Preparations are being made by a syndicate to open coal properties on Roy Creek below Forty-Mile, where some excellent coal is said to have been found, and for some time past a mine has been worked at State Creek, and the product shipped to Dawson for local requirements.

COMPANY MEETINGS.

The Cariboo Consolidated, Ltd.—A meeting of the shareholders of this company was held in London last month. The chairman, Sir James Bevan Edwards, said that considerable progress had been made in the development of the company's Lightning Creek property. A cablegram had been received from one of the directors at present visiting the mine, conveying certain recommendations for the future and when these were carried out the mine would become dividend-paying.

Britannia Copper Syndicate, Limited (B.C.).—A meeting of this syndicate was held in Vancouver, on August 14th, when the following resolutions to increase the capital stock of the company were unanimously carried:—

That the capital of the company be increased to \$937,500 by the creation of 1,000 additional ordinary shares of \$312.50 each, ranking for dividend and in all other respects *pari passu* with the existing ordinary shares of the company when and so soon as such existing shares have been subdivided into shares of \$312.50 each.

That the directors be and they are hereby authorized to enter into an agreement with Henry Stern, of New York, for the underwriting of 884 of such new shares at *par*, viz.:—\$312.50, subject to a commission of 10 per cent. in cash upon all shares unsubscribed for by the shareholders, provided the said Henry Stern will have the opportunity of subscribing for additional shares at *par* to the amount of such cash commission, and provided that notwithstanding such agreement and as a term thereof, the said 884 new shares shall be first offered to the members at *par* in the proportion to the existing shares of \$625 held by them, such offer to be open for a period of twenty days from the date of such offer.

The chairman, the Hon. E. Dewdney, referring to the position of affairs at the mine, said that the plant is now

practically complete, the tramway being in working order, while some 2,000 tons of ore are now in the bins, a daily output of 100 tons a day being maintained from the mine. It is proposed to enlarge the Crofton smelter to treat 1,000 tons daily, and reverberatory furnaces and Edwards reasters would be added to the plant. In addition, the Anaconda type of briquetting machine for handling the fine concentrates was about to be installed. It is expected that the plant will be in readiness to commence operations early in October; meanwhile Mr. Geo. H. Robinson, managing director, has succeeded in securing the tonnage of the Mount Andrews group of mines, Prince of Wales Island, for this smelter.

Hastings (British Columbia) Exploration Syndicate.—The directors, in submitting the seventh annual statement of accounts, for the year ending May 31st, 1905, show a balance of cash on hand of £6,572, 19s. 1d. The ore shipped to smelters realized £10,099, 16s. 10d. net after the deduction of freight and treatment. No account has been taken of the value of the ore in bin at the mine. The board has recommended the distribution of a dividend at the rate of 5 per cent., which was payable on the 5th of August.

Following are extracts of the report of Mr. Leslie Hill, the company's local representative and consulting engineer:—

"Arlington Mine.—During the year 1,088 feet of development work was done, consisting of drifts, cross-cuts, raises and winzes, the total cost of which for labour was \$10,324.11, equal to \$6.12 per foot, which compares favourably with previous years.

"During the year 1903-04, I followed up a small streak of high-grade ore which had been exposed above the No. 1 or Main Tunnel, and which assayed well, but was considered too small to work. This streak enlarged and spread, and finally developed most of the ore which was shipped during this year. This new ore body extended to within 5 feet of the ore previously mined in the large stope known as the 'Bull-pen,' and was only separated from it by a thin layer of barren slate.

"During the year returns were received from the smelter on 1,128.75 tons of ore, the gross value of the contents being \$66,140.00, and the net smelter returns, after deducting the cost of freight and treatment, and the usual smelter deductions, \$52,700.57. The average gross value was \$58.60 per ton, and the average net smelter value, \$46.70. 112 tons of this ore shipped were taken from the head Arlington workings, the average net smelter value of this ore being \$59.33 per ton, and 1,016 tons were from the Arlington workings, the average net smelter value of which was \$45.30. These values were slightly higher than those obtained last year.

"In addition, a sum of \$1,200.12 was received from the Dominion Government as a bounty on the lead contents of the ore, making a total received from ore of \$53,900.69.

"The total cost of mining and hauling to Erie was \$34,746.08, leaving a gross profit of \$19,154.61, equal to 36.34 per cent. of the net smelter returns.

"The detailed mining costs per ton of sorted ore were as follows:—

	Per ton.
Development (labour)	\$ 9.15
Stoping (labour)	9.04
Sorting and tramming	3.98
Timbering .....	.40
Supplies	2.25
Surface and general expenses, including assaying and surveys	1.93
Hauling to Erie and loading on cars....	2.77
Ore tax .....	.87
Insurance .....	.40
	\$30.79

The cost per ton for development has been increased, owing to the greater amount of development necessitated by the opening up of fresh ground, and the cost per ton

for stoping is greater than that for the previous year, caused chiefly by the extra expense of stoping small high-grade sheets of ore in the Head Arlington. The total cost per ton of sorted ore is 20 cents higher than in the previous year; the average net smelter value, however, was greater by \$2.38 per ton, which is further increased by \$1.06 per ton lead bounty, making a total increase of value per ton of \$3.44.

"The total quantities of rock mined and of ore shipped would be in proportions of eleven to one, and the cost of mining, tramming, sorting and timbering, including supplies, would be \$2.25 per ton of rock mined.

"The above costs include all the expenses incurred at the mine, and in connection with mining and shipping, but do not include the expense of the Nelson office and of the general manager.

"The development of this new ground on the 770 feet north level is of very great importance to the future of the mine, as it opens up large possibilities. There is a large block of ground belonging to the company lying to the north of the present workings, and if the vein carries ore throughout the ground lying between the present stopes and the old Micawber workings, it will be seen that there is a large area of the vein to be developed. The ore shoots now exposed are narrow, but more continuous than in the portion of the vein already stoped. It is impossible to give any estimate of the quantity of ore in sight; the shoots are only exposed on one side, and also they generally turn out more ore in stoping than the exposed side would indicate, but there is more ore now exposed than at any previous time during my management, and there is a large block of ground in which it would be reasonable to expect development to find fresh ore shoots.

"The Head Arlington workings, while worked by the company, have turned out 112,113 tons of ore, which realized net smelter returns of \$6,652.00, and the total amount expended on these workings has been \$4,225.50. The vein as shown in these workings is very difficult to understand. The ore shoots have been dipping at a much greater angle than the regular dip of the vein. The streak of ore has usually been very narrow, but the ore has been high-grade. The ore shoot which we have been following has been stoped out, and I have not been able to connect it with the other vein worked by Muffett during his lease. From the present development it would appear that it is a spur or slip that we have been following, and in which we have found the ore shoots, and I believe that the main vein continues on the other side of the porphyry dyke which cut it off. I am in hopes that the seam which we are now following will prove to be the main vein."

With regard to the East Kootenay and other mineral claims, Mr. Hill advises as follows:—

"No work has been done during the year on your mineral claims in East Kootenay, or on the 'Sunlight' fraction mineral claim in the Slocan district. With regard to the claims in East Kootenay, I am informed that the North Star Mining Company is now doing development work on its claim called the 'Midnight.' This is the most northerly of their claims, and adjoins your claims 'Melton' fraction and 'Big Chief.' Some ore has been shipped from the 'Midnight' claim, and some float ore has been found in the wash on your claims, and any ore body developed in the 'Midnight' will increase the value of your claims. The smelter at Marysville is now in operation, and treating ore from the Sullivan group, which adjoins your property on the other side."

Elk River Coal & Oil Company.—The annual general meeting of the Elk River Coal & Oil Company was held in Fernie last month. The president, Mr. W. A. Bleasdel, presented a report of the directors, which showed the company to be in a strong financial position. The company own 45 coal claims in the Upper Elk Valley, which are now being developed. The following directors were elected for the ensuing year: Messrs. W. A. Bleasdel (president), J. R. Lawry (vice-president), Chas. Klingensmith, and W. S. Fairfield. The latter was re-elected secretary-treasurer.

COMPANY NOTES.

Tyee Copper.—The report for July states:—"Smelter ran 11 days, and smelted Tyee ore, 1,793 tons; Customs ore, 262 tons—2,955 tons. Matte produced from same, 277 tons. Gross value of contents (copper, silver and gold) after deducting cost of refining and purchase of Customs ore, \$31,472."

Ymir.—The last report by cable to the London office, from the manager, states that conditions are generally improved on levels 5 and 7, where payable ore is being mined. 20 stamps ran 31 days, and crushed 1,700 tons (2,000 lbs.) of ore, producing 321 ozs. bullion. The estimated realizable value (gross) of the product is \$3,150. 153 tons of concentrates, shipped; gross estimated value, \$3,700. Cyanide plant treated 1,330 tons (2,000 lbs.) of tailings, producing bullion having estimated gross value of \$1,325. Sundry revenue, \$45—\$8,220. Working expenses, \$8,035; profit, \$185. There has been expended during month on development, \$2,942."

Le Roi.—Cable from Rosslund:—"Shipped from the mine to Northport during the past month 8,575 tons of ore, containing 2,954 ozs. of gold, 2,885 ozs. of silver, and 174,000 lbs. of copper. Estimated profit on this ore after deducting cost of mining, smelting realization and depreciation, \$9,000. Expenditure on development work during the month, \$10,250. Shipped from the concentrator to Northport, 116 tons of concentrates of an estimated value of \$1,850."

Le Roi No. 2.—The mine manager cabled for July:—"Shipped 280 tons. The net receipts are \$4,294, being payment for 197 tons shipped, and \$2,213, being payment for 60 tons concentrates shipped. In all, \$6,507."

Hastings Exploration.—The report of the Hastings (British Columbia) Exploration Syndicate, Limited, for the year ended May 31st 1905, states that the balance of cash on hand at the bank in London and Nelson amounts to £6,573. Administration expenditure shows no material increase, but £461 more has been spent on development work, as compared with the previous year. The ore shipped to smelters realized £10,099 net—that is, after deduction of freight and treatment. No account has been taken of the value of the ore in bin at the mine. The directors recommend a dividend of 5 per cent., equal to 1s. per share.

Shipments and returns for the months of June and July from the Arlington mine were as follows:—

	Shipments.	Net Smelter Returns.	Expenses.
June	118.8 tons	\$4,701.12	\$4,249.27
July	63.18 "	2,997.35	3,688.31
	175. "	\$7,698.47	\$7,937.58

Temiscamingue.—The Temiscamingue Mining Co., Haileybury, Ont., has been incorporated with a capital of \$100,000, to carry on a mining, milling and reduction business. The provisional directors include: Messrs. C. A. Richardson, St. Catharines, Ont.; J. L. Wheeler, Emporium, Pa., and R. A. Cartwright, Brockport, Pa.

Ontario Cobalt and Silver.—The Ontario Cobalt & Silver Mining Co., Ottawa, has been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include the Hon. Louis Bedell, Goshen, N.Y.; and Messrs. W. A. Allan and J. T. Lévis, Ottawa.

Detroit & Kent Co. Oil and Gas.—The Detroit & Kent County Oil & Gas Co. of Ontario, Limited, a United States incorporation, has been licensed to produce oil, gas, etc., and to manufacture drilling machinery, etc., in Ontario, with a capital of \$40,000. Mr. William Jackson, Osborne P.O., Ont., is the company's attorney.

Port Arthur Iron.—The Port Arthur Iron Mines, Toronto, has been incorporated with a capital of \$500,000, to carry on a mining, milling, and reduction business. The provisional directors include Messrs. W. H. Moore, G. G. Ruel, and F. C. Annesley, Toronto.

Buffalo.—The Buffalo Mining Co., of Fort Eric, Ont., has been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include Messrs. C. L. Denison, R. W. Pomery and G. C. Miller, Buffalo, N.Y.

Sucker Creek Gas and Oil.—The Sucker Creek Gas and Oil Co., of Anderdon, Limited, Amherstburg, Ont., has been incorporated with a capital of \$250,000, to bore and drill for oil petroleum, natural gas, etc., and to carry on a mining, milling and reduction business. The provisional directors include Messrs. John G. Mullen, W. H. McEvoy, and J. A. Auld, Amherstburg.

MINING AND INDUSTRIAL SHARE MARKET.

(Specially Reported by Messrs. Robert Meredith & Co., Montreal.)

There is very little change in the market for mining stocks since our last report. The low-priced shares are in demand, but it is impossible to procure any large amounts. The improved outlook has encouraged holders to wait for better prices, and it is only occasionally some few shares find their way into the market.

The encouraging reports from the large Rosslund properties have created a demand for the shares of the contiguous smaller ones, but it is almost entirely local; for speculation at the mining centres appears to have completely died out.

Trading in industrials is limited, and quotations show very little change during the past month.

Quotations at September 6th were as follows:—

Par value of shares.		Asked.	Bid.
.10	Canadian Gold Fields Syndicate..	.05	.04
1.00	Centre Star..	.35	.30
1.00	Deer Trail Consolidated ..	.01½	—
1.00	Giant..	.03½	—
10.00	Granby Consolidated ..	7.25	7.12
10.00	Montreal and Boston ..	—	—
1.00	North Star..	.02	—
1.00	Payne..	—	.02
1.00	Rambler Cariboo..	.20	.15
1.00	Republic..	—	—
1.00	St. Eugene..	.45	.40
1.00	War Eagle..	.20	.18
1.00	White Bear..	.04	.02
100.00	Nova Scotia Steel (common)..	63.00	62.75
100.00	Ditto ditto (preferred)..	—	—
100.00	Dominion Coal (common)..	79.00	78.00
100.00	Ditto ditto (preferred) ..	—	—
100.00	Dominion Iron and Steel (com.)..	23.00	22.00
100.00	Ditto ditto ditto (pfd.)..	72.00	71.50
—	Ditto ditto ditto (bonds)	85.00	84.00

INDUSTRIAL AND MACHINERY NOTES.

The Handy Mining Co., Lardeau, B.C., contemplate installing additional plant at the mine in this district.

The directors of the Eva gold mines, operating at Camborne, B.C., propose installing an additional 10 stamps at the company's mill, subject to the approval of the shareholders, at the annual meeting, which will be held some time this month.

The five-drill compressor plant and other machinery belonging to the City of Spokane mine has been shipped to Ferguson, in the Lardeau, where it is to be used in driving a long tunnel under the Nettie L. mountain for the purpose of developing several properties owned by the Reward company. The City of Spokane mine was closed down in the early part of 1897, and since that

time it has remained idle. The Reward company recently acquired the plant, which is in excellent condition, considering that it has not been used for so long a time.

The Canada Foundry Company, Limited, received, last month, an order from the Western Fuel Co., of Nahaimo, B.C., for two 150 h.p. horizontal tubular boilers.

The equipment of the Betts and Hesperus mines was increased a short time ago by the addition of another power drill.

The Nova Scotia Steel & Coal Co., New Glasgow, N.S., have put in two of Barr's automatic spike machines, manufactured by the Smart-Turner Machine Co., Hamilton, Ont.

The Allis-Chalmers-Bullock, Limited, have introduced a change in the British Columbia branch, which heretofore has been in charge of the agency of the Canadian Fairbanks Co. Recently, however, Mr. G. C. Hinton, of the Hinton Electric Co., was appointed sales manager for British Columbia. Offices have been opened on Seymour Street, Vancouver, and here a complete stock of the Allis-Chalmers-Bullock products will be kept, including rock drills, and rock drill parts and electric and saw mill machinery. Mr. Hinton, though becoming local manager of Allis-Chalmers-Bullock, still retains an interest in the Hinton Electric Co.

Among the recent sales of the Allis-Chalmers-Bullock, Limited, Montreal, are a mining outfit to the Canada Metal Company, Ainsworth, B. C., including one 15 h.p. vertical boiler, one 40 h.p. vertical boiler, two No. 5 Cameron Sinker pumps, one 6 $\frac{1}{4}$ x 8 inch hoisting engine, one 7 x 10 hoisting engine, ore buckets, etc., and to the Souris Coal Mining Co., Bienfait, Assa., one 75 h.p. Lidgerwood hoisting engine of the combined friction drum and brake and reversible link motion type.

A hoisting engine of very heavy design has just been shipped to the Centennial Copper Co. from the Chicago works of the Sullivan Machinery Co. It is of the direct-acting type, and consists of two 36 x 60 inch simple, reversible Corliss engines of the heavy duty type, connected to a straight-faced drum, 15 feet in diameter by 15 feet winding face. The drum is grooved for 1 $\frac{3}{8}$ inch wire rope, and is keyed direct to the engine shaft. The plant is designed to hoist from a vertical depth of 5,000 feet at the rate of 4,000 feet per minute, with a boiler pressure of 150 pounds. The reverse engine is of novel design, and may be operated by either steam or air. The brake mechanism is arranged for steam, hand or gravity operation with independent control in each case. The main throttles are on the cylinders, moved by hand from the engineer's platform, which is elevated to a point higher than the drum. The dial indicators are provided with fast and slow moving pointers. A very sensitive and powerful automatic stop and throttle closing device is another important feature, diminishing the danger of over-winding with the high speed used. This hoist is complete in every detail, being equipped with the latest and most improved auxiliaries.

The plant, business and goodwill of M. Beatty & Sons have been purchased by M. Beatty & Sons, Limited. The new company will be under the same management and control, and continue the manufacture of the same lines of high-grade machinery as heretofore.

DIGEST OF RECENT PATENTS—MINING AND METALLURGICAL.

Specially Reported for the Canadian Mining Review.

794,198.—Process of removing or recovering zinc from ores. William Stewart, Mount Florida, Glasgow, Scotland. A process consisting of pulverizing the ores, mixing therewith bisulphate of an alkali metal and common salt, furnacing at a red heat and thereafter lixiviating or leaching and precipitating the zinc salts.

794,555.—Ore Concentration. Hannibal Scovell, Harlie J. Scovell, Leslie E. Scovell and Wilsie E. Scovell, Galena, Kansas. The combination with a fluid-holding tank, shafts mounted in suitable bearings on said tank, and a set of cams secured on each of the said shafts, one cam near each end of each of said shafts, of a screen suspended in said tank, the forward end of said screen having a sharp upward curve, and the tail portion thereof being slightly upwardly inclined to permit an easy discharge of the waste matter from said screen, a suitable hanger secured to each side of said screen and supported on the cams of the shafts, a cam secured on one of said shafts, and a pitman, one end pivoted to the hangers and the other end provided with a strap adapted to embrace said cam, whereby, when a motion is imparted to the shaft the screen will be given a compound vertical and horizontal motion.

794,272.—Method of reducing Copper Mattes, white-metal and blister-copper in a single furnace. Ralph Baggaley, Pittsburg, Pa. A method which consists in producing a bath by melting mattemaking material in such vessel or chamber producing thereby a low-grade matte, removing slag and adding to the molten bath from time to time ore in small quantities at a time, namely in less quantities than the molten bath, blowing air through the bath, and by the heat thereby developed fusing and fluxing such additions of ore.

794,274.—Dumping Mechanism for Cars. Anton Becker, Chicago, Ill., assignor to Joseph S. Ralston, Chicago, Ill. A car, in combination with load-retaining doors, a shaft adapted to be rotated to operate said doors, two ratchet-wheels upon said shaft, an operating-lever journaled upon said shaft between said ratchet-wheels, pawls on opposite sides of lever, each engaging one of said ratchet-wheels and a mechanical connection between pawls so that they move in unison.

794,255.—Electric Furnace. Cecil Saunders, Cleveland, O. The combination with a horizontal continuous trough forming a hearth, of means for continuously rotating the same, positive and negative electrodes supported on said hearth and adapted to convey current to and from the material thereon, stationary contact-pieces with which said electrodes make temporary contact and connections from said contact-pieces to the source of electricity.

794,876.—Ore or Rock Crusher. Edgar S. Moulten, Central City, Colo. The combination with a casing, of a buffer-block secured thereto, crushing-plates secured to said buffer-block, an eccentric-shaft journaled upon said casing, an oscillating jaw carried by said eccentric shaft, comprising a lever member, a plurality of crushing plates secured thereto upon one side thereof, a removable plate secured to said lever member upon the opposite side to which said plates are secured, a flexible member secured to said casing and connected with said lever member, a revoluble member engaging said plate carried by said lever member, and means for moving said revoluble member and retaining the same in an adjusted position.

795,193.—Treatment of Chromiferous Iron. Harry H. Campbell, Steelton, P. A method which consists in charging the same into a basic Bessemer converter, producing a basic slag, oxidizing the chromium by blowing air through the body of the metal, thereby causing the chromium to become part of the slag, and separating metal and slag.

- 795,007.—Briquetting Machine. Grant W. Rigby, Pittsburgh, Pa. The combination with a machine-frame, a crank-shaft, a reciprocating feed-box provided with mould-recesses therein, reciprocating plungers adapted to enter said mould-recesses, vertically-movable plungers with said feed-box, and means connected to said vertically-movable plungers and engaging with said crank-shaft for operating said vertically-movable plungers to feed and hold the material within said feed-box and between said mould-recesses and said reciprocating plungers to allow said reciprocating plungers to force said material into said mould recesses and compress the same.
- 795,258.—Gas Producer Apparatus. Carleton Ellis, New York, N.Y., assignor to Eldred Process Company, New York, N.Y., a corporation of New York. The combination of a gas-engine, a producer for supplying gas for the operation of the engine, a gas-passage connecting the producer with the engine, means for returning a portion of the products of combustion to the producer, means for cooling said products of combustion, means for admitting air to said producer, and means for the adjustment of the relative proportion of the products of combustion and air.
- 794,736.—Conveyer. Isaac Peabody, St Mary's Canada. A conveyer comprising a frame open at the top and bottom, and having tracks at the bottom of said frame, a series of horizontal brace-rods across the frame, sprocket-wheels on each of said rods, a driving-shaft mounted in adjustable bearings at one end of the frame, driving-sprockets on said shaft, and an endless carrier composed of a plurality of sprocket-chains adapted to co-operate with said sprockets, and spaced across-slats attached to the chains, a portion of said slats being provided with anti-friction-rollers which travel upon said tracks.
- 794,714.—Ore Grinder. Frederick J. Hoyt, Redlands, Cal. The combination with flanged and rotatable discs provided with sectors of radially-adjustable spring-cushioned grinding-faces, of opposed non-rotatable spring-cushioned and radially-adjustable grinding-faces.
- 795,294.—Fuel Briquet, and method of making same. Michael F. McGinnis, Philadelphia, Pa. A method which consists in providing a dry mixture of finely-powdered bituminous coal, plaster-of-paris, coal-ashes, salt, alum; preparing a solution consisting of molasses, water and meal, the residue of linseed-oil; and then combining the said dry mixture and solution and thoroughly mixing for a predetermined time, and then moulding into briquets.
- 795,275.—Process of Manufacturing Portland Cement from Slag. Carl von Forell, Hamburg, Germany, assignor to Henry Edmunds, London, England. A process which consists in forming briquets from a mixture of water-granulated furnace-slag and slag-meal, in roasting said briquets into a rotary-kiln in an oxidizing flame, in adding to said highly-heated slag small quantities of water, in disintegrating and projecting said heated slag against chilled surfaces, and in grinding said treated slag material.
- 795,770.—Coal-Loading Apparatus. John L. Howard, Oakland, Cal. In a coal-loading apparatus, a supply-trunk fitted in the vessel's hold, with its open top reaching to the hatch, said trunk having on one side a vertical series of independently-controllable discharge-gates, controlling the delivery of the coal from the whole of said side, and a controllable discharge-gate in its opposite side disposed as its upper portion to control the delivery from said side as required.
- 795,471.—Ore-Reducing Apparatus. William T. Armstrong, San Jose, Cal. In an apparatus, a tube of uniform diameter threaded at the ends, removable closures for said ends and rendering the tube substantially air-tight, said tube having an inner lining capable of being reduced to a carbonaceous form by heat, a condenser, and a pipe leading from the tube to the condenser, said tube adapted to contain a body of carbon-forming material mixed with ore, and said pipe having the end within the condenser provided with a check-valve to prevent backflow into the tube.
- 795,522.—Conveyer. Albert L. Laubenstein, Ashland, Pa. A conveyer-link comprising a pair of parallel bars, said bars having integral wings projecting from the edges thereof, said wings having laterally-disposed flanges projecting in opposite directions and transversely with respect to said bars, said flanges being in substantial alignment and affording means for attaching bucket.
- 795,923.—Ore-Feeder. Martin Nelson, Kalgoorlie, Western Australia, Australia. An ore-feeder comprising an ore-chute, a rotatively-mounted receiving-table located at the discharge end of said chute, guide-wings for said table secured to the discharge end of the chute and projecting outwardly therefrom abreast of said table, means for intermittently rotating said table, means for adjusting said table toward and away from said wings.
- 795,312.—Apparatus for the Reduction of Iron-Sand, Iron Oxide and other suitable substances. David R. S. Galbraith, Auckland, New Zealand, assignor of one-half to William Stewart, Auckland, New Zealand. An electrical furnace comprising a casement, a furnace-body arranged therein, resistances mounted within the furnace body, interceptors arranged in suitable relation to the resistances, carbon blocks mounted in the casement and projecting into the furnace-body, a cap mounted upon the furnace and provided with a feed-opening, a chambered casement supporting said furnace and first-mentioned casement, said supporting-casement provided with a gas-inlet and a pair of tap-openings, and a receiving vessel mounted in the chamber of the supporting-casement and provided with an inlet and a pair of discharge-openings registering, respectively, with a gas-inlet and tap-openings of the supporting casement.
- 796,338.—Pulverizing-Metals. Hudson Maxim, New York, N.Y. A process which consists in fusing the metal, atomizing the fused metal by the action of a highly-heated gas, cooling the atomized metal by the expansion of a refrigerant and collecting the metallic particles.
- 795,886.—Making Aluminium. Anson G. Betts, Troy, N.Y. A process which consists in electrolyzing a fused aluminium-depositing electrolyte of greater specific gravity than pure aluminium and of less specific gravity than the said aluminium-containing material used, with the alloy as anode and a suitable cathode.
- 796,282.—Method of Converting Matte. Ralph Baggaley, Pittsburg, Pa. A method which consists in distributing a lining of unpacked silicious material over the working area of the interior of the converter, centring the same in place, introducing matte into the converter, and blowing air there-through.

PROVINCE OF QUEBEC

The attention of Miners and Capitalists in the United States
and in Europe is invited to the

GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

**Gold, Silver, Copper, Iron, Asbestos, Mica, Plumbago, Phosphate,
Chromic Iron, Galena, Etc.**

ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY.

**The Mining Law gives absolute security to Title, and has been
specially framed for the encouragement of Mining.**

Mining concessions are divided into three classes:—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.
2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (a) as a mining concession by purchase, or (b) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals*; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein; in concessions for the mining of the inferior metals, those only may be mined for.

*The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals, and ores.

Mining lands are sold on the express condition that the purchaser shall commence bona fide to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands.

(b) Licenses may be obtained from the Commissioner on the following terms:—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100; if the mine is on Crown lands (1) in surveyed territory, \$5 for every 100 acres, and (2) in unsurveyed territory, \$5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine, paying the prices mentioned.

Licenses for mining are of two kinds: Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of \$5 and an annual rental of \$1 per acre. Each license is granted for 200 acres or less, but not for more; is valid for one year, and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

The fullest information will be cheerfully given on application to

THE MINISTER OF LANDS, MINES AND FISHERIES,

PARLIAMENT BUILDINGS, QUEBEC.

Ontario's

Mining

Lands..

THE Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and sulphides; zincblende, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places, and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. Recent discoveries of corundum in Eastern Ontario are believed to be the most extensive in existence.

The output of iron, copper and nickel in 1903 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province salt, petroleum and natural gas are important products.

The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific Railway runs through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,

Commissioner of Lands and Mines.

OR

THOS. W. GIBSON,

Director Bureau of Mines,

Toronto, Ontario.



PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

— AND —

PRECIOUS STONES.

TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.

GOLD AND SILVER.

Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills,

who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

THE HON. W. T. PIPES,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.



DOMINION OF CANADA

SYNOPSIS OF REGULATIONS

For disposal of Minerals on Dominion Lands in Manitoba, the North-West Territories and the Yukon Territory.

COAL.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2,000 pounds shall be collected on the gross output.

QUARTZ.

Persons of eighteen years and over and joint stock companies holding free miner's certificates may obtain entry for a mining location.

A free miner's certificate is granted for one or more years, not exceeding five, upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner, having discovered mineral in place, may locate a claim 1,500 x 1,500 feet by marking out the same with two legal posts, bearing location notices, one at each end on the line of the lode or vein.

The claim shall be recorded within 15 days if located within ten miles of a mining recorder's office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1.00 an acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper, in the Yukon Territory of an area not extending 160 acres.

The patent for a mining location shall provide for the payment of a Royalty of 2½ per cent. of the sales of the products of the location.

PLACER MINING.

Manitoba and the N. W. T., excepting the Yukon Territory.—Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

Dredging in the rivers of Manitoba and the N. W. T., excepting the Yukon Territory.—A free miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental, \$10 per annum for each mile of river leased. Royalty at the rate of two and a half per cent. collected on the output after it exceeds \$10,000.

Department of the Interior.

Ottawa, February, 1904.

DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the river below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100 per mile for first year and \$10 per mile for each subsequent year. Royalty, same as placer mining.

PLACER MINING IN THE YUKON TERRITORY.

Creek, gulch, river and hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end, bearing notices. Entry must be made within ten days, if the claim is within ten miles of mining recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a free miner's certificate.

The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee, \$10. Royalty at the rate of two and one-half per cent. on the value of the gold shipped from the Yukon Territory to be paid to the Comptroller.

No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained on the same creek, gulch or river, by giving notice and paying a fee.

Work must be done on a claim each year to the value of at least \$200.

A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

The boundaries of a claim may be defined absolutely by having a survey made and publishing notices in the Yukon Official Gazette.

PETROLEUM.

All unappropriated Dominion Lands in Manitoba, the North-West Territories and within the Yukon Territory are open to prospecting for petroleum, and the Minister may reserve for an individual or company having machinery on the land to be prospected, an area of 640 acres. Should the prospector discover oil in paying quantities, and satisfactorily establish such discovery, an area not exceeding 640 acres, including the oil well and such other land as may be determined, will be sold to the discoverer at the rate of \$1.00 an acre subject to royalty at such rate as may be specified by order-in-council.

W. W. CORY,
Deputy of the Minister of the Interior.

DEEP DRILLING

makes economical mining and the deepest hole can be drilled at the smallest cost by a

DIAMOND ROCK DRILL

It can cut through 2,500 feet of solid rock in a vertical line. It brings up solid cylinders of rock, showing formation and character.

Made in all capacities, for Hand or Horse-power, Steam or Compressed Air—mounted or unmounted.

You will find lots of information in our new catalogue—may we send it?



AMERICAN DIAMOND ROCK DRILL COMPANY

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HADFIELD'S STEEL FOUNDRY CO. LIMITED SHEFFIELD

Heclon Rock and Ore Breaker

HADFIELD AND JACK'S PATENT

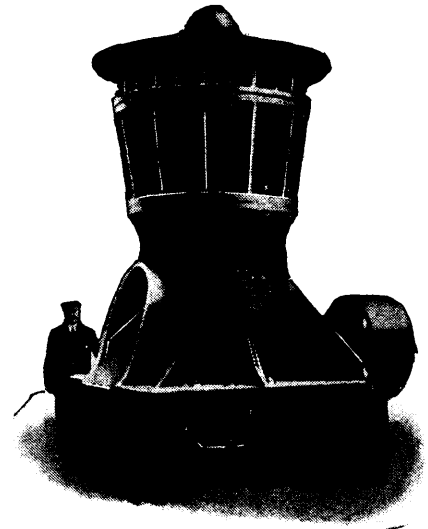
The only Perfect Gyrotory Stone-Crusher

THE PARTS THAT ARE SUBJECT TO EXCESSIVE WEAR ARE MADE OF

Hadfield's Patent "Era" Manganese Steel

WE MANUFACTURE **JAW** BREAKERS, CRUSHING ROLLS,
ELEVATORS, BIN GATES, AND GOLD MINING REQUISITES.

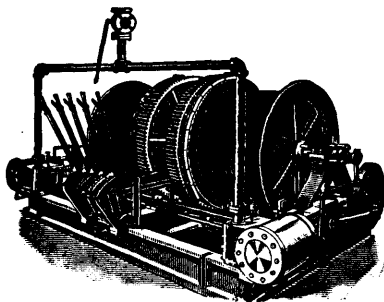
Sole Representatives of the Hadfield Steel Foundry Company, Ltd., Sheffield, for Canada
PEACOCK BROTHERS, Canada Life Building, - Montreal.



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WELLAND, ONTARIO

MANUFACTURERS OF



DREDGES

DERRICKS

SUBMARINE ROCK

DRILLING MACHINERY

CENTRIFUGAL PUMPS

for WATER and SAND

CLAM SHELL BUCKETS

CONCRETE TUBS

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MINE HOISTS

HOISTING ENGINES

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STONE DERRICKS

COAL TUBS

AGENTS:

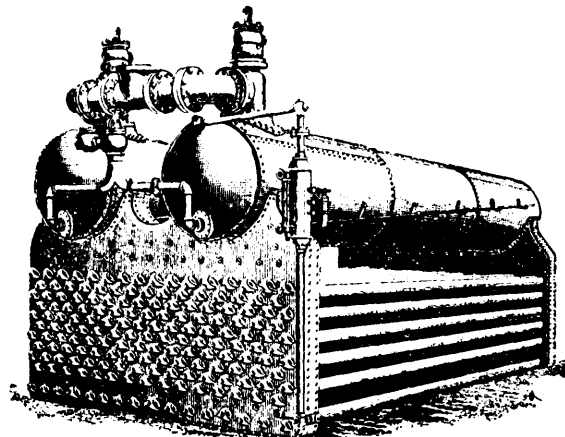
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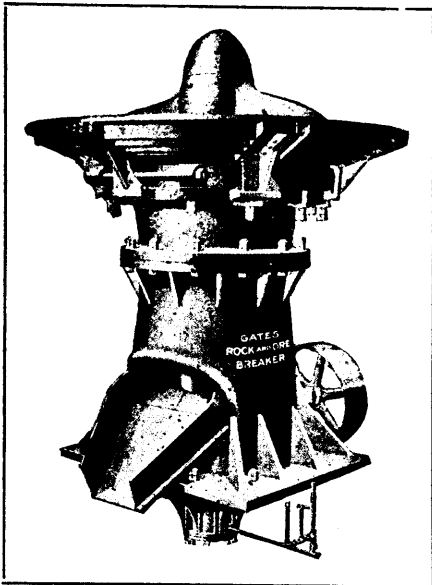
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